DEPARTMENT OF POLITICAL SCIENCE

The environment of conflict

A quantitative analysis of the link between water scarcity, non-state conflict and the quality of government in Africa

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Abstract

Environmental security has been diligently examined in previous research on both subnational and multinational levels and have not found consensus on the contributing factors for why and how environmental conflict occurs. This thesis aims to contribute to this strand of research, more specifically asking if water scarcities effect the number of non-state conflicts in Africa, depending on the quality of governments. The study suggests, that as freshwater resources gradually decreases the number of non-state conflicts increase, however that it is moderated by levels of corruption within governmental institutions. The research question has been examined and answered, utilizing a quantitative regression analysis comparing the change in freshwater resources in African countries, the amount of domestic non-state conflicts and levels of corruption within the time period of 1995-2016. The findings of this study demonstrate that there is no linear correlation between water scarcities and the amount of non-state conflicts in African countries, furthermore levels of corruption do not moderate this. On the other hand, the results have found that where there are water scarcities there is also a greater likelihood of non-state conflicts to occur if the governments of that country suffer high levels of corruption. Finally, this thesis provides a discussion and suggestions for future research on the topic.

Keywords: Freshwater resources, water scarcity, non-state conflict, impartiality, corruption.

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1. Introduction

The Senegal river flows along the border of Senegal and Mauritania, and the agricultural lands and farms located close by thrives and depends on it. Unfortunately, a devastating drought hit the region during the 1980s, and the value of land along the riverbank substantially increased. This resulted in upper-class Moors[1] in Mauritania rewriting property legislation, driving black Mauritanian farmers off of their lands. Water and land conflicts continued to escalate, resulting in two Senegalese farmers being killed in the spring of 1989 by Mauritanian herders. This event sparked ethnic conflicts in both Senegal and Mauritania, resulting in hundreds of deaths, thousands wounded, deported and made homeless (Homer-Dixon, 1994). The Senegal river conflicts, paints the reality of how water scarcity can spark violence, and has not only occurred in the past, but is something that still occurs in Africa today.

Traditionally peace and security studies have mainly focused on military warfare, nuclear weapons and arms control when addressing inter and intra-state conflicts[2]. However, in recent decades researchers have considered additional mechanisms that might aggravate conflicts, such as environmental security[3] (Maystadt & Ecker, 2014; Evans, 2010; Uexkull, 2014; Uexkull et al, 2016; Navas, 2018). This research is scattered amongst many different disciplines, analysing several different resources and regions, and has found that Africa is especially sensitive to scarcity in freshwater[4]. Because of this, Africa has been a common region to examine on how and why conflicts sometimes occur when there is less freshwater. This research has mainly been conducted on subnational levels, demonstrating that environmental degradation sometimes results in intra-state conflicts, further suggesting several conditional factors that can either mitigate or aggravate conflicts, such as economy, democracy or the quality of governance, (Turner, 2004; Maystadt & Ecker, 2014; Detges, 2016).

[1] "Moors" refer to Muslim inhabitants in Maghreb.

Therefore, a number of theories exists from subnational studies on why and how conflicts sometimes occur when there are water scarcities, however not enough quantitative research has been conducted examining these theoretical claims. Studies that have examined this on a multinational level, investigates numerous factors that might aggravate or mitigate the likelihood of conflicts (Uexkull, 2014: Uexkull et al, 2016; Gizelis & Wooden, 2010). This strand of literature has however not found consensus on what contributing factors might increase the likelihood of conflicts in the occurrence of water scarcities, containing various explanations between contextual factors such as ethnicity, religion, politics and economy. Due to this lack of consensus in current research, the different theories are constantly argued and challenged.

Some previous research conducted on a multinational level has provided special attention to the role of the governments in environmental conflicts. In 2010 Gizelis and Wooden published an article examining how water scarcities are connected to intra-state conflict depending on the democracy levels of states. Although the article was informative, it solely examined how democracy affects intra-state conflicts and did not include any further governmental indicators. Other researchers have pointed out the limitations of solely using democracy when examining governments (Deglow & Fjelde, 2019). Claiming that levels of democracy do not indicate holistically how governments are good or bad, and that there are further measures that indicate the quality of government that are equally as important. Alternative suggestions for measuring the quality of government have been provided by Rothstein, claiming that examining *impartiality* might be more useful when evaluating governments (Rothstein, 2008). The impartiality of a government, which is the fair equal treatment of all citizens by a state, can be evaluated through numerous ways. One rather powerful way to examine the impartiality are levels of corruption, as corruption is in its nature unfair and partial. Therefore, this thesis argues that it might be useful to conduct a similar study as that of Gizelis and Wooden (2010), but instead include alternative indicators on quality of government, that specifies levels of impartiality, such as the

[2] Inter-state conflicts occur between two or more states, intra-state conflicts rather address domestic conflicts between non-state or state actors within the borders of a country.
[3] "Environmental security" refers to when the environment is unthreatened and is able to provide people and animals with essential natural resources to thrive and survive.
[4] "Freshwater" (also called renewable freshwater resources) is all water that is found in rivers, underground and in lakes that is not saltwater or brackish water.

presence or absence of corruption. Additionally, the article by Gizelis and Wooden did not specify on what types of conflicts water scarcities might aggravate, other than that they tend to occur domestically. Thus, this thesis suggests that it may be important to examine whether water scarcities have a unique effect on non-state conflicts[5] across Africa, since subnational case studies have indicated that non-state conflicts are more likely to occur when there is less freshwater (Homer-Dixon, 1994; Raleigh, 2010; Maystadt & Ecker, 2014). Additionally, this study proposes to examine to which degree water scarcities affect non-state conflicts depending on the corruption levels of African countries, since corruption increases partiality towards citizens, thus aggravating conflicts.

In summary, previous research has examined contextual factors of why inter-state conflicts occur when there is water scarcity, this research has however mainly focused on specific case studies providing a board selection of explanatory factors. Further research that has examined the link between water scarcity and inter-state conflicts through a quantitative method have dedicated special attention to the role of governments, although this strand of research has not yet included measurements of corruption. Furthermore, to my knowledge no quantitative study has examined how water scarcities effect specific types of conflict, such as conflict between non-state actors. Thus, this thesis has set out to examine if water scarcities affect the amount of non-state conflicts in Africa, and if this depends on levels of corruption within governments, utilizing a quantitative method. I argue that by doing this we will gain a more complete picture of what governmental characteristics help mitigate or aggravate conflict when environmental degradation causes water scarcity. My research question is therefore as follows:

- *Does water scarcity affect non-state conflicts to different degrees in Africa depending on corruption?*

[5] Non-state conflicts are a subcategory of intra-state conflicts that specifically refers to conflicts where only actors that are not a part of or a representative of the government participates. Participates may be extremist groups, different professions, ethnic groups or civil-society organisations.

This study demonstrates through a quantitative analysis measuring change in freshwater resources, non-state conflicts and levels of corruption that there is no linear effect between water scarcities and non-state conflicts during the time period of 1995-2016. In other words, greater scarcity does not lead to an increased amount of non-state conflicts, only corruption alone showed a significant effect on the amount of non-state conflicts in African countries. However, in a complementary regression analysis, it was shown that the overall likelihood of non-state conflicts is greater in countries with any degree of water scarcities, but only where corruption is high. In conclusion, this thesis has shown that non-state conflicts do seem to rather occur in countries that experience water scarcities and that countries with lower levels of corruption are able to mitigate the likelihood of non-state conflicts from occurring, than countries with high levels of corruption.

2. Previous research

This chapter provides a summary of the previous literature. The first section discusses freshwater resources, how it is defined and different ways of measuring them. The second section discusses how natural resources might cause conflict, eventually narrowing down to how water scarcities can cause conflict. The final section describes how corruption can help to indicate quality of government and how it might aggravate conflict when there is water scarcity.

2.1. Freshwater resources and scarcity

A challenging task in the natural resource research field is how to define when there is scarcity in water resources, since consumption of water varies greatly between different countries. For example, a household in Sweden might be used to entirely different habits of using water than say a household in rural Nigeria. According to the UN-water entity of the United Nations (2020) the definition of water scarcity says:

"Water scarcity can mean scarcity in availability of renewable freshwater due to physical shortage, or scarcity in access due to the failure of institutions to ensure a regular supply or due to a lack of adequate infrastructure" (UN-water entity, 2020).

Since it is complicated to measure and determine when water resources are considered scarce, and the fact that there are no quantitative measurements appropriate for this thesis that indicate water scarcities, this thesis will have to use a proxy measure, and instead measure the increase or decrease in freshwater resources. Therefore, this study does address the decrease in freshwater as water scarcity, since a decrease in such a vital resource does require societies to readapt and experience a period of scarcity. Additionally, since this thesis focuses on environmental degradation and how it may cause conflict, it is appropriate to measure water resources that are impacted by environmental degradation. There are in general two types of water resources, the physical and economic. Physical water resources refer to the total freshwater availability in rivers, lakes and soils within a given region. Economic water resources on the other hand, refers to the infrastructural capacity of states

to provide citizens with water through pipelines and taps. (Petruzzello, 2019). Thus, for this thesis physical freshwater resources are more appropriate to measure, since it is primarily affected by environmental degradation. The decrease in freshwater resources can be caused by a number of factors, such as seasonal factors, population growth and changed weather patterns due to global warming. Therefore, the decline in freshwater is not entirely due to environmental degradation and climate change, however it is partially. According to the Food and Agricultural Organization (FAO) around 1,2 billion people are today living in areas subjected to physical water scarcity due to the changing and extreme weathers patterns caused by climate change, and that water scarcities are expected to continue as global warming gets worse (Petruzzello, 2019).

2.2 How freshwater resources are measured

But how are freshwater resources measured? And which measure is more appropriate for the purpose of this study? In 2016 Taylor and Damkjaer published an extensive study on the existing measures on freshwater resources, analysing both their liability and qualities. According to their article, the most widely used measure for freshwater is the Water Stress Index (WSI). This measure utilizes inter alia something called the "Mean Annual River Runoff" (MARR) measure, which indicates freshwater resources that flows in rivers and lakes above ground level, however it does not measure groundwater. Rockström and Falkenmark (2015) pointed out that the WSI measure might be misleading as it does not take into account groundwater and soil moisture which is a large part of the freshwater resources in Sub-Saharan Africa, where up to 51 % of freshwater is found underground (Rockström & Falkenmark, 2015). Another widely used measure, is the Withdrawal-to-availability ratio (WTA), this measure studies the total annual withdrawal per sector in relation to the available freshwater and can with this determine whether or not a country is water stressed. Similarly, this measure utilizes MARR and does not include soil moisture, which (as stated above) is an important indicator for measuring freshwater resources in Africa (Taylor & Damkjaer, 2016).

Since both of the measurements mentioned above utilize MARR in order to compute metrics on freshwater resources, using these when examining water scarcity in Africa might be inadequate. Thus, if the measurement does not include groundwater, it is possible that

the obtained data doesn't measure all freshwater resources and consequently produces a faulty result. However, a measurement that does account for above ground water as well as underground water is the "Internally Renewable Freshwater Resources per Capita" measure (IRFWR) which is also used in the study of Gizelis and Wooden (2010). This measurement does include both the average annual flow of rivers and soil moisture per capita within each country. The IRFWR measurement is the most fitting measurement of the analysis because it captures all freshwater resources in rivers, lakes and underground, which therefore indicates how fertile soil is for agricultural production in African countries. This causal link however will be more closely explained in the following chapter.

2.3 Africa's dependency on freshwater resources

The agricultural industry is very important for Africans, as it keeps two thirds of the African population employed and additionally makes up for 30-60 percent of the GDP in most African states (Britannica, 2020). The African agricultural industries produce primarily principal grains, such as corn, wheat and rice, which is important for both domestic consumption and exports. Additionally, Kenya, Tanzania and Mozambique are large tea exporters; for example, in 2010 Kenya alone accounted for 32 percent of the global exports of black tea. For producing coffee, Ethiopia is the seventh largest coffee producer in Africa, followed by Uganda and Cote d'Ivoire (Britannica, 2020). Agriculture is however important for African countries to different degrees. For example, countries such as Botswana lives mainly off of their mining industry for national revenues, still almost half of the Botswana population relies on the agricultural industry for their main occupation. Additionally, Burkina Faso is an Agri-economic state, where most citizens are more or less dependent on farming for their livelihoods, where the cotton industry is one of the primary economic sources for Burkina Faso and provides work for over 3 million citizens (OECD/FAO, 2016). This indicates, that it is important to keep in mind when examining how dependent African citizens are on agriculture, to rather focus on the percentage of Africans employed in the agricultural sector and not on national revenues or exports, since these can depend on other industries.

In summary, since the agri-business is important to many African states, it carries a heavy weight and importance in both the civil and national economy thus the occurrence of drought has high potential to cause conflict in Africa. But how do water scarcities affect societies in Africa? Since the agricultural industry is very important, water scarcities can cause a domino effect of consequences. To illustrate this, an example will be presented on how water scarcities have caused conflict in Somalia.

2.4 The case of Somalia

In 2011 The Intergovernmental Panel on climate change reported that due to irregular seasonal rainfall, Somalia has experienced its most severe drought in over 50 years. At its worst the drought resulted in famine causing 4 million Somalis in need of urgent help. Since approximately two-thirds of the Somali population lives in rural areas, farming and other agricultural work is the main source of livelihood. As drought hit rural areas of Somalia, large migration waves forced people to move elsewhere. The widespread poverty caused by drought and lack of employment as agri-businesses suffered, further encouraged the development of extremist's groups like Al-Shabab. A concrete example of this would be the famine of 2011-2012 in Somalia, where a representative of the United Nations Refugee Agency in Somalia stated;

"This famine has been a boon for Al-Shabaab's recruitment campaign because when you don't have purchasing power to buy the food, you will be encouraged to be recruited because then you will be saved, and you can use your salary or you will be given food" (Maystadt & Ecker, 2014, p. 1162).

Both drought and civil conflict has become more common in Somalia in recent years, for example between 1997 and 2009, most outbreaks of violence occurred during times of severe drought, peaking in 2003-2004 and 2007-2009. The increase of conflicts seems to have overlapped with periods of intense water scarcity and higher temperatures (Maystadt & Ecker, 2014). In summary, the case of Somalia demonstrates how poor and victimized farmers suffer as their livelihood is taken away due to water scarcities and that this can encourage citizens to join extremist groups causing an increase in non-state conflicts. But conflicts do not always surface when water resources are lacking, previous research has

diligently tried to explain why conflict occurs in certain states when resources are low and why it does not occur in others, the following chapter aims to map out this previous research.

3. Previous research on natural resources and conflict

The following chapter aims to map out the previous research that addresses the connection between natural resources and conflict, beginning with generally discussing natural resources and towards the end narrowing down to how water scarcities affect conflict.

3.1 The (Neo) Malthusian Theory

Research on how natural resources can cause conflict has been present since the 18th century. In his essay "The principle of the population" Thomas Malthus claims that as the population of the world increases, natural resources will not satiate people creating poverty, famine and war. One way to prevent this imbalance are preventative checks, such as family planning, late marriages and celibacy (Mellos, 1988). In more current literature, this theory has been reapplied onto the modern circumstances by the Neo-Malthusian school, claiming that resource scarcities and conflict occurs due to over-consumption, environmental degradation and technological expansion, instead of solely focusing on the population. The Neo-Malthusian school departs somewhat from the original Malthusian school, as it suggests other ways natural resources can last longer, such as increased sustainability (Mellos, 1988). The Neo-Malthusian school today shapes numerous studies in the temporary resource-related conflict research. And has formed two general research fields, the *environmental security theory* and the *common property management theory* (Turner, 2004).

The environmental security theory

The *environmental security theory* creates a rather direct link between conflicts and resource scarcity and does not pay too much attention to interlaying factors, such as the actions of governments. One much recognized scholar of the environmental security perspective is Homer-Dixon who in his article from 1994 examined the connection between environmental scarcities and violent conflict. He explains that there are three main sources for resource-related conflict; Environmental change, population growth and unequal distribution, but he does not provide an explanation to what these mechanisms are empirically. Homer-Dixon does however suggest that the likelihood of environmental scarcity causing conflict is more likely in poor states, since the institutions are not resilient

enough to handle scarcity, and that this forces citizens to utilize violent conflict in order to survive, this was claimed to be understudied and in need for further examination. Additionally, Homer-Dixon states that it is important to distinguish the different resources and what types of conflict they trigger. He suggests that inter-state wars concern non-renewable resources rather than renewable resources. This is because petroleum, coal or other minerals can be faster converted into power, such as fuelling armies. On the other hand, agricultural resources such as land, forests and freshwater rather tends to trigger intra-state conflicts between regions and groups of people, and that the one renewable resource that is more prone to trigger non-state conflicts is freshwater, since it is very vital and important for people's everyday life (Homer-Dixon, 1994).

The common property management theory

This theory similarly believes that environmental conflicts are mainly resource scarcity driven, and that these conflicts rather occur in resource-poor rural areas. However, the common property theory rather focuses on examining common properties and claims that the ill-governed natural resources that are openly available for all is causing unsustainable competition. This competition eventually leads to scarcity of the natural resources, resulting in conflict. The common property theory states that poor governance and lack of regulation of the common natural resources stems from inadequate institutions that fail to insure equal distribution amongst its citizens (Turner, 2004). Much of the common property theories are inspired by the works of Garett Hardin, who in his article "The tragedy of the commons" (1968) discusses overpopulation, the high demand for natural resources and the need for states to start organising a sustainable way to utilize resources. He claims that as the population rises, the need for equal distribution and restriction by governments is important for the safekeeping of the environment. Scholars have further built on the theories of Hardin, diving into more case-specific examinations on the role of institutions for regulating common property. Runge (1986) adds to the hypothesis of Hardin claiming that governments need to centralise rules and regulations surrounding the utilization of common natural resources rather than privatizing them, since the risk of corruption will become greater if resources are privatized.

Furthermore, Painter, Sumberg and Price (1994) also contributed by examining the effectiveness of the *Terroir Villages* policies in the Sahel states[6]. The Terroir Villages is a set of development policies, advocated by foreign non-governmental organisations (NGOs) and Western governments, which was introduced in 1974 when drought affected most of the Sahel states. The article argued that the reason the Terroir Villages policy measures were unsuccessful and ineffective was due to its European-contexed framework, not being adapted to the culture of the agriculturalists and pastoralists of the Sahel's states. This caused policy misfit and inadequate governance of the properties which eventually resulted in mild conflicts. This article showed how faulty property management, can cause disputes and grievances in societies.

To summarize, within the Neo-Malthusian school both the environmental security theory and the common property management theory have consensus regarding what types of natural resources seem to trigger certain types of conflicts. Firstly, Homer Dixon suggests that renewable resources such as freshwater may trigger non-state conflicts between farmers within agricultural industries. And secondly, the common property management theory almost exclusively examines how common properties in farming contexts affect conflicts between agricultural workers and is therefore also mainly focusing on renewable natural resources. The idea that different types of natural resources cause different types of conflicts is further supported by the *resource curse* theory (Ross, 2015). This theory points out that certain natural resources rather tend to cause conflicts when there are more of them, such as diamond's or oil, and that natural resources that rather cause conflicts when they are scarce are renewable resources such as freshwater. However, exactly how and which renewable resources effect conflicts is far from settled in current literature according to Ross (2015).

[6] The "Sahel States" refers to a specific ecoclimatic part of Africa that is the part of the continent where the desert climate transitions into the savanna's climate typical for the south. The area of this semi-arid climate stretches from the west coast to the east of the continent, including parts of the northern Senegal, Southern Mauritania and Mali, the southern parts of Algeria and Niger, and the extreme norths of South Sudan, Ethiopia and Eritrea.

Additional previous literature that examines these theories is the works of Uexkull et al. (Uexkull, 2014; Uexkull et al, 2016). Regarding freshwater and conflict, Uexkull demonstrates how regions within sub-Saharan Africa that depend on rainfed agriculture are at higher risk for civil conflict when there is drought (Uexkull, 2014). She also reveals that regional drought is more likely to cause intra-state conflict rather than inter-state conflict but does not provide a deeper description on what types of conflicts tend to occur when water is scarce (Uexkull, 2014). Also, Uexkull et al. (2016) conducts an actor-oriented analysis that also accounts for socioeconomic contextual factors in Africa and Asia. The study demonstrates that drought in general does not cause more conflict but does so for certain socio-economic groups that are more vulnerable to civil conflict due to being politically excluded and vulnerable. The study showed that under certain conditions, these groups ran a greater risk of experiencing conflicts, due to being more dependent on natural resources for their livelihood, and that this was largely affected by the sensitivity of that ecosystem and the groups' coping capacity. This *coping capacity* refers to the levels of socio-economic development of that region, their history of conflicts and their limited access to economic and societal capital. The conflicts that were included in the analysis of this study however, only measured state vs non-state actors, and did not measure conflicts where solely non-state actors are involved. In addition to these findings, Uexkull et al. concluded that civil conflicts between the governments and civil groups are more likely to occur in underdeveloped regions with marginalized groups, and that this societal instability increases the risk of conflicts to occur when there is drought. However, they also point out that this societal instability needs to be further examined (Uexkull et al, 2016). Other previous literature examining the link between natural resources and conflicts, has additionally added further factors and multidimensional reasons for conflicts occurring. The following chapter maps out previous research that focuses on the injustice of ecological distribution[7] and how partiality and unfairness is the main driver for scarcity conflicts: Political ecology.

[7] Ecological distribution refers to when ecological and environmental benefits or costs are distributed unequally, thus consequently causing conflict.

3.2 Political ecology

The field of political ecology similarly examines the mechanisms causing resource related conflicts however takes into account deeper cultural and social factors. Since its first appearance in a study conducted by Basset in 1988 examining herder-peasant conflicts on the Ivory coast, the discipline has incorporated more and more perspectives and methods into its field (Le Billon, 2015). The field of political ecology departs somewhat from the previously explained Neo-Malthusian approach, by claiming that environmental conflict does not solely occur due to the environment, but also due to pre-existing social structures and conflicts, where resources and environment trigger them. In 2004 Turner addressed the existing environmental conflict studies and how they mainly examine material dimensions of conflicts. He claimed that the failure of institutions when managing drought does trigger conflict, but that there are also cultural divisions and moral borders among the agro-pastoral communities that aggravate conflicts (Turner, 2004). Further, Escobar (2006) provides a deeper dive into the ownership of governments in environmental conflict. He explains that since the environment is essential for workers' livelihoods to financially keep themselves stable, the inequality of the ecological distribution harms citizens economically. And that the cultural marginalization and hierarchical structures deprive certain minorities and groups from the right to use and live in nature based on their own cultural beliefs. He suggests that a partial solution to the environmental conflicts is increased equality within key state institutions that manage policy regarding property rights, ecological distribution and economic organization. He also suggests that a more plural knowledge on culture and a greater impartiality within a state's institution is important to avoid conflict (Escobar, 2006).

Another article which suggests that democratic and fair institutions will mitigate the likelihood of intra-state conflicts, is the article of Gizelis and Wooden (2010). Their study examined if freshwater resources and conflicts correlate depending on the democracy levels of governments, theorizing that the higher the democracy level is, the better governments can handle grievances and distribution of natural resources once they are scarce. They found that there is no direct link between water scarcities and intra-state conflicts, however that there is some correlation in autocratic states, but not in democratic states. These

findings show that the quality of governance can be important in how water scarcities affect society and the conflicts that occur due to them. Gizelis and Wooden further suggest that more attention and research should be provided on states' governance and how it might mitigate environmental conflicts. In their article, Gizelis and Wooden used the Polity_2 measurement (Jaggers & Gurr, 1995) in order to evaluate the democracy levels of the countries included in their analysis. Using the Polity_2 measurement for analysing governments has however since then been criticized. Deglow and Fjelde (2019) claim that the Polity_2 measurement might be misleading as it creates a spectrum of scores that ranges from total autocracy to total democracy, risking that vastly different types of governments are given the same democracy scores. Additionally, in a study by Povitkina (2018) she questions how relevant democracy is for the performance in environmental and sustainability policy, and rather suggests an increased interest in governmental quality when examining states. Quality of government (QOG) addresses the impartiality of a government, meaning the fair and equal treatment of citizens, and therefore inter alia evaluates control of corruption, effective bureaucratic administrations and rule of law. Povitkina shows that the democracy of states only correlates with better environmental performance if the quality of government is satisfactory, thus demonstrating that the governmental quality is equally as important to evaluate when looking at the performance of states. The following chapter will more closely explain quality of government and what it entails, and further argue why it is relevant to include in this analysis on how water scarcities affect conflict.

4. Quality of Government and corruption

A government interacts with their citizens through two dimensions. First, trough the input dimension, which refers to the democratic input by citizens into the state, and second trough the output dimension which refers to the actions and services that are provided to the citizens by the government. In the output dimension, the manner that power is exercised is indicated, thus consequently the quality of government. According to Rothstein (2008) the output is more satisfactory for the majority of citizens, if the condition of *impartiality* is fulfilled. The impartiality of the output dimension, meaning the fairness and equality in distribution of goods and services, makes sure that the government is providing citizens with equal treatment and opportunities. According to Rothstein:

"When implementing laws and policies, government officials shall not take into consideration anything about the citizen/case that is not beforehand stipulated in the policy or the law" (Rothstein, 2008, p. 170).

A good example of impartiality in the output dimension would be the recruitment system for the administrative agencies of a government. Say that an agency for social workers recruits their employees based on pre-stipulated qualifications, and that all applicants are considered based on their education, merits and experience. This would be regarded as an impartial recruitment process provided by the government to its citizens so that everyone has the same opportunities to become employed. However, if the recruitment process would instead hire social workers based on their clientelist contacts, bribes or ethnic heritage, then this would be viewed as a partial recruitment system (Rothstein, 2008). Impartiality within governments can be examined through many different areas and indicators, one of them is level of corruption. Oskar Kurer defined corruption in the following sense;

*"Corruption involves a holder of public office who is violating the impartiality principle in order to achieve private gain" (*Kurer, 2005, p. 30).

Thus, the presence of corruption within a state's institutions, provides a rather strong indicator whether a government lacks impartiality or not. Corruption is not only unfair and partial, it also often affects several parts of a government, harming the impartiality of several sectors simultaneously and therefore further being a very useful indicator of impartiality. Bo Rothstein does however point out, that once corruption is considered absent from an institution, there is not necessarily complete impartiality, but that even if say financial or recruitment processes are fair, there is always a presence of discrimination against people based on gender or background e.g.

Even though the absence of corruption does not guarantee total impartiality, the principles of non-corruption is, as Kurer (2005) puts it, that "*A state ought to treat those who deserve equally*" which fits into the definition of quality of government and the impartiality principal, that a state should treat all equally in its actions of governance.

4.1 How corruption aggravates or mitigates conflicts when there is water scarcity

But how does corruption within governmental institutions affect the outcome of conflict when there are water scarcities? Since corruption decreases the impartiality within governmental institutions, it then causes governmental institutions to conduct unequal and unfair treatment against its citizens. According to Kurer (2005), corruption is when authorities exercise power for the benefit of private gain, which then removes resources from the general public, especially for marginalized groups. As previously explained, the agricultural sector is an important industry in Africa and many workers depend on it for their livelihoods. Thus, as there is less freshwater the agricultural industry suffers, causing crop failure and thus consequently affects the financial situation, pushing people into poverty and vulnerability. This further causes grievances, poverty and social exclusion, that put people in positions where they need to find livelihoods or aid elsewhere. If governmental institutions are corrupt, the treatment and resource distribution is unfair and unequal, leaving large groups of people socio-economically vulnerable and exposed. Additionally, in corrupt states, elitist groups tend to have a greater opportunity to access social and economic capital, such as job opportunities or financial help, while marginalized groups may not have the same possibilities (Uexkull et al, 2016).

Escobar (2006) states that an unequal ecological distribution pushes certain marginalized groups further into poverty and that this causes increased grievances and frustrations amongst them. Recalling the example of Somalia, this argument is further empirically supported where many of the new recruits of the Al-Shahab extremist group, were poor and affected farmers that had lost their land or fertile soil, partially due to drought. With no other job opportunities available due to being politically vulnerable, joining Al-Shabab was necessary in order to survive. The weak and corrupt intuitions of Somalia, where not able to mitigate the consequences that the drought brought, thus people could not seek help elsewhere. Corruption combined with drought causes poverty, and poverty causes vulnerability and desperation, which eventually cause frustration and lastly increase conflicts. Thus, if governments have high levels of corruption and with this low level of impartiality, this entails that the authority within these institutions are exercising power for private gain. This consequently affects the quality of governance and civil services that are carried out for the good of all citizens, thus aid and other services are most likely not available in times of increased water scarcity and financial deprivation.

5. Theoretical framework and hypothesis

In this chapter the theoretical framework will be presented. The first section will explain the research question, hypothesis and the theoretical framework. The second section will illustrate the causal chain and lastly repeat the hypothesis for clarity.

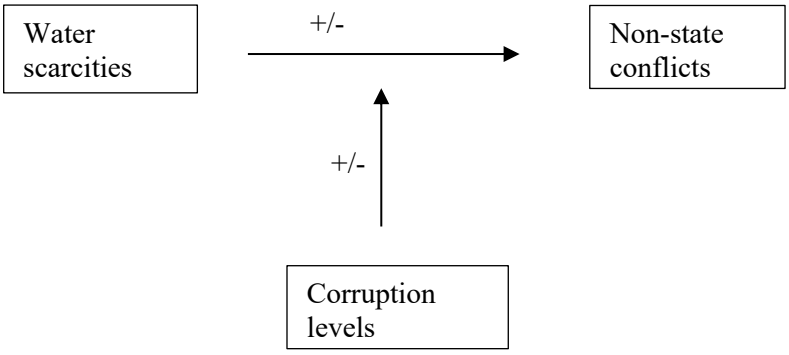
5.1 How water scarcities effect non-state conflicts depending on corruption

The aim of this study is to examine whether there is a connection between water scarcities and non-state conflicts depending on the levels of corruption in African states. Based on previous research, this study assumes that renewable natural resources, such as freshwater is more likely to cause domestic non-state conflicts, rather than international war (Ross, 2015; Homer-Dixon, 1994). Thus, as freshwater is reduced in quantity, it is believed that the amount of non-state conflicts increases (Turner, 2004; Maystadt & Ecker, 2014; Detges, 2016). This thesis also intends to examine whether high or low levels of corruption mitigate or aggravate the likelihood of non-state conflicts occurring when there is water scarcity, since previous research has indicated that quality of government such as levels of democracy have a moderating effect on the likelihood of conflict when there is less water (Gizelis & Wooden, 2010). However solely measuring democracy when examining governments has been questioned by previous research, suggesting that the quality of governments is equally important to take into account (Povitkina, 2018; Rothstein, 2008). In the works of Turner (2006) and Escobar (2006) it is suggested that contributing factors for conflicts to occur is low quality of governmental institutions, and that as key-institutions within governments are unfair and impartial towards certain cultural and ethnic groups, conflicts are aggravated in between them. In 2008, Bo Rothstein further addressed that when measuring impartiality in governments, levels of corruption is a powerful indicator (Rothstein, 2008).

Therefore, this thesis sets out to conduct a similar analysis as that of Gizelis and Wooden (2010), however, instead replaces the debated democracy measure with levels of corruption. Corruption is believed to affect the likelihood of conflicts in the sense that it permeates several dimensions and parts of society that harms the equal and fair treatments of all

citizens, aggravating grievance and conflicts when financial hardships are caused by freshwater scarcity. This premise is further supported in the works of Uexkull et al. (2016), as their study suggests that conflict is more likely to occur in development countries that are dependent on agriculture for their livelihoods, especially for marginalized groups who are politically excluded. Thus, this study suggests that as corruption is more present, governments will exercise power for private gain or certain elitist groups rather than the general population, and that this affects their capability and managements skills to mitigate conflicts and aid people that are pushed into poverty due to water scarcity. Additionally, several previous studies (Homer-Dixon, 1994; Turner, 2004; Gizelis & Wooden, 2010; Uexkull et al, 2016), have indicated that when renewable natural resources decrease, such as freshwater, this rather affects intra-state conflicts, but they do not deeper examine what types of conflict these are. To my knowledge, no quantitative analysis has examined how freshwater affects uniquely non-state conflicts, where on the other hand plenty of sub-national case-studies have indicated that conflict between different professions or ethnic groups are aggravated when there is less water. Thus, the research question this thesis is as follows; *Does water scarcities affect non-state conflicts to different degrees in Africa depending on corruption?* Furthermore, the hypothesis attached to this research question is; *H1: As water scarcities increase, states with low corruption experience less non-state conflicts, whereas high corruption states experience more conflict.*

5.2 Casual chain and hypothesis



Hypothesis;

H1: As water scarcities increase, states with low corruption experience less non-state conflicts, whereas high corruption states experience more conflict.

6. Research design

The following chapter will present the dependent, independent and control variables. The first section describes the main variables utilized for this analysis, being non-state conflicts, freshwater resources, and the moderating variable being levels of corruption. The second part will describe the selected control variables, and lastly limitations and scope of the data will be discussed.

6.1 Operationalization of the main dependent and independent variables

The main independent variable provides metrics on freshwater, called the "Internally Renewable Freshwater Resources per Capita, In cubic meters" (IRFWR). It indicates the average annual flow of rivers and the recharge of groundwater within a country's borders, and thus indicates physical freshwater resources. The data is obtained from the World Bank "Development Indicators" dataset (2020) and provides data for all African states excluding Seychelles, Eritrea, Ethiopia, Sudan, South Sudan and Sao Tome Principe since their data was missing. The freshwater data is obtained for the years of 1997, 2002, 2007 and 2012 and have been calculated into averages of freshwater resources in between 1997 and 2002 and then the same for 2007 and 2012. Afterwards, the later average has been subtracted from the first average, thus calculating the change in freshwater resources between 1997-2002 and 2007-2012, showing if freshwater has decreased or increased over time. The reason that the data is aggregated into a cross-sectional analysis instead of a time series analysis, is due to the freshwater data only being available in certain points of time. Additionally, a robustness check has been carried out for this variable. This has been done by recoding all the positive values in the freshwater variable into 0, thus only measuring the negative changes in freshwater resources and then compared them with the amount of non-sate conflicts. This has been done in order to control if the effect on non-state conflicts are scarcity driven.

The dependent variable is non-state conflicts, which are expected to change as the amount of freshwater resources changes. This data is from the "Uppsala Conflict Data Program" (UCDP) more specifically from the "Non-state Conflicts dataset 20.1" that provides the number of non-state conflicts per country per year, within the time frame of 1995-2016. The Non-state conflicts dataset defines conflict with the following definition; *"The use of armed force between two organized armed groups, neither of which is the government of a state, which results in at least 25 battle-related deaths in a year."* (Sundberg, Eck & Kreutz, 2012, p. 3). Additionally, the non-state conflict data has been complemented with a "kick", where the 0s have been replaced with 1 in order to log the conflict variable. This is important since the variation in the number of conflicts between the African states is very dispersed, and also since there is quite a large number of zeros in the conflicts data causing the distribution to become skew.

6.2 Operationalization of the moderating variable

The moderating variable is an indicator of corruption. The data is obtained from the Word Bank dataset from the "Global Governance Indicators" (2020) where the variable used is called "Control for corruption, estimate". More specifically the corruption data indicates the perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption. The estimate provides countries with aggregated scores ranging from -2.5 to 2.5, where a lower value indicates more corruption. The corruption data is obtained for the years of 2002-2012, where an average of the control of corruption scores for this time period has been calculated in order to create one variable for the analysis. This specific time period has been chosen as it is believed that the corruption levels in this time period has had the most effect on the amount of non-state conflicts. Additionally, this variable has also been made into a dichotomized variable in order to conduct an interaction analysis. This has been carried out by calculating the mean of the corruption scores amongst all African states, afterwards countries with corruption values beneath this mean have received a "0" in the dichotomized variable, representing the countries with a high level of corruption. Thus, the countries with a corruption value above the mean have been assigned a "1" that represents countries with low levels of corruption.

6.3 Operationalization of the control variables

The first control variable included in the analysis measures states democracy levels, via the Polity_2 indicator, more specifically called "Revised combined polity score" from the Quality of Government (QOG) Standard Cross-Section dataset. Since Gizelis and Wooden (2010) used this indicator in their analysis, and since this thesis aims to complement their study, the democracy levels are included to avoid omitted variable bias. The Polity_2 data measures democracy scores for each state by ranging them on a democracy-authority spectrum with values ranging from -10 to 10, where a negative value indicates less democracy and a positive value indicates more. This indicator of democracy evaluates inter alia elections and their competitiveness and openness, the possibility for citizens to participate in politics and to what extent authorities are held accountable. The second control variable is the Gross Domestic Product (GDP) per capita measured in US dollars, which is also obtained from the QOG standard dataset, and is more specifically called "GDP per capita (current US dollar)". The GDP is included as it might affect the capacity of states to actually mitigate conflicts and/or can actually be a cause for states experiencing more violence, thus this is also included. The third control variable measures the percentage of people employed in the agricultural sector in each African state. The data is from the QOG standard dataset and is called "Employment in agriculture (% of total employment)", this variable more specifically measures all individuals who work with agriculture or in some way sell or profit from their commodities. This control variable is included since previous research has shown that water scarcities and conflicts tend to have a closer correlation in countries where citizens are more dependent on agriculture and therefore require a thriving environment and plenty of freshwater (Uexkull, 2014).

6.4 Limitations and scope

Firstly, the IRFWR variable for freshwater does measure both ground and river water, however it does not provide us with information on when the amounts of water are considered scarce or abundant. Because of this the study instead examines how non-state conflicts are affected as freshwater resources change, using this as a proxy measure for water scarcities. This is indeed a limitation in the analysis, as the dataset does not provide a more specific threshold of when the freshwater resources are considered scarce or not. Therefore, this study has assumed that countries with a negative change in freshwater resources have experienced water scarcity. An advantage however with utilizing this measurement for water resources, is the fact that it measures the physical water resources rather than the economic resources, which allows this analysis to measure water that is primarily impacted by climate change. If this study instead would measure the economic water resources the efficacy of the government would largely be intertwined with the water resource data. Additionally, by not choosing to measure economic water resources the study avoids measuring water that is largely a function of the government's efficiency and thus making it easier to examine if water has an independent effect on conflicts. Another limitation considering the freshwater data, is the fact that this variable is a count-variable, typically when conducting a linear regression analysis utilizing a count-variable one would use a different method other than the Ordinary Least Squares (OLS), e.g. Poisson. However, with a limited understanding and knowledge within the quantitative method field, there is a risk of conducting the analysis incorrectly by doing this. Regarding the dichotomized regression analysis carried out in table 3, previous research has questioned if it's appropriate to use a binary dependent variable in an OLS linear regression analysis. However, in an article by Hellevik (2009) two analyses were conducted comparing how the results varied between an OLS analysis and a logistics regression analysis using a binary variable in both and found that the results were almost identical.

Furthers limitations concern the “Non-state Conflict” data. The conflict variable in itself is limited as it does only measure non-state conflicts, with some states having a total of 20 conflicts in the past 30 years, while some states record 0 conflicts. This becomes a limitation since conflicts where governments are involved are not included, and therefore risking to not demonstrate a correct picture of the actual violence in African states. There is indeed data available on UCDP where non-state vs government actors-conflicts are measured, however this was not included in this study for several reasons. First, the format of the data was not structured in the desired way, making it hard to easily add it into the dataset used for this analysis. Thus, not enough time was left to look for options to get around this problem in order to include this conflict data. Secondly, a majority of previous literature examining the link between intra-state conflicts and water scarcities had solely included non-state actor’s vs governments in their analysis (Gizelis & Wooden, 2010; Uexkull, 2014; Uexkull et al, 2016). Thus, it was determined that it would be interesting to examine how freshwater resources uniquely effect non-state conflicts, as many of the case-studies claimed that this was one rather common type of conflict to occurs when there is water scarcity.

7. Results

In this chapter the results of the regression analysis will be presented. Firstly, some descriptive statistics demonstrate the qualities of the data used in this study. Second, a scatter plot is provided of the bivariate analysis using the freshwater variable and non-state conflicts. Finally, the main regression analysis using all variables will be presented and additionally a complementary analysis using dichotomized variables will be displayed.

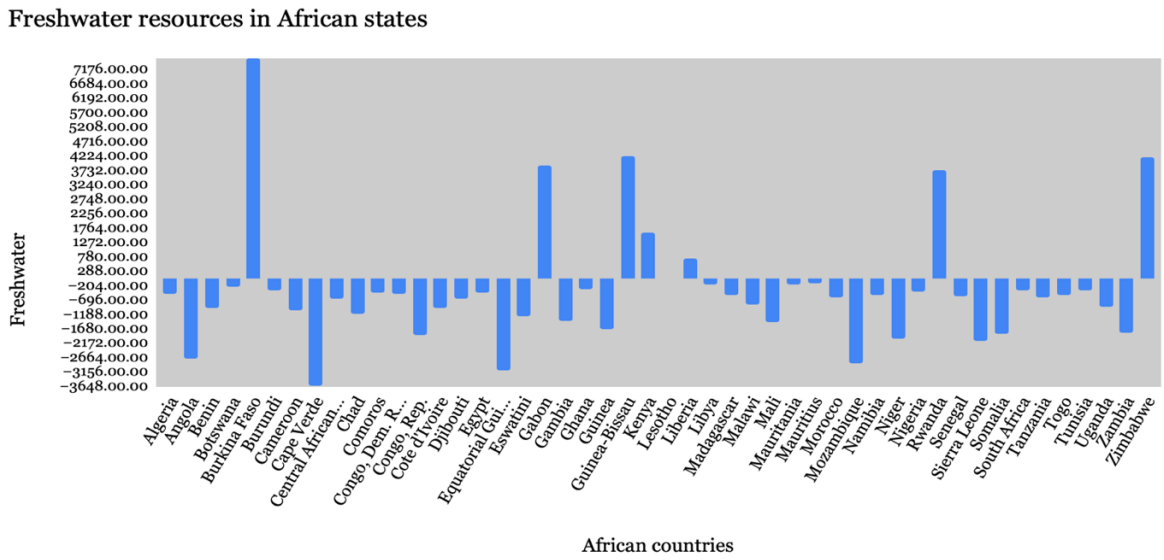
Table 1: Descriptive statistics

	N	Minimum	Maximum	Mean	Standard Deviation
Non-state conflicts	48	1.00	104.0	8.6250	19.802889
Change in freshwater	48	-3642.48	7520.10	-372.2989	2033.567113
Levels of Corruption	48	-1.82	1.09	-.7061	.63306
GDP in Dollars	48	2.82	96.82	21.4490	23.01800
Polity_2	48	-9	10	3.02	4.949
% employed in Agri	48	6	92	47.59	22.806
Valid N	48				

In the table above the descriptive statistics are illustrated. In the first column “N”, the number of countries used in the analysis are demonstrated, which is 48. The states that are excluded have been so due to lacking data in one or more variables. For the first variable, non-state conflicts are presented. In the minimum column, it is important to remember that the minimum conflicts are actually 0 however I have replaced the 0 with a 1, which has been explain in chapter 6.1. Secondly, the freshwater variable demonstrates the total increase or decrease in freshwater resources per African country between the time period of 1997 and 2012. The freshwater data is measured in cubic meters per capita, however, the number of cubic meters of freshwater per capita is a very large number, therefore the freshwater resources have been divided by 1 million, this allows the freshwater data to be

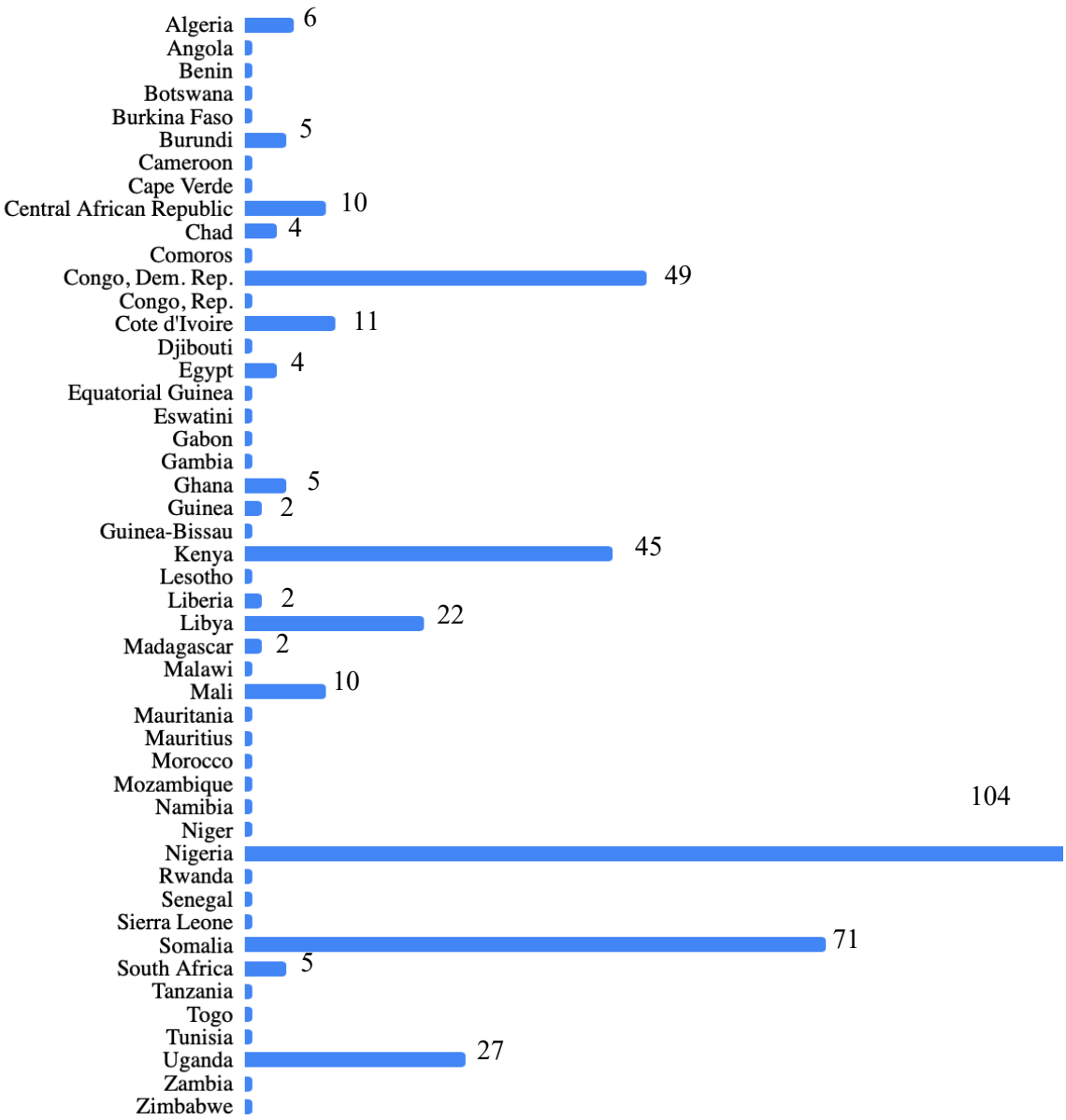
presented in smaller numbers. The freshwater variable measures the largest decrease in freshwater resources and the largest increase in freshwater resources, therefore the minimum category measures -3642 cubic meters per capita and the maximum reads 7520 cubic meters per capita. The third variable is the moderating corruption variable, which measures the average corruption scores for each country between the time period of 2002 to 2012. In general, most African countries have quite a low value in control of corruption, the minimum being -1.82 and the maximum being 1.09. As mentioned previously, a lower value in the corruption variable indicates a high level of corruption in that respective country, thus the descriptive demonstrate that most African states are experiencing some degree of corruption. The fourth variable is the control variable that measures countries GDP in US dollars per capita. This variable was initially provided in thousands of dollars, however for the sake of interpreting the GDP data easily, it has been divided with 100, explaining the low values. The fifth variable is the Polity_2 measure which examines the democracy levels of African states. This variable provides each state with a score of their democracy levels ranging from -10 to 10. The Polity_2 descriptive ranges between a quite varied spectrum amongst the 48 states, where the lowest value is -9 and the highest score is 10. Lastly, the final control variable is the "% employed in Agri", representing the "Employment in agriculture (% of total employment)" indicator, which is included to control for spurious correlations. In the descriptive table it is clear that the state with the lowest percentage of citizens hired within the agricultural sector has 6 % while the country with the highest has 92 %, which also demonstrates a fruitful variance in the variable.

Graph 1: Change in freshwater from 1997-2012 in Africa



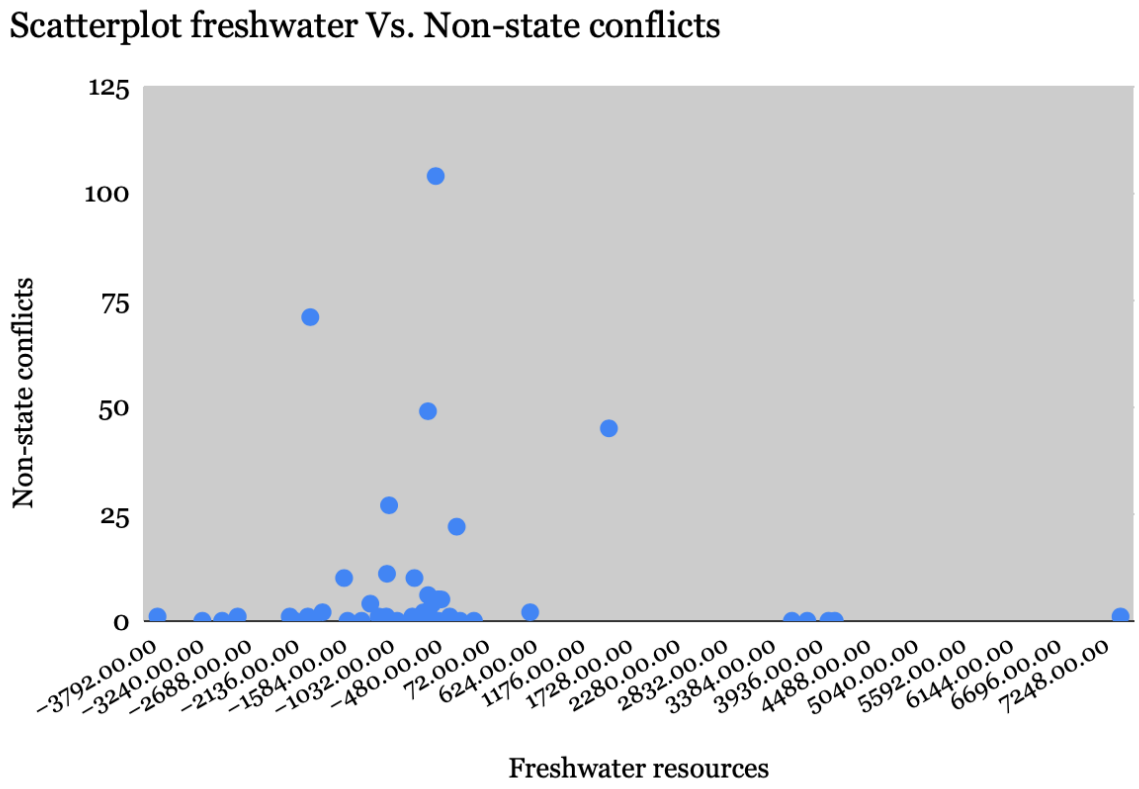
The chart above illustrates the increase or decrease in freshwater resources in African countries within the time period of 1997 to 2012. On the y-axis the freshwater resources in cubic meters are presented, and on the x-axis, the African countries are displayed. In this graph two observations are interesting for this thesis, first is that the countries that have experienced an increase in freshwater resources reach into larger amounts than the countries on the minus scale. However, the amount of countries that have had a decrease in freshwater are also larger in numbers than countries with an increase.

Graph 2: Non-state conflicts in Africa from 1995-2016



Above, the total number of non-state conflicts between 1995-2016 in each African country is presented. The states with no numbers have had 0 non-state conflicts detected. In the graph it is apparent that very few countries have experienced high numbers of conflicts. The graph also demonstrates that Congo Democratic Republic, Kenya and Nigeria have experienced the most conflicts within this time period, while many African countries have experienced 0.

Graph 3: Scatter plot of a bivariate analysis with change in freshwater and non-state conflicts



The figure above demonstrates a scatter plot analysis on change in freshwater resources and the total amount of non-state conflicts between 1995-2016. The x-axis demonstrates the freshwater resources and the y-axis show the non-state conflicts. The scatter plot clearly illustrates that there is no linear correlation between conflict and water scarcities, however countries that do have conflicts also seem to have experienced scarcity. This either indicates that there is no effect on conflicts by freshwater resources or that there are intermediate factors that need to be accounted for, therefore it is useful to conduct a multiple regression analysis.

Table 2: Multiple regression analysis with change in freshwater, Non-state conflicts, corruption and the control variables

Model:	1	2	3	4	5	6
Variables:						
Change in freshwater	-.062 (.254)	-.011 (.237)	-.011 (.240)	.006 (.235)	-.074 (.233)	-.161 (.356)
Levels of Corruption		-.848** (.294)	-.846* (.322)	-1.074** (.338)	-1.287*** (.352)	
GDP in Dollars			-.003 (.209)	-.338 (.276)	-.264 (.272)	-.390 (.281)
% employed in Agri				-.747 (.414)	-.805 (.405)	-714 (.410)
Polity_2					.627 (.350)	.288 (.341)
Dummy_Low_Corruption						-1.337** (.412)
Freshwater*Low_Corruption						.144 (.474)
Constant	.850***	.263	.272	3.733	2.048	4.444
N	48	48	48	48	48	48
Adjusted R	-.020	.119	.099	.143	.185	.147
R Square	.001	.157	.157	.216	.272	.256

*p<0.05, **p<0.01, ***<0.001
Standard error in parentheses

The table above demonstrates the multiple regression analysis of freshwater resources, non-state conflicts and control variables. The 6 models demonstrate 6 separate regression analyses, where the variables have been gradually added in each model. In model 1 solely non-state conflicts and freshwater resources have been included in a bivariate regression analysis, where the coefficients do indicate a negative effect on conflicts as water increases, however the result is not significant thus the coefficient might as well be 0. In model 2 the corruption measure has been added to the regression, similarly, indicating no significant effect by freshwater on non-state conflicts, however corruption has a strongly significant and negative effect on conflicts. This pattern continues throughout the models, with all the

control variables added in models 3-5, none of them increase the effect of freshwater on conflicts.

Thus, in order to closer examine how freshwater effects conflicts depending on levels of corruption, an interaction variable has been added. This interaction variable now includes a dichotomized version of the corruption variable and the freshwater variable, the results of the interaction analysis is demonstrated in model 6. This model now demonstrates the effect that freshwater has separately in countries with high levels of corruption and low levels of corruption. The interaction analysis shows the effect freshwater resources have on conflicts in countries with high levels of corruption in the "Change in freshwater" variable, which is -.161, however this is not a significant result and therefore could might as well be 0. The effect that freshwater resources have on conflicts in countries with low levels of corruption is now visible in both the "Change in freshwater" variable and the interaction term "Freshwater*Low_Corruption", however they first have to be added with one another. Thus, the effect that freshwater has on non-state conflicts in states with low corruption levels is -.017, this result is however also not significant.

The results in the multiple regression analysis above does not seem to correspond to with scatter plot in graph 3, where it shows some correlation between countries that have experienced conflicts and water scarcities. However, the regression analysis show that there is no correlation between freshwater and non-state conflicts when both are measured as continuous variables. However, it is still plausible that there is a connection between freshwater and non-state conflicts, only rather indicating that where there are non-state conflicts there are also water scarcities and that maybe levels of corruption can either encourage or decrease the likelihood of this being the case. Thus, in the following table an analysis is conducted where the freshwater variable and non-state conflicts have been dichotomized, along with levels of corruption as the intermediate variable.

Table 3: Dichotomous analysis with freshwater, non-state conflicts, corruption and the control variables

Model:	1	2	3	4
Variables:				
Change in freshwater	.275 (.189)	.323 (.182)	.467* (.195)	.530** (-193)
Levels of Corruption		-.319* (.135)		
Freshwater*Low_Corruption			-.366* (.147)	-.472* (.156)
GDP in Dollars				-.074 (.099)
% employed in Agri				-.197 (.146)
Polity_2				.258* (.120)
Constant	.375*	.494**	.375*	.653
Number	48	48	48	48
Adjusted R	.023	.111	.123	.190
R square	.044	.149	.160	.276

*p<0.05, **p<0.01, ***<0.001
Standard error in parentheses

Above, results from the analysis using dichotomized variables is presented. In model 1 only freshwater and non-state conflicts are included and seem to follow the same pattern as the regression with the undichotomized measures, showing that freshwater resources have 0 effect on non-state conflicts. In model 2 the dichotomized variable of corruption is included, and also demonstrate 0 effect, however corruption has a negative and significant effect on non-state conflicts. Furthermore, in model 3 an interaction variable has been included with the dichotomized freshwater variable and corruption variable. In this model, interesting results are unveiled. In model 3 the freshwater variable now demonstrates a positive and significant effect of .467* on non-state conflicts for African states that have high levels of corruption. Further adding the effect of the freshwater variable with the interaction variable "Freshwater*Low_Corruption", the results demonstrate that freshwater affects non-state conflicts significantly less in countries with low corruption levels, where

the coefficient for these countries is .101. Lastly, in model 4 the control variables have been included to check for illusory correlations. In this model, the effect by the freshwater variable in countries with high corruption levels has increased to .530** and stayed significant. Additionally, calculating the effect that freshwater has on non-state conflicts in countries with low levels of corruption, this coefficient is 0.058. This does not entail that freshwater have an effect of 0.058 in low corruption countries, since the significance of this coefficient is unknown. But what is known is that in model 4, the effect of freshwater on non-state conflicts is significantly less in low corruption countries than in high corruption countries, as well when the control variables have been accounted for.

8. Discussion and conclusion

The aim of this study has been to examine whether water scarcities effect the amount of non-state conflicts in African states depending on their levels of corruption. A quantitative analysis has been carried out on 48 African countries, utilizing data on their levels of freshwater resources, number of domestic non-state conflicts and corruption scores within the time-period of 1995-2016. This study has not only aimed to fill the gap of knowledge regarding if corruption does have an intermediate effect on the likelihood for non-state conflicts to occur during water scarcity, but additionally aims to more specifically examine whether non-state conflicts are uniquely affected by water scarcities and corruption. Thus, the research question for this thesis has been; *Does water scarcity affect non-state conflicts to different degrees in Africa depending on corruption?* Additionally, the hypothesis attached to the research question claims; H1: *As water scarcities increase, states with low corruption experience less non-state conflicts, whereas high corruption states experience more conflict.*

The results brought forward in this thesis partially supports the hypothesis. The findings in the main regression analysis demonstrate that there is no linear correlation between water scarcities and non-state conflicts, and that corruption does not moderate this effect. This implies that the hypothesis of this thesis is wrong, demonstrating that there is no continuous increase in non-state conflicts as freshwater decreases, and that the degree to which conflicts would occur as freshwater decreases does not depend on levels of corruption. However, in the dichotomized analysis the results instead show that where there is water scarcity there is also a greater likelihood of non-state conflicts to occur, and that the presence of conflicts depends on their levels of corruption. In other words, countries with a decrease in freshwater are less likely to experience non-state conflicts if they have low levels of corruption, than countries that have high levels of corruption. Retrieving back to the research question of this thesis, that asked if water scarcities affect non-state conflicts to different degrees depending on corruption, the answer is: Yes, water scarcities affects the likelihood of non-state conflicts to different degrees depending on corruption in African countries however not in a continuous manner.

In conclusion, the findings of this study have shown that where there is water scarcity and high levels of corruption non-state conflicts are more likely to occur. This could indicate that corruption is an important conditional circumstance that need to be accounted for in future sustainability and peace-development work. This study suggests, that equal and fair distribution of services and ecological distribution is important in order to prevent environmental conflicts from occurring. Where and how climate change will affect regions and countries all over the world, is unknown, however this study has demonstrated through conducting an analysis on water scarcities, non-state conflicts and corruption, that partial governments will experience greater consequences facing water scarcities. On the other hand, it is important to keep in mind, that many more intermediate factors are involved for why conflicts occur, as we have learned from previous research, from the case of Somalia and the case of the Senegal river. Conflicts are complicated, multidimensional and not easily explained trough a regression analysis. Conflicts are chaotic, confusing and deeply personal for the people involved and therefore need further and careful attention in order to be solved. Because of this, several suggestions for future research paths have been found in the process of writing this thesis. First, this study has aimed to measure how corruption levels contributes to non-state conflicts when there is water scarcity, claiming that lower levels of impartiality increases conflicts. However, Rothstein has provided additional suggestions for how to measure impartiality other than corruption, since corruption alone does not indicate all levels of partiality. A suggestion for future research is to deeper examine quality of government and how this interacts with the likelihood of environmental conflicts to occur, such as rule of law or bureaucratic transparency. Another suggestion is to look deeper into how corruption might result in increased non-state conflicts and to find further empirical evidence of how corruption might affect specific socio-economic or marginalized groups when they are affected by scarcity in natural resource scarcities. Lastly, another suggestion is to further examine new potential measurements of water scarcity that include both above ground water resources and underground water resources, to further create a threshold of when water is scarce using these metrics.

In closing, this thesis suggests that an increased focus on climate change and environmental degradation is vital when working towards a more secure and peaceful world. Additionally, this study proposes that countries facing water scarcities, must aim to conduct fair and equal governance for all citizens of all ethnic and social groups, for the purpose of protecting the most valuable resource there is: Peace.

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11. Appendix

Appendix 1: List of African countries included in the analysis

1. Algeria
2. Angola
3. Benin
4. Botswana
5. Burkina Faso
6. Burundi
7. Cameroon
8. Cape Verde
9. Central African Rep
10. Chad
11. Comoros
12. Congo, Dem. rep
13. Congo, Rep
14. Cote d'Ivoire
15. Djibouti
16. Egypt
17. Equatorial Guinea
18. Eswatini
19. Gabon
20. Gambia
21. Ghana
22. Guinea
23. Guinea-Bissau
24. Kenya
25. Lesotho
26. Liberia
27. Libya
28. Madagascar
29. Malawi
30. Mali
31. Mauritania
32. Mauritius
33. Morocco
34. Mozambique
35. Namibia
36. Niger
37. Nigeria
38. Rwanda
39. Senegal
40. Sierra Leone
41. Somalia
42. South Africa
43. Tanzania
44. Togo
45. Tunisia
46. Uganda
47. Zambia
48. Zimbabwe