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Understanding environmental terrorism in times of climate change: Implications for asylum seekers in Germany

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ABSTRACT

With an increasing global population and undeniable climate change, environmental terrorism is causing unprecedented levels of human insecurity. The use of resources as weapons of armed conflict is particularly effective on vulnerable societies, triggering large-chain global migration-related issues. This research advances the understanding of environmental terrorism, addresses the connections of resources and conflict, and the effects of climatic events on these phenomena. The existing related body of literature was scrutinized and complemented with an in-depth empirical study of 100 asylum seekers from 17 countries hosted in German facilities. The results point to the use of environmental terrorism by governments or opposition groups, or both, in Syria, Iraq and Afghanistan. Interviewees provided accounts of how perpetrators oppressed and harmed their enemies and civilians by attacking, drastically reducing or cutting the supply of resources, such as water or electricity, and by contaminating water with disease-causing agents. This paper elaborates on the conflict in Syria by presenting empirical evidence on the climate's contribution to the armed conflict in order to demonstrate that environmental terrorism is particularly effective on populations living in drought-stressed regions. Considering that 81% of interviewees reported observing water or electricity scarcity – or both – in their place of origin, this research claims that mounting climate pressure on resources is likely to increase the use of environmental terrorism, thereby contributing to migration and human insecurity across regions. The purpose of this research is to inform academia and policy makers on the strategic importance of monitoring and preventing resource related threats and violence.

1. Introduction

While environmental terrorism – the co-optation of resources to serve as both a target and instrument of armed conflict – has long been used as a form of violence, the magnitude of its effects today is unmatched. With an increasing global population and undeniable global warming, the destruction and control of resources is now capable of causing greater and longer-lasting human health and economic damage, political chaos and other adverse effects on human security and international peace than it would have in previous decades.

To date, the claim made by Schwartz (1998) holds true that the concept of “environmental terrorism” remains an ambiguous one among policy makers and academics across disciplines. According to Gleick (2006), environmental terrorism is defined as “the unlawful use of force against environmental resources or systems with the intent to harm individuals or

deprive populations of environmental benefit(s) in the name of a political or social objective.” The defining difference between environmental terrorism and other types of terrorism is the specific target of the former, which are the environment and resources (Chalecki, 2001; Schwartz, 1998). The equivocal debate over environmental terrorism stems from its complex distinction from environmental warfare, which is the use of war tactics that may cause collateral environment damage, but environmental resources are not intentionally being targeted (Chalecki, 2001; Gleick, 2006; Schwartz, 1998; United Nations, 1976). Differentiating between environmental terrorism and environmental warfare is challenging during armed conflict as unlawful acts against non-combatants are not exclusively carried out by formally organized groups,¹ but also by states (Chalecki, 2001). Moreover, during armed conflicts, collateral environmental damage may occur and accordingly it is complex to determine whether resources were targeted or damaged intentionally. To remove any ambiguity, this research

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¹ As of the Uppsala Conflict Data Program (UCDP), a formally organized group is any non-governmental group of people having announced a name for their group and using armed force.

will use the term “conflict-induced resource scarcity” to describe the unlawful use of the environment and resources as weapons and tools during armed conflict, when the distinction between environmental terrorism and environmental warfare is uncertain.

Links between resource scarcity and national security are clear and growing and the threat of resources being targeted is real (Gleick, 2006). However, existing scientific literature on environmental terrorism remains limited and understanding of this phenomenon among academics, policy makers and the public requires timely analysis (Chalecki, 2001; Gleick, 2006, 1993; Yuzon, 1996). Environmental terrorism is considered more dangerous than conventional civil terrorism because the physical harm is not confined to the direct effect of the act of violence, resulting in long-lasting and widespread consequences for the affected population (Chalecki, 2001; Schwartz, 1998).

The use of water resources and systems as targets with incidents dates back to 681 BCE in the Tigris and Euphrates region, however, scientific literature and understanding among water managers and society remains limited (Gleick, 2014, 2006; Lloyd, 1961). Authors consider the chance that perpetrators strike at water resource and systems a concrete threat for human security and scientific literature on environmental terrorism mainly focuses on this natural resource as a target (Chalecki, 2001; Gleick, 2014, 2006, 1993; Schwartz, 1998). The literature's emphasis on water-related violence may be attributed to the increasing amount of data made available by the water conflict chronology of the Pacific Institute since the 1980s, as well as the high value of this resource as a target for environmental terrorism. Freshwater and water infrastructure are integral to ecological, human and economic systems, though unevenly and irregularly distributed across the globe. And while there exists no substitute for water, any disruption or control thereof has the potential for causing great physical hardship and economic damage on the impacted population (Gleick, 1993, 2006). Recent years have witnessed a global uptick in incidents of water-related violence, with 279 events related to water and conflict only over the last ten years (Gleick, 2014; Pacific Institute, 2019). And while they occur in many forms, research on the linkage between water and security often neglects the role of water in not only being a trigger for war, but also in its use as an instrument of armed conflict (Gleick, 2006, 2014; Tignino, 2010).

Today, water resources and systems are of increasing strategic relevance, as water scarcity is rising, accelerated by anthropogenic factors, whereby freshwater-related risks of climate change mount with increasing greenhouse gas concentration (Gleick, 2006; IPCC, 2014). Transformations in today's economy, climate and society continuously increase global water scarcity and estimates highlight that 40% of the world's population will live under water-stressed conditions by the middle of next century (De Amorim et al., 2018; OECD, 2013). Energy security is also considered vulnerable to climate change and other global risks. The debate about how climatic events may affect energy supply is become increasingly tenser, as it strongly influences economic development, health and quality of life (De Amorim et al., 2018; IPCC, 2014).

Research on climatic events and their consequences on human security recently regained momentum, building on earlier research on resource scarcity, an important mediating factor between climate and conflict (Brzoska & Fröhlich, 2015; Homer-Dixon, 1994; Hsiang, Burke, & Miguel, 2013; Scheffran, Brzoska, Link, & Schilling, 2012). Furthermore, the potential for increased migration is important to discuss in this context. It is among the most frequently cited link between climatic events and conflict, which is based on the conviction that climatic events can precipitate and cause resource scarcity, and ultimately may drive migration as well as conflict (Brzoska & Fröhlich, 2015; Burrows & Kinney, 2016). Overall, human insecurity almost never has single causes, and conflict of any kind is rarely, if ever, attributed to any one single motive (Gleick, 2014; IPCC, 2014). Therefore, climatic events are just one among many important factors contributing to conflict, migration and endangering human security (IPCC, 2014). The existing scientific evidence highlights that the impact of climatic events on societies and human security is shaped by the vulnerability specific to each affected entity and whether scarcity or abundance of natural resources affects the risk of conflict or leads to migration, is likely to

depend on intervening factors that make a state more or less vulnerable (Brzoska & Fröhlich, 2015; Koubi, Spilker, & Böhmelt, 2014).

The ongoing conflict in Syria is a widely discussed example of a conflict with complicated but direct connections to resource scarcity, in particular water (Gleick, 2014). It is characterized by multiple mechanisms and mediating factors that impact the relationship between climatic events and armed conflict. In fact, Ide et al. (2014) claim, that the link between climate and armed conflict may be observed in regions experiencing simultaneously a high exposure to climate change, high vulnerability to climatic events and high risk of armed conflict. Between 2006 and 2011, the country experienced a multiyear period of extreme drought that contributed to agricultural failures, economic dislocations, and population displacement to urban areas (De Châtel, 2014; Gleick, 2014). Syria's vulnerability during this period of extreme drought was exacerbated by a combination of an exponentially increasing population growth rate, the government's overambitious agricultural development projects, and multiple long-term droughts that kept the country in moderate to severe drought from 1998 through 2009, with 7 of 11 years recording rainfall levels that fell below the 1901–2008 normal (De Châtel, 2014; Gleick, 2014; Kelley, Shahrzad, & Mark, 2015). Overall, the Syrian conflict has many roots beyond its official start in 2011, however, Gleick (2014) argues that these key environmental factors include both direct and indirect consequences of water scarcity, the impacts of climatic events and the use of resources as a weapon or tool during conflict.

Various targeted attacks on water systems and power plants by the government and opposition groups were reported by the media, including the bombing of water resources in 2017 by the Syrian government in Damascus that cut off access to the water supply for 5.5 million people (Miles, 2017). Prior to that, anti-Assad rebels took over the Tishrin hydroelectric dam on the Euphrates River in late 2012 (Mrroue, 2012). In 2013, the formally organized group called the Islamic State (IS) occupied the Tabqa al-Thawrah dam, which is the largest hydroelectric dam in the country (Saad, 2013). The IS appropriated dams, canals and reservoirs as weapons in order to deny water to regions outside of their territories and flooded the route of approaching enemy armies (Beach, 2015). In the city of Raqqa, the IS exhausted water reserves and disrupted distribution networks, forcing residents to use untreated water, which led to the spread of waterborne diseases such as Hepatitis A and Typhoid (Ibid.). Moreover, they used their partial control over the country's energy infrastructure as a bargaining chip to demand payment for utility services and reportedly collected \$20 every two months from business owners in exchange for electricity, water and security (Beach, 2015; Humud, Pirog, & Rosen, 2015).

This paper seeks to increase the understanding of environmental terrorism, in particular the targeting of water and electricity resources. It addresses the connection between resources and armed conflict, the effects of climatic events on these phenomena, and contributes to the debate on how the scarcity and changes of the distribution of resources increase the vulnerability of societies to environmental terrorism and climatic events, affecting human, national and international security. This research draws from existing scientific literature, participant observations and individual semi-structured interviews capturing the experiences, perceptions and decisions of 100 asylum seekers from 17 countries that were conducted in eight different migrant housing centers and local networks located across three German federal states. This paper sought to explore the following main question, ‘how did asylum seekers perceive resource scarcity in their place of origin and how is it associated with conflict and climatic events?’ and answer the detailed questions of ‘how is water and electricity scarcity used strategically as weapon and tool?’

2. Theoretical framework

Pressure on resources is expected to increase significantly given the growing global population, which is projected to reach 8.5 billion in 2030 and 9.7 billion by 2050 (United Nations, 2019). In particular, the provision of fundamental resources such as water and electricity are under significant stress in the 47 least developed countries, which are among the world's fastest growing and putting mounting pressure on already strained resources (Ibid.).

Climate change has longstanding, recurring and sweeping occurrences, though, and while climate change has evident ecological effects, the effects and dangers of climatic events on societies are less tangible, visible and predictable (Berlemann & Steinhardt, 2017; Geddes & Scholten, 2016). The body of literature reveals a general consensus that changing climate will affect human security² across the globe. And while climate is not the only factor influencing social and economic outcomes, it is a major factor that impacts societies on numerous dimensions and degrees (Carleton & Hsiang, 2016; IPCC, 2014). However, the impact of climatic events on human beings and societies is shaped by the vulnerability specific to each affected entity (Brzoska & Fröhlich, 2015; Scheffran et al., 2012). Across academic disciplines, researchers analyze the extent to which climatic events are responsible for interpersonal violence, armed conflict or non-state conflict, terrorism and political instability (Hsiang et al., 2013). Studies reveal that these phenomena date back to 10,000 BCE, and the evidence shows that the association of climate and conflict has been observed across all types of conflict, human history, regions of the world, income groups and the various duration of climatic events (Ibid). While overall scientific research does not conclude on a strong positive relationship between climatic events and conflict (Buhaug et al., 2014; Theisen & Petter, 2013), theories on the potential of climatic events to increase conflict are mounting and diverse (Brzoska & Fröhlich, 2015; Gleditsch, 2012; Scheffran et al., 2012). At the same time, the literature underscores the important mechanism that conflicts increase societies' vulnerability to climatic events in multiple forms (Buhaug et al., 2014; Scheffran et al., 2012).

The connection between climatic events and conflict is not linear, as multiple mediating factors are at play (Buhaug et al., 2014; Scheffran et al., 2012). Since the 1980s, when the links between climate and conflict was a burgeoning area of academic research, resource scarcity has been considered to be an important link to the relationship. Today, the extent to which and how the scarcity and changes of distribution of natural resources such as minerals, water, energy, and arable land affect conflict is highly contested (Hsiang et al., 2013; Koubi et al., 2014; Scheffran et al., 2012). Koubi et al. (2014) highlight that existing scientific literature provides significant theoretical arguments linking resource scarcity or abundance with conflict, however, empirical evidence remains limited, particularly for the nexus between resource scarcity and conflict.

With the level of scarcity and vulnerability of resources becoming more pronounced, environmental terrorism can now cause far more deaths, property damage, political chaos and other adverse effects compared to previous decades (Chalecki, 2001). The concept of terrorism has numerous definitions and is highly contested among policy makers and academics, who are debating whether terrorism exists in isolation from warfare (Chalecki, 2001; Gleick, 2006; Schwartz, 1998). In fact, the difference between environmental terrorism and more conventional environmental warfare reflects the larger dichotomy between terrorism and warfare in general (Chalecki, 2001). Existing scientific research primarily discusses terrorism based on the 'just war theory' and explains the distinction between warfare and terrorism — based on these criteria that go back to Roman law (Chalecki, 2001; Sussmann, 2013). 'Just war theory' seeks to ensure that war is morally justifiable and is divided into two independent sets of rules: the 'jus ad bellum' criterion posits that war must be declared for a good reason and the 'right to go to war' must exist; and the second criterion, 'jus in bello,' is a set of rules that determine the 'right conduct in war,' highlighting that war must be conducted in a 'just' fashion. Chalecki (2001) explains that the 'jus ad bellum' criterion is difficult to apply to terrorism, as a universally accepted judgement on what constitutes rightness does not exist. Moreover, terrorism clearly violates the second set of rules, since targeting non-combatants is a central element of its strategy (Chalecki, 2001).

Environmental warfare follows the Environmental Modification Convention (ENMOD), formally the 'convention on the prohibition of military or any other hostile use of environmental modification techniques,' approved in 1976, which was based on the 'jus in bello' criterion, determining

that while collateral environment damage may occur, environmental resources are not to be intentionally targeted during war, unless there is a direct military advantage of doing so (United Nations, 1976). Unlike environmental warfare, the specific aim of environmental terrorism involves targeting the environment and resources themselves for a political, social or economic objective (Gleick, 2006). Terrorists targeting resources do not apply the 'jus in bello' criterion on the environment and on humans as they directly attack human non-combatants and seek to have a psychological effect on the enemy (Chalecki, 2001; Gleick, 2006). While acts of terrorism generally have four essential components, namely motivation, means, target and enemy, the differentiating characteristic of environmental terrorism lies mainly in the target, which is environmental and not human. As the distinction between environmental terrorism and environmental warfare is particularly ambiguous for incidents during armed conflict, this paper applies the term 'conflict-induced resource scarcity' to highlight the unlawful use of the environment and resources themselves as weapon and tool during armed conflict.

While there are several types of environmental terrorism, two broad categories are highlighted in existing literature (Chalecki, 2001; Gleick, 2006; Schwartz, 1998). First, the environment or resources can be attacked in order to create destruction, compromise or control of the target (Chalecki, 2001). For instance, water infrastructure - dams, reservoirs, treatment plants or pipelines - can be attacked directly, leading to the destruction of the facility or control over the water or energy supply or both (Gleick, 2006). Secondly, environmental resources such as water, crops, or livestock can be contaminated through the intentional introduction of poison or disease-causing agents to harm a human population (Chalecki, 2001). For example, when water is used as delivery vehicles, poison or disease-causing agents are used to render water unusable, to destroy purification and herewith disrupt the supply of it (Gleick, 2006).

The attractiveness of resources as a terrorist target depends on their physical attributes such as scarcity and prestige, the physical location, vulnerability to attack and capacity for regeneration (Chalecki, 2001; Gleick, 2006). For instance, water is a vital resource for human welfare and economic development and the scarcity, prestige and vulnerability of water and water systems are particularly high, thereby increasing the chance that terrorists strike at this resource (Gleick, 2006, 2014). Energy is a further essential resource to support human needs and economic development and in recent years, the discourse over energy security³ has gained prominence as a consequence of terrorist threats (De Amorim et al., 2018). Hydroelectric projects and dams can be attacked, especially where there exist gross inequities concerning energy supply (Gleick, 1993). Moreover, energy supply can be disrupted through attacks on oil production, shipping, storage facilities, and routes, which decreases oil production and cause price spikes that can seriously harm world economies and human well-being (Cohen, Kreutzer, Beach, Carafano, & Ligon, 2011; De Amorim et al., 2018). This research focused on the analysis of two resources – water and electricity – following along the focus of existing literature on environmental terrorism. In fact, the interconnections between water and electricity are numerous as for instance, by attacking a hydroelectric dam, terrorists may obtain control over water and electricity supply. Both resources are targeted by terrorists across regions and considered important for the understanding of environmental terrorism.

While resource scarcity is considered an important liaison between climatic events and conflict, among the most frequently cited links is the potential for increased migration (Brzoska & Fröhlich, 2015; Burrows & Kinney, 2016). So far, the body of knowledge on the relationship between these phenomena focuses entirely on a possible security risk that migrants,⁴ who are motivated by climatic reasons, pose on receiving locations, despite

² According to the IPCC (2014) (p.759), human security in the context of climatic events can be considered, 'a condition that exists when the vital core of human lives is protected, and when people have the freedom and capacity to live with dignity.'

³ As of the International Energy Agency (2019) 'energy security' can be defined as the uninterrupted availability of energy sources at an affordable price.

⁴ This paper follows the United Nations' definition of 'international migrant', which comprises 'any person who changes his or her country of usual residence' (United Nations 1998) and the term 'migrant' is used broadly including all people who have left their habitual place of residence, irrespective of legal status, causes for the move, duration of the stay, and nature of the movement as voluntary or involuntary.

a so-far limited theoretical basis and empirical evidence for this proposition (Brzoska & Fröhlich, 2015).

3. Methodology

A qualitative phenomenological research approach with individual semi-structured interviews and participant observation was applied to capture detailed narratives of the perceptions, lived experiences, decisions, and behavior of migrants who moved to Germany via irregular means.

3.1. Data collection

Individual semi-structured interviews were conducted in German migrant housings with 105 migrants from 17 countries, and with one stateless person. However, due to a number of challenges, including missing information of interviewees, one inexperienced interpreter, and unsigned consent forms, a total of 100 interviews were validated and analyzed. The data collection process was undertaken between the end of December 2016 and mid-April 2017. Each interview lasted between 30 and 75 min, and was conducted in the language of the respondent's choice. The interviews in Arabic, Kurdish Kurmanji and Sorani, Somali, Persian, Tigrinya, Dari Persian, Turkish, and Urdu were conducted with the assistance of experienced interpreters while those in German, English, and French were conducted directly with the principal researcher. To ensure the safety and comfort of the interviewees, the interviews were held either in the privacy of the interviewee's quarters or in an undisturbed location, as agreed upon by both parties. All interviewees were informed orally and in writing about the research purpose, specifying the advantages and disadvantages, and terms of confidentiality of the research project, in addition to the voluntary nature of their participation. Both the interviewee and interpreter were asked to sign a consent form prior to starting their interview. The approval to conduct interviews in the different migrant housings was sought from the directors of the facilities and, in specific cases, from the federal government's regional board.

The individual semi-structured interviews consisted of open-ended questions that addressed general information about the interviewee's place of origin and the motivations for leaving it. Moreover, the impact of possible climatic events on the interviewee's daily lives was questioned, followed by an inquiry on resource use and alterations. In particular, migrants were interrogated on their perceived alterations of water or electricity supply, or both, in their place of origin. Those who did perceive negative changes were asked to quantify the scarcity in hours of electricity or water per day. In addition, the perceived tensions or conflict and inflow or outflow of migrants were investigated. The interviews were documented following handwritten protocols, which mainly summarized the responses of the interviewee, though also included a verbatim protocol of specific statements. The data were later transcribed into a digital datasheet and recorded in the NVivo software. To synthesize the data collected, an explorative thematic analysis was conducted. The field notes taken from participant observation and non-verbal communication during the interviews were triangulated to support the reflections and analysis.

3.2. Study participants

To capture a diverse and comprehensive sample of interviewees, the interviews took place in four initial reception facilities and four follow-up accommodations located throughout the federal states of Hesse, Berlin, and Brandenburg. Purposive sampling was applied to obtain a large and diverse research sample, for which the criteria were that interviewees be migrants in Germany who were at least 18 years of age. The popularity of the sports classes offered by the researcher and the 'snowball' method helped to recruit a larger number of migrants who volunteered to participate in the study and created the opportunity to observe daily interactions. The recruitment of interviewees was stopped once an adequate level of saturation of information was attained. In fact, the study population resulted in a highly-cultural heterogeneous group (Table 1).

Table 1

Demographic profile of interviewees.

Demographic characteristics n = 100	(%)	Demographic characteristics n = 100	(%)
Gender		Main occupation	
Female	36%	Housewife	17%
Male	64%	Shopkeeper	12%
		Student at university	9%
Age of interviewee		Student at school	7%
18–28	44%	Corporate employee	7%
29–39	30%	Unemployed	6%
40–50	22%	Construction worker	5%
51–61	4%	Mechanic	4%
		Teacher	4%
Country of origin (or residency, if more than 10 years)		Farmer	3%
Syrian Arab Republic	34%	Security guard	3%
Iraq	12%	Hairdresser	3%
Afghanistan	11%	Truck driver	2%
Eritrea	6%	Carpenter	2%
Iran (Islamic Republic of)	5%	Baker	2%
Somalia	5%	Soldier	2%
Kenya	5%	Metalworker	2%
Turkey	4%	Shepherd	2%
Ethiopia	3%	Taxi driver	2%
Cameroon	3%	Hotel owner	1%
Pakistan	3%	Shoemaker	1%
Egypt	2%	Water and soda seller	1%
Yemen	2%	Electrician	1%
Chad	1%	Doctor of medicine	1%
Sudan	1%	Cook	1%
Russian Federation	1%		
Jordan	1%	Year when interviewee applied for asylum	
Stateless	1%	2017	4%
		2016	77%
Marital status		2015	15%
Married	57%	2014	1%
Single	36%	2012	1%
Widowed	4%	2009	1%
Divorced	3%	2003	1%
Religion			
Christian	14%		
Muslim (Ahmadi, Alawit, Shia, Sunni)	48%		
Hindu	1%		
No religious or ethnic affiliation	1%		
Unassigned	36%		

3.3. Methodological considerations and limitations

The recruitment process proved to be a major challenge because many migrants were reserved or anxious, most likely because they did not want to relive past trauma. The consent form presented an additional hurdle, as some migrants were apprehensive about signing it while others were visibly ashamed of being illiterate. Identifying qualified interpreters was also demanding, especially because the interviews had to be conducted in nine languages. The gender and cultural background of the interpreters put forth an added challenge, as manifested by the reluctance or refusal of male interviewees to participate with female interpreters. While great effort was put into finding qualified interpreter for each interview, one cannot conclusively state that all potential misunderstandings and misinterpretations were avoided. The identity of the interviewer – a white European woman and outsider of the migrant housing communities – represented a further limitation, as language, gender, and cultural barriers were likely to have influenced the content and amount of data shared. However, an attempt to balance these limitations was made through careful attention to the interview context and extensive dialogue with the interviewees. Moreover, in response to the feedback provided by the first round of interviewees who explicitly refused to be recorded, a recording device was not used to document the interviews. All possible efforts were taken to provide a trustworthy atmosphere to the interviewee, though,

considering the sensitivity of the subject and vulnerability of asylum seekers in a foreign country, one cannot be certain if the interviewees always reported the truth. This research recognizes its one-sided focus, as it solely includes migrants that already moved to Germany. Why some people stay in one place whereas others choose to leave is a crucial question to understanding the decision to migrate amid a complex environmental and social context and should be contemplated in future studies. Moreover, while this research focused on the analysis of water and electricity as target for environmental terrorism, it acknowledges that the scrutiny of further resources such as food and livelihood should be considered in a follow-up study.

Given the aforementioned limitations, as well as the relatively small research sample size of 100 interviewees, this research does not claim to be representative of the overall migrant population in Germany.

4. Results

The findings of this empirical research describe interviewees reported resource scarcity, experienced climatic events, human mobility, violence and conflict within different contexts.

4.1. Resource scarcity

Electricity or water scarcity, or both was reported by 81 interviewees (Fig. 1). Nearly half (45%) of the interviewees experienced resource scarcity in their place of origin. However, 36% of interviewees from Syria, Iraq, Yemen and Afghanistan reported the beginning or a significant increase of electricity or water scarcity, or both, after violence started in their place of origin (Fig. 1).

Syrian interviewees who worked in the agriculture sector reported observing increasing water scarcity and continuous reduction in groundwater since 1997. However, the majority of the group of Syrian interviewees reported electricity or water scarcity or both, specifically after violence erupted in their place of origin. One of them recounted that “before the war, water scarcity was only a problem for farmers as we had two wells in our village. After the war started, there was no water and electricity for anyone.” Five Syrian interviewees did not single out resource scarcity, possibly because they generally resided in major cities like Damascus and Homs. One interviewee from a village explained that there was no water scarcity because two rivers ran through his city.

Five Syrian interviewees who lived under the rule of the IS or Free Syrian Army (FSA) reported that the formally organized groups took control over water and electricity supply in their city and cut or reduced it to control and punish the society. Interviewees from Aleppo reported that the IS cut telephone lines in their city. An interviewee from the Yarmouk

camp, a district of Damascus, who lived under the ruling of the FSA, explained that their access to electricity was restricted to 2 h or less per day and they had little water. Other Syrian interviewees explained that after the war started or after their cities or neighboring cities were invaded by formally organized groups, the government completely cut or heavily reduced the electricity and water supply. An interviewee from Al-Hasakah reported that “before the war, there were no problems, but after the war started, there was suddenly no water and we only had 1 h of electricity per day. The government claimed that the resource scarcity was due to the bombing of factories.”

Six Iraqi interviewees reported resource cuts or shortages due to the ruling of the IS and the Kurdish government. Iraqi interviewees explained that once the IS had entered their cities, the water supply was extremely reduced, and electricity supply was reduced to 1 h per day, or to no electricity at all. Furthermore, an interviewee from Sulaymaniyah explained that since the Kurds started governing the region in 1991, electricity was reduced to 3 h per day and the water supply was strongly reduced. He explained that “to not provide water and electricity is all politics because the government wants that the people are occupied and do not think about politics.”

An interviewee from Kunduz, Afghanistan recalled that the formally organized group Taliban cut electricity lines and pressured telecommunication companies to cease services at night in order to control the society. He also explained that as the Taliban had important supporters, the government was not able to act upon these aggressions. Moreover, an Afghan interviewee from Baghlan reported that he survived an attack perpetrated by Taliban in his university, where they poisoned the drinking water and consequently 30 people died. A farmer from Herat, Afghanistan explained that the Taliban were in his city because it was rich and had a river and a dam; he recalled so-called ‘water wars’ with terrorists from Pakistan and Iran and the major problems due to badly managed and distributed water supply.

Many Syrian and Iraqi interviewees who reported resource scarcity after the conflict started in their place of origin, reported about adaptive strategies including investing in a generator for electricity, which was also used to pump up water from the well, buy expensive water in bottles and multiple interviewees described how people handled the scarce water supply by using the water of the river since the resource scarcity and violence started.

More than half (56%) of interviewees reported violence, armed conflict and non-state conflict as their main motivation to leave their place of origin (Fig. 2), out of whom 22 left due to violence and persecution by formally organized groups, 19 fled because of the overall circumstances of armed conflict, and 15 left their country due to the forced military service. This interview sample of 56 interviewees who left the country due to violence, armed conflict and non-state conflict includes 49 interviewees who also reported resource scarcity.

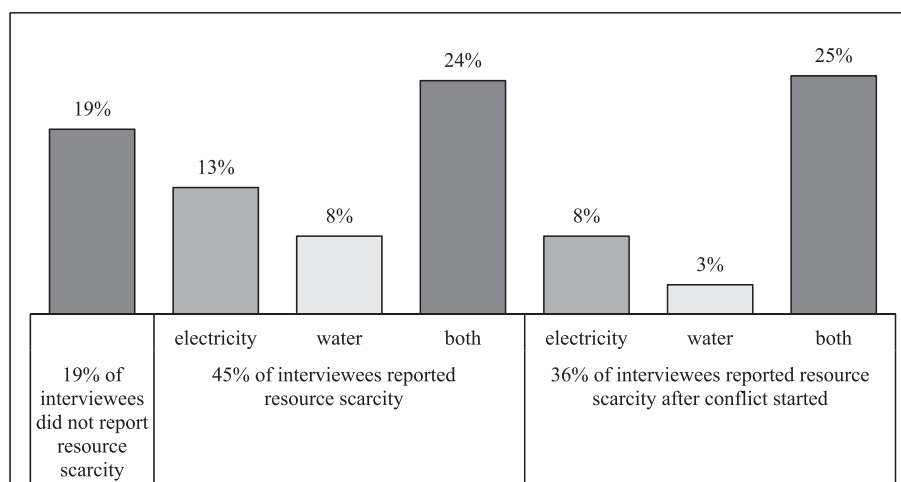


Fig. 1. 81% of interviewees reported resource scarcity in their place of origin.

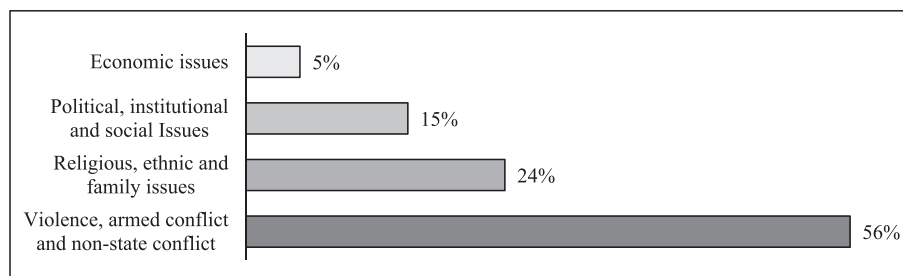


Fig. 2. Main driver for migration.

4.2. Climatic events, conflict and human mobility

A Kenyan interviewee described the society in Mandera as “trapped” because the continuous droughts, heat and water scarcity impoverished the region significantly and only a few rich people had the resources to move to neighboring villages during the driest months of the year. However, he explained that moving is dangerous because migrants are chased out by the receiving communities that are from different ethnicities.

Syrian interviewees working in the agricultural business from the north-eastern Al-Hasakah governorate were severely impacted by the consecutive droughts that occurred between 1999 until 2000. They explained that during this period, those who had the financial means moved to Europe or the United States; those with less financial means moved to Syrian urban centers. While different Syrian interviewees of this study narrated about the consecutive droughts at the end of the 1990s, they also mentioned a significant increase in violence in their home regions.

Moreover, interviewees from different regions in Syria reported about the dire straits during the droughts that started in 2006 and remembered family members, friends and acquaintances who moved to urban areas to find a job. A farmer's wife from Al-Malikiyah reported that her family suffered the most in the three years of consecutive droughts that lasted between 2006 and 2008. During this period, their livestock died, they lost their entire crops, and consequentially were forced to sell their property and move to Damascus.

An interviewee from the surroundings of Aleppo explained that her family only survived the multiple droughts over the last several years because they had groundwater and a river that ran through their property, which had barely enough to feed their cattle. Moreover, since February 2016, her village was occupied by the IS and therefore the government had reduced the resource supply to a minimum and heavily bombed her village. As she explained, the existence of the river made her entire village less vulnerable to the reduction of water supply during the conflict and to climatic events, compared to a nearby village that was heavily affected by droughts.

The severe droughts between 2015 and 2016 strongly affected, among others, the family of an interviewee from the north of Syria. She explained that the drought intensified existing difficulties they were facing since armed conflict started, which included water and electricity scarcity and exorbitant fuel prices that impeded them to use their well. These challenges, in addition to the drought forced the interviewee's father to give up his agricultural business. However, unlike his daughter and the majority of his relatives, he did not migrate. The interviewee firmly explained that “despite these problems my father did not leave his home, because no one leaves his country because of lost crops or a drought, however because of war.” While interviewees from Somalia, Iraq and Syria reported immigration to urban areas, they did not recall farmers, resource scarcity and conflict or both among migrant communities in urban cities.

5. Discussion

The results of this research show that 45 interviewees plainly reported resource scarcity in their place of origin and additionally 36 interviewees, the majority of Syrians, Iraqis, Yemenis and Afghans, reported that water

and energy scarcity only began after armed conflict started and when formally organized groups or the local government took control over the supply of resources. Interviewee's perceived resource scarcity and narratives highlight the use of environmental terrorism, in particular water and energy resources used as weapon and tool in Syria, Iraq and Afghanistan. Results confirm the claim of [Gleick \(2006\)](#), that environmental terrorism is a real threat to human security across regions.

Impacts on water distribution systems and intentional attacks on water systems and power plants, perpetrated by both the government and formally organized groups such as the IS, FSA and Taliban were reported by interviewees. Syrian and Iraqi interviewees specifically explained how the IS used their control over water, water systems and electricity plants as a strategic weapon to oppress enemies and civilians. Interviewees from Syria confirm that the Syrian government, the IS and FSA attacked or drastically reduced or cut the supply of water and electricity and how this impacted their daily lives, significantly increased insecurity and forced them to adapt to the circumstances. For instance, narratives of interviewees from Aleppo and surrounding villages, reporting the attack and control of water systems and electricity plants by formally organized groups and the government, coincide with media reports tracked in the water conflict chronology of the Pacific Institute. In 2012, media reports highlight, that a major pipeline delivering water to the city of Aleppo was badly damaged during conflict and other reports describe how rebels overrun government forces and capture the Tishrin hydroelectric dam on the Euphrates River in the Aleppo governorate ([BBC, 2012](#); [Mroue, 2012](#); [Pacific Institute, 2019](#)). Moreover, Afghan interviewees reported how the Taliban demonstrated their clout by disrupting the energy supply and using water as delivery vehicle to poison its enemy. Although the reported incidents of Afghan interviewees do not coincide with recorded attacks in recent years, they highlight that Taliban uses environmental terrorism to harm individuals or deprive populations of water and electricity in the name of their political or social objectives.

Resource scarcity was not specifically mentioned as a driver for migration, however interviewees from multiple backgrounds explain that the scarcity of water and electricity significantly increased their vulnerability, as it deteriorated their living conditions and for many, resource scarcity significantly aggravated circumstances of conflict. Therefore, this research assumes that among the 49 interviewees who fled their country due to conflict, armed conflict, non-state conflict, and also reported resource scarcity, the challenges faced due to resource scarcity may have influenced their decision to migrate.

The results of this research show that resource scarcity is an obviously perceived challenge across regions, as 81% of interviewees reported water or electricity scarcity, or both in their place of origin. Now, mounting global population and climatic pressure on resources is likely to increase scarcity of resources, value and attractiveness for environmental terrorism. Syrian interviewees confirm the multiyear period of extreme drought, which contributed to agricultural failures, economic dislocation, and migration between the years 2006 and 2011 ([Gleick, 2014](#); [Kelley et al., 2015](#)). This long-term drought, which authors coined as the most severe drought in history of the fertile crescent region, significantly impacted interviewees from the north-east of Syria, however, was also perceived by Syrians from different regions of the country ([Gleick, 2014](#); [Kelley et al.,](#)

2015). Interviewees reported migration across borders or to urban cities, also due to climatic events, and confirmed multiple factors which intensified the effects of the long-term drought. Firstly, it was intensified by an increased demand for resources in Syria, as the country's population grew from four million in the 1950s to 21 million in 2010 (Kelley et al., 2015; Worldometers, 2019). Moreover, despite the growing water scarcity and frequent droughts, the government of President Hafez al-Assad (1971–2000) initiated unsustainable water and agricultural policies, which overstretched both land and water resources (De Châtel, 2014; Kelley et al., 2015). As different interviewees confirm, this factor contributed to significantly deplete the groundwater levels and shaped Syria's vulnerability to droughts. Lastly, the late 1990s droughts strongly impacted the population, in particular farmers and pastoralists in the north and northeast of Syria, as various interviewees affirmed. Kelley et al. (2015) claim, that Syria never fully recovered from these severe droughts, leaving the country particularly vulnerable to the long-term drought, which hit the country between 2007 and 2011. Based on the collected evidence, this paper claims that conflict-induced resource scarcity used during the Syrian conflict was particularly effective on the vulnerable Syrian populations in drought-stressed regions. Therefore, while climate is just one among many factors, climatic events could be considered a contributor that spurred the Syrian conflict.

Based on narratives highlighting mounting climate pressure on resources, this research claims, that climatic events may affect conflict, the decision to migrate and the use of environmental terrorism can be expected to increase in particular in drought-stressed regions. However, it is important to note, that till date, other societal challenges remain dominant as main factors, in particular for migration (Fig. 2). Shifts in climate take decades to be clearly understood and assimilated, if at all, and oftentimes perceptions and actions, either positive or negative, only occur when a crisis is acute (Brzoska & Fröhlich, 2015).

The findings confirm the non-linear strong connections between climatic events and conflict (Barnett & Adger, 2007), which is firstly demonstrated by multiple existing intervening factors. Secondly, results underline, that on the one hand, a society effected by climatic events is more vulnerable to environmental terrorism, however, on the other hand, this tactic also leaves a society more vulnerable to climatic events. Empirical results show that environmental terrorism carried out by formally organized groups or governments or both, can significantly increase a society's vulnerability, also to climatic events. Syrian interviewees reported how climatic events, which hit the country during the conflict, exacerbated or contributed to existing difficulties, including resource scarcity, they faced during conflict. This research underscores the important mechanism outlining that conflicts increase societies' vulnerability to climatic events (Buhaug et al., 2014; Scheffran et al., 2012) and suggests that climatic events may have impacted vulnerable societies that were already suffering from conflict-induced resource scarcity during armed conflict. Yet, when climatic events hit already vulnerable populations, the climate impact will be significantly stronger, as the society's sensitivity and adaptive capacity to climatic events is weakened, effecting individual's livelihoods and health, among many other factors of human security. This, in turn, may potentially intensify an ongoing conflict or lay the ground for increased sociopolitical instability and cause migration movements towards more resource-rich regions. This analysis demonstrates that the consequences of climatic events and conflict may present similar circumstance. Therefore, this research suggests that conflict may cause climatic event-like circumstance, where environmental terrorism causes comparable circumstances as climatic events, increasing vulnerability of affected entities, aggravating livelihood- and overall human insecurity.

This research specifically investigates the widely discussed link in literature, where climatic events cause rapid mass migration, leading to conflict in receiving areas. However, the resulting empirical evidence on this link remains ambiguous and inconsistent, conform to existing theoretical and empirical evidence (Brzoska & Fröhlich, 2015). None of the interviewees engaged in conflict over resources in receiving locations or perceived violence among migrants or with residents in urban centers. While existing

theory should not be discarded, this research supports the widespread skepticism on this link and discords based on the findings, existing evidence revealing that most migration flows, did not lead to conflict (Burrows & Kinney, 2016), and mainly because this theory generally assumes a mono-causality in migration decisions, which implies that people migrate solely due to climatic events, which is rarely the case (Black et al., 2011). This does not imply that climatic events are irrelevant for future patterns of migration or migration linked to conflict. However, while migration studies have witnessed tremendous progress in the understanding of the environment over the past 20 years (Cattaneo & Peri, 2015; Hunter, Luna, & Norton, 2015), authors argue that the climate-migration literature has placed too much emphasis on climate as the driving factor of migration (Brzoska & Fröhlich, 2015).

6. Conclusions

Rising political and scientific attention on the potential impacts of global warming on human, national and international security and peace, and the ambiguity and complexity of environmental terrorism, have inspired this paper. To the last point, this research was committed to advance the understanding of environmental terrorism, the linkages among resources and human security and the impact of climatic events on this relationship. For this purpose, existing related scientific literature was scrutinized and individual experiences and decisions of 100 asylum seekers from 17 countries hosted in German facilities were explored.

This paper argues that populations affected by climatic events, especially those living in drought-stressed regions, are particularly vulnerable to environmental terrorism. The Syrian conflict may be rooted in long-standing political, social and ideological disputes and economic dislocations from both global and regional factors. However, the direct and indirect consequences of water scarcity, including the impacts of climatic events provided ideal conditions for the use of conflict-induced resource scarcity. Evidence of environmental terrorism in Syrian, Iraq and Afghanistan underlines that the links between resource scarcity and national security are clear and growing and the chance that governments or opposition groups strike at water systems, electricity plants and use resources as target, weapon and tool, is real.

Moreover, results show that society's suffering under environmental terrorism may become more vulnerable to climatic events. Therefore, this paper suggests that research on the nexus between climatic events and conflict, in particular environmental terrorism, may consider a diverse research approach, where conflict causes climatic event-like circumstance. In light of the prediction that climate change will be an increasingly important driver of human insecurity in the future, the pace of gathering knowledge on climate's impact could be accelerated by considering the non-linear relationship and parallels of risks and consequences of climatic events and conflict on human security.

Scientific research has an important role to fill in reversing the current neglect of research on the linkages between water and international peace and security and the relationship between water and conflict, fostering analysis on how water is used as weapon or tool, or both during conflict and not only as factor triggering conflict (Gleck, 2006, 2014; Tignino, 2010). In addition, the evidence that perpetrators of environmental terrorism are not exclusively formally organized groups, however, include governments may foster research and increase monitoring of government's warfare tactics.

Based on the scientific evidence that climate change is real and global population growth projections definite, it is expected that strain on resources, value, vulnerability and attractiveness as terrorist target increases continuously. Therefore, environmental terrorism is likely to increase, in particularly in drought-stressed regions, causing more and longer human health and economic damage over time, unless mechanisms for reducing resource insecurity can be identified and implemented.

Since 2010, the United Nations General Assembly recognizes the human right to water and sanitation and that the denial of water to civilians constitutes a war crime. Findings of this research on conflict-induced

resource scarcity in Syria, Iraq and Afghanistan, should persuade policy makers to protecting water resources, based on the UN resolution 64/292 and ensure energy security in conflict zones and raise global awareness. Academia and the international community should monitor resource related threats and prevent resource-related violence. Moreover, it becomes decisive for human security to improve and implement conflict-sensitive mitigation and adaptation strategies that contain conflict, for instance with strategies impeding formally organized groups to gain control over water, water systems and power plants. Precautions actions to reduce the risks of conflict and resource scarcity could be sought through international cooperation, effective institutional frameworks, conflict management, and governance mechanisms to prevent resource-related violence. Moreover, practitioners and NGOs in conflict zones may emphasize the need of resource and provide assistance and information especially among populations at risk.

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