TRT world forum 2019

Closed Session

Environmental Security: Tragedy of Commons

Dr Şirin Duygulu

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The TRT World Forum 2019, recognised as one of the most significant political events of the year, took place from October 21st- 22nd at the Istanbul Congress Center with over one thousand esteemed guests and panellists. Consisting of nine keynote speeches and exclusive talks, 12 public sessions, and 15 closed sessions this year's Forum succeeded in providing a platform for serious engagement with the most pressing challenges of our time. The themes of the sessions ranged from the rise of far-right terrorism, populism and nationalism, environmental issues, the future of the Middle East, trade wars, the future of the European Union and cooperation of emerging powers. Uniting all of these themes was a focus on the fragmented state of today's world and a sincere desire to offer meaningful solutions.

This roundtable meeting was held in English under the Chatham House Rule. This rule stipulates that 'when a meeting, or part thereof, is held under the Chatham House Rule, participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed.'

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Background

The panel presented a fertile environment for environmental scientists, engineers, social scientists, diplomats and politicians from different countries to discuss not just climate change, but also various immediate environmental problems such as microplastic pollution in the oceans as well as ozone depletion. While coming from different backgrounds, through the lively discussions that took place speakers and participants agreed on three main points. The first one is the importance of treating the environment as a common good, where all are responsible for taking proper care of. The first step toward taking proper environmental action is to acknowledge that economic calculations cannot solely guide environmental policies. The second point is the need for a multifaceted approach to environmental problems; not only immediate environmental implications require attention, but also the negative impact that environmental issues have on security, development, agricultural production, social cleavages and poverty.

While different participants had varying levels of hope with regards to the possibility of finding prominent solutions for environmental problems, the third point that all participants agreed on is the need for collaborative action. The participants emphasised that such collaboration could be realised only if differentiated responsibilities are defined for developed and developing countries in global policy making. While developed countries should take responsibility for the share they have had in creating the environmental problems we face now, developing countries should appreciate the fact that they cannot afford to behave the way that developed countries behaved in the last century.

Introduction

Both political and academic discussions on security have significantly changed in the last three decades. What constitutes a threat to one's security and what it takes for an actor to feel secure have altered in a number of ways. In other words, security – both as a policy domain and as an academic field of study – has widened and deepened (Buzan, Wæver, & de Wilde, 1998; Krause & Williams, 1996). Widening, on the one hand, refers to diversification of threats to security in such a way that it now includes non-traditional security concerns such as economic security (Schiffman, 2016) and food security (Cavalcanti, 2005); Klare & Thomas, 1994; Wæver, 1995). Deepening, on the other hand, refers to the realisation that in making security decisions, actors other than states (individuals, local actors, regional actors, and international actors) should be taken into account as both subjects with security needs, and also as potential threats to security. (Buzan, 1991; Booth, 1991; Tickner, 1995; Williams, 2003).

As a part of this process, environmental security has become one of the frequently discussed and highly politicised issue areas. One of the discussions surrounding the issue of environmental security is whether framing environment as a security issue contributes to the solution of the problems. On the one hand, some argue that emphasising the security implications of environmental problems would be important in attracting politicians' attention to the issue. Environmental issues could be brought to the forefront of political agendas, and necessary funds could be directed toward solutions for environmental problems (Litfin, 1999; Dalby, 2016; Schilling et al., 2017). However, on the other hand, sceptics warn that emphasising the security implications of environmental issues would push the much-needed scientific expertise aside. This would result in the initiation of security-oriented policies which would in turn have damaging consequences (Deudney, 1990; Kakonen, 1994; Levy, 1995).

The speakers and participants sided with the first approach. They highlighted that placing emphasis on the security implications of environmental issues was the most effective way to address environmental concerns. Building on that understanding, the discussions in the session focused on identifying the reasons for and consequences of various environmental concerns. They also discussed the successes and failures of policies and initiatives that have been taken place so far, incorporating suggestions for the future.

Identifying the Problems and Their Significance

The first speaker began the discussion by highlighting the connection between environmental security and the retreat of globalisation, which was the theme for this year's TRT World Forum. The speaker reasoned that environmental collapse, which in and of itself is tragic, combined with overproduction, are the main reasons for globalisation's retreat. While climate change gets the most attention, one speaker emphasised retreat. While climate change gets the most attention, one speaker emphasised that other environmental problems need to be evaluated together, as they are inevitably intertwined, both in their causes as well as in their implications.

The speakers repeatedly emphasised that the most important aspect of the environment is that it is a global, common issue (Buck, 1998). For this reason, it is not enough for a country to control pollution within its own limits. As the environment is a global common, those who suffer from pollution are not necessarily those who contribute to its creation. However, since no country can escape from the negative impact of

environmental problems, 'not being the source of the problem' does not relieve states from the responsibility of taking action to address the issue.

Pollution travels among states, through air, water or land. This is not a distant possibility that scientists entertain; on the contrary, it is something we experience on a daily basis. As one speaker highlighted, green gases stemming from industrial production, energy production and transportation are severely damaging the atmosphere. For example, pollution carried by the Danube River has been polluting the Black Sea for years. As one speaker explained, there is almost no oxygen left at the bottom of the Black Sea. The pollution of the Danube, caused by the activities of developed countries in Europe, is felt by the countries who produce it as well as the states neighbouring the Black Sea (Milenkovic et al., 2005). And the pollution does not stop there. It goes to the Aegean Sea through the straits and eventually on to the oceans. The pollution of oceans has the potential to disrupt and destroy entire ecosystems through food chains: plastic waste goes to the oceans through rain; fish eat microplastics that are filling oceans; humans and other animals consume the fish and face illnesses as a result. In addition to lowered oxygen levels in the oceans, increased ocean acidity also poses a great risk. This is an underrated environmental problem that has the potential to disrupt people's lives directly. Increasing acidity in the oceans would also break food chains. Given the fact that more than twenty per cent of the world population is fed by fish caught in the ocean, this would create challenges for food security as well.

So the question is, as one speaker highlighted, who is going to be responsible for cleaning up the pollution which the Danube River has brought to the Black Sea, the Aegean Sea, or the oceans? Who will take responsibility for addressing the pollution caused in the atmosphere? The difficulty in answering these questions remains at the heart of our environmental problems.

Loss of biodiversity is (and will be) one of the most important environmental problems (Smith et al., 2003). Initial steps were taken in Rio in 1992 with the Convention on Biological Diversity, but as one speaker criticised, no additional steps have been taken in the last twenty- seven years to properly address the issue (Morger & Tsioumani, 2010). To put things into perspective, one speaker reminded the assembly that the asteroid that hit the earth sixty-five million years ago led to the loss of sixty percent of species, and the damage that the human race inflicts on earth today is much worse than what that asteroid did.

Some of the issues that require immediate attention were listed by the participants: loss of forests due to wildfires, as we see in Brazil (The Guardian, 2019); loss of freshwater resources, which has made countries rich in fresh water, such as Turkey, on the verge of freshwater scarcity; as well as problems like the excessive use of fertilisers, which pollute not just land, but also the seas and oceans (Puckett, 1995).

Climate change adds another layer to complex environmental problems. Climate change is going to create a 'butterfly effect', as one speaker put it, which will be felt in all aspects of life (UNFCCC). What Is more worrisome is that 'we don't know for sure what kind of reaction nature will give', which makes it even more important to come up with comprehensive environmental policies and do so immediately.

The most worrying aspect of climate change, as was highlighted by all speakers and participants, is the impact climate change has (and will have) on security (Levy, 1995; Podesta & Ogden, 2008; Schwartz & Randall, 2003; Halden, 2007; WBGU, 2007; 2008; Campbell-Lendrum & Woodruff, 2007; Smith & Vivekananda, 2007). Security threats that environmental problems create are not possibilities for the future, but rather realities that we now live in. These will become even worse if not addressed. One speaker reminded the gathering that 'the UN estimates that 40% of internal conflicts over the last sixty years were related to natural resources'. Another speaker noted that the Arab Spring, which began in Tunisia in December 2010, followed a 35% increase in food prices between September 2010 and December 2010 (Jonstone & Mazo, 2011;

Perez & Wire, 2013). While climate change cannot be listed as the only factor behind these developments, it is important in illustrating the security implications of climate change.

The type and severity of the impact that climate change has varies from region to region. The MENA region, as one speaker emphasised, happens to be one of the regions that faces the most severe consequences of climate change (Terink et al., 2013; Gleick, 2014). The Intergovernmental Panel on Climate Change (IPPC) estimates that by the end of the century there will be a 20-30% decrease in levels of precipitation in this region, which will result in long periods of drought followed by severe rains (Collins et al., 2013).These developments will have the potential to further destabilise an already volatile region.

Speakers also emphasised the climate change/migration/security nexus. On the one hand, conflicts are likely to break out due to worsening living conditions, as well as an increasing scarcity of natural resources (Myers,1993; Levy et al. 2005; Hendrix & Glaser 2007). On the other hand, these conflicts, along with natural disasters, will lead to waves of migration. This will in turn likely increase migration-related security concerns (CNA, 2007; Gleditsch et al., 2007; Hartmann, 2010). As emphasised by one speaker, displacements resulting from natural disasters are higher than displacements resulting from conflicts. It is estimated that 140 million people will need to migrate by 2050 from Sub-Saharan Africa, Latin America and South Asia alone. Overall, about one billion people are expected to move by 2050 (Rigaud et al., 2018). The pressure from these migratory moves will be most severely felt by developing countries. However, the developed world will not be immune. Europe, for instance, will witness a surge of refugees running away from climate change-related conditions (Huysmans, 2006).

Climate change is not just a threat to security, but rather to all aspects of life. As one speaker emphasised, agriculture is one of the fields that is going to be affected directly by climate-related problems (Falkenmark, 2013). Water and soil are two key components needed for agricultural production, and they are both going to be affected by climate change. Too little water, due to droughts, or too much water, due to floods, coupled with the effect of rising temperatures on plant production will lead to food insecurity. As another speaker mentioned, agriculture depends on a very tight balance. Because of this, in the future it will be very difficult to cultivate a number of plants as simple as tomatoes, because the earth will be either too hot, too cold, too dry, or too wet. Industrial production will also be adversely affected by water scarcity caused by climate change (Gosling & Arnell, 2016). An increasing number of hot days will lead to a rise in temperature-related diseases. Coupled with increases in rainfall, rising temperature will likely contribute to the spread of communicable diseases (Greer & Fisman, 2008). Climate change poses a threat to development as well, since those who suffer the most from environmental problems are the ones who are already economically and socially in disadvantaged positions (Chitiga, 2019).

One speaker mentioned that the fundamental reason why environmental security is not getting the attention it deserves is because of the dominant role played by economic interests in shaping national discourses. Another speaker acknowledged the role that the economic implications of environmental initiatives play in shaping public and private actors' reluctance; however, he suggested that to ignore environmental problems also creates a significant economic burden. The speaker supported this argument by reminding the participants that according to the 'Global Climate Risk Index 2019, disasters caused by climate change in Turkey led to an economic loss of 2 billion dollars in 2017.' (Eckstein et al., 2019) These insights further highlight that climate change leads to both future and immediate economic problems.

Attempts at Addressing Environmental Problems

Participants at the session identified major environmental concerns. A number of concrete attempts at collectively addressing environmental issues, however incomplete or inadequate they might have been, were also discussed. The participants also shared their ideas about the reasons for the very limited success that policy initiatives have been able to attain. Although the different ways that environmental problems affect lives were discussed, the picture was not completely negative. On the contrary, speakers underlined the efforts that have been made during the last three decades, especially in relation to climate change. The most important thing that has been accomplished during the last few years, as one participant highlighted, is the almost complete elimination of doubt about the scientific validity of climate change (Oreskes, 2004). This step, in and of itself, has been crucial in prioritising the issue on political agendas.

In terms of policy, following upon the UN Framework Convention on Climate Change, the Kyoto Protocol was a turning point in prioritising the issue on the global political agenda, and it brought together countries from around the world. The speakers agreed that the relative failure of the Kyoto Protocol in delivering upon its promises can best be understood in light of the tensions between developed and developing countries (Rosen, 2015). Through this framework, the developed countries basically told developing countries that they had progressed by damaging the environment. However, if the developing countries did the same, there would be no world to live in. The mismatch between expectation, willingness and capacity for change led to the failure of the Kyoto Protocol. The problems originated not from the policy-making stage, but from the implementation stage. However, climate initiatives have not come to an end with the Kyoto Protocol, and a number of promising albeit insufficient steps have been taken. The opening of a Climate Academy in Warsaw, for example, was a positive step toward enhancing cooperation.

The Paris Agreement presented a renewed opportunity to collectively address climate change. However, the withdrawal of the USA has presented a challenge for the future (Zhang et al., 2017; Urpelainen & Van de Graaf, 2018). There are also regional and global efforts through the G20 to address the issue (Kiron & Kokotsis, 2016). However, as the speakers emphasised, even though efforts have been made, scientific studies illustrate that we are still far behind the target policies. One speaker pointed out that even if every country strictly followed the requirements of the Paris Agreement, the world would still be warming up by three degrees, "and three degrees is going to [create] a different world than we have ever lived in as a human race." It must be noted that this presents the best-case scenario. If states do not keep with their commitments, then the world runs the risk of warming up by four-six degrees. What needs to be kept in mind is that the more delayed we are in developing proper policies, the more dire the consequences of climate change will be. As one speaker mentioned, the IPCC used to estimate a rise in sea levels of around eighty centimetres to one metre. However, they have renewed their estimate, now indicating that there could be a rise of up to two metres.

What makes the situation worse is that even in in some areas where we thought we had successfully initiated cooperation and collective action we are now observing regression. For example, people are having difficulty in going out into the streets in China due to heavy air pollution (Song et al., 2017). Moreover, though we had thought that the problem of depletion of the ozone layer was improving, in fact this issue still remains. It was recently revealed that a number of companies, especially in Western China, have been

using chemicals that were banned about thirty years ago (Fang et al., 2019).

Some positive steps have been taken, for instance in addressing the issue of microplastics (Fendall & Sewell, 2009). One speaker pointed out that Turkey raised this issue at the Fourth Session of the UN Environment Assembly, which took place in Nairobi in March 2019. Since then, Germany has taken the lead and organised a roundtable meeting to which more than fifty countries were invited. As one speaker suggested, however, to successfully address this issue requires that all countries around the world contribute toward the creation of an international agreement. Climate change has been on the global agenda for over twenty-five years, and diplomats, lawyers and environmentalists have been working together to find a solution. The issue of microplastics must first find a place on political agendas, and then be addressed before it is too late. Furthermore, as climate change has illustrated, even if a common understanding is developed and a framework of operation is agreed upon, it is possible that policy initiatives could be less assertive than necessary (Wu et al., 2017). Thus, it is clear that a renewed approach and a revised set of policy tools are needed in order to successfully solve environmental problems.

Suggestions for Solutions and Problems Ahead

The common denominator for the suggestions and solutions that were emphasised during the session can best be summarised in the words of one speaker: 'The climate already changed; we have to adapt to it'. The participants in the session highlighted the main obstacles to be overcome, emphasising some policy initiatives that have the potential to bring promising results.

The overall risk for future environmental protection, as one participant emphasised, is the growing distrust of multilateralism. One speaker described the environment as 'the most important component of our collective security', and a component that can only be addressed collectively. Solving environmental issues requires cooperation at local, national, regional and international levels. Since coordination and cooperation at each level are the only ways to address issues of global commons, we can only move forward by rebuilding trust in multilateralism, at least for environmental protection. If we were to take the Mediterranean as an example, one speaker emphasised that all twenty-one countries need to come together to address pollution if we want to prevent negative affects to the creatures of this area.

The speakers also highlighted that cooperation must go beyond the organising of meetings. While organising meetings is important, turning ideas into action is even more necessary. As one speaker highlighted, since June 2019, as a part of the Zero-Waste Project, more than 150,000 cubic meters of marine litter were collect by Turkey (Ay, 2019). While emphasising the importance of the leading role that Turkey has been trying to play in this issue, the speaker also reminded the assembly that all countries must get together in addressing environmental issues, such as collecting microplastics from the oceans and seas. This is simply because no country acting alone is likely to produce the desired outcomes. Since all countries are responsible for plastic pollution in the oceans, effective cleaning of marine litter can only be realised by coordination of all the parties involved.

For such collective action to be effectively realised, the first hurdle that must be overcome is to convince

politicians about the importance of environmental problems. The causal link between the sources of environmental problems (for example plastic use and carbon emissions), and their consequences (like decreased fish populations and climate change) are not always easy to recognise. For example, last June was the hottest June in recorded history. The pattern was the same for July and September, while August was the second hottest August that has been recorded (National Oceanic and Atmospheric Administration, 2019). These were temperatures that people personally experienced. However, since climate change is gradual, it is difficult to illustrate the connection between climate change and what people experience.

One speaker gave the example of apricot production in Turkey. In 2008, experts had warned producers that it would not be possible to continue with apricot production in the region. However, as the speaker revealed, the expert advice was not heeded by the producers as there was no threat that the producers could observe with their own eyes. However, after ten years, the producers ended up cutting down two million apricot trees. There is also a problem of uncertainty. We think that we know what kind of security implications might come with climate change, but we cannot be one hundred per cent sure. The long causal link creates a fertile environment for people with economic or political motives to deny, and in some cases silence, scientific evidence. The fact that the policy discussions around climate change are still populated by 'climate deniers' (even though they are decreasing in number) is a testament of this problem (Norgaard, 2019).

The causal link shortens when there is an environmental disaster. For example, as one speaker mentioned, Turkey in the last few years has suffered a number of flood-related deaths and damaging outcomes. The hailstorm that happened in 2017 was a financially devastating episode for Turkey. When such disasters occur, environmental issues find a place in the media. People then become more likely to lend an ear to environmental experts. Climate change increases the frequency and severity of environmental disasters, and this can potentially contribute to the prioritisation of environmental issues on political agendas. However, if we want to effectively address environmental problems, as one speaker pointed out, '...we have to take measures before such disasters [occur]'.

The second hurdle in developing effective environmental policies is the time required for policy initiatives to create observable impact on the ground. As one speaker put it, 'If we start zero carbon emissions now, the effects of it [the damage created so far] would still be felt for centuries'. This time gap makes it difficult for politicians to be motivated to take drastic policy measures that prioritise environment over economic concerns. As one participant stated, the most important problem that prevents states from taking environmental action is the question of 'Who will pay for it?' Many citizens want environmental action to be taken, but not many are willing to sacrifice anything to this end. This leads politicians to hesitate in taking action as they are worried about angering their constituents. Thus, the need for everyone to shoulder their share of responsibility is a necessity for proper policies to be developed and implemented.

Once these hurdles are overcome, then the content and scope of the policies must be properly designed. The first step toward that end is appreciating the fact that (a) environmental issues create different problems for different regions (and groups within regions), and (b) each actor has a different capacity to contribute to the solution of the problem. The experience so far has illustrated that ignoring these realities has led to incomplete and inappropriate policies that neither get the political support they need nor create the desired outcomes.

In developing environmental policies, it must be noted that not every individual or group within a country will be equally affected by the negative impacts of climate change. The urban poor are disproportionately affected by climate change due to their physical, geographical and social exclusion (Roy et al., 2016; Sanni et al., 2019). They live for the most part in informal settlements in the urban periphery, as well as

fragile locations which include slopes and coastlines, making them more vulnerable. By 2030, 600 million urban poor will be directly at risk for problems related to climate change. This important issue has been addressed at the Climate Action Summit 2019. However, such meetings constitute only a beginning for the creation of appropriate policy measures. It is estimated that about 15 billion dollars is needed for integrated efforts to increase climate resilience.

One step that must be taken to develop more effective environmental policies is to better appreciate the security implications of environmental problems. Historically, there has been a limited link seen between environment and security; this focused on the possibility of water scarcity leading to wars. However, over time, it has become clear that a whole range of environmental problems must be addressed if we want to avoid new wars. As one speaker pinpointed, the rising awareness about the link between environment, development and security on the UN Security Council agenda is promising. However, as one speaker noted, 'If we do not want new wars', we must establish a system that would focus upon capacity building for the developing and least developed countries to prevent environment-induced conflicts. Successfully addressing the worsening security implications of environmental problems can only be realised if sufficient finance, technology and capacity-building support is provided by developed countries. The speaker also highlighted that developed countries need to understand that opening their resources and sharing their technology is not only beneficial for the developing countries, but also for themselves; this would help prevent potential refugee flows.

Lastly, while developing effective environmental policies is of crucial importance, taking the environment into account in all policy initiatives is also a much needed approach. All policy decisions, including those unrelated to the environment, need to take potential risks to the environment into account, for example climate change. On that note, one speaker highlighted the need to take climate change into account during urban planning, as well as in construction (Broto, 2017). The speaker stated that in civil engineering schools, students are now taught to consider climate change as a new criterion in designing buildings and to account for possible floods in calculating pipeline capacities. While these are important signs of 'adaptation', attempts to deal with environmental issues will inevitably fall short as long as the root causes of problems are not properly addressed.

Conclusion

The speakers and participants from different professions, coming from different countries, all agreed that we are indeed experiencing a 'tragedy', as the title of the session has suggested. The participants further agreed that not only our understanding of national security, but also our views of development, urbanisation, industrial production, agriculture, and poverty alleviation need to be changed for any significant progress to be made in successfully addressing environmental concerns. Addressing a global tragedy requires global action; this is why participants emphasised the importance of international cooperation and collaboration in the face of global retreat. The situation might be dire and the prospects may be gloomy, but increased public awareness and political attention mean that we are more prepared to tackle the problems than we were twenty years ago.

References

Ay, Hasan. (2019) Seas now cleaner thanks to Zero Waste Blue project, Daily Sabah, 8 November. Available at: https://www.dailysabah.com/turkey/2019/10/08/seas-now-cleaner-thanks-to-zero-waste-blue-project

Booth, K. (1991) Security in anarchy: utopian realism in theory and practice, *International Affairs*, 67(3), p527-45.

Buck, S. J. (2017) *The Global Commons: An Introduction*. Routledge.

Buzan, B. (1991) People, *States and Fear: An Agenda for International Security Studies in the Post-Cold War Era*. 2nd ed. Boulder, CO: Lynne Rienner.

Buzan, B., O. Wæver, and J. de Wilde. (1998) *Security: A New Framework for Analysis*. Boulder, CO: Lynne Rienner.

Campbell-Lendrum, D. and R. Woodruff. (2007) Climate change: quantifying the health impact at national and local levels, *Environmental Burden of Disease Series*, No. 14. World Health Organization.

Cavalcanti, H.B. (2005) Food Security in F. Dodds and T. Pippard (eds.) *Human and Environmental Security: An agenda for Change*. London: Earthscan.

Chitiga, M., H. Maisonnave, R. Mabugu, and M.Henseler. (2019) Impact of climate change on vulnerable groups on South African labour markets, Presented at the 22nd Annual Conference on Global Economic Analysis, Warsaw, Poland.

CNA. (2007) *National Security and the Threat of Climate Change. Report from a Panel of Retired Senior US military officers*. Alexandria, VA: CNA Corporation.

Collins, M., R. Knutti, J. Arblaster, J. L. Dufresne, T. Fichefet, P. Friedlingstein, and M. Shongwe. (2013) Long-term climate change: projections, commitments and irreversibility, *Climate change 2013 – The Physical Science Basis: Contribution of Working Group 1 to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, pp. 1029-36.

Dalby, S. (2016) Environmental (in) security, *International Encyclopaedia of Geography: People, the Earth, Environment and Technology*:, pp.1-10.

Deudney, D. (1990) The case against linking environmental degradation and national security, *Millennium - Journal of International Studies*, 19(3), p.461-76.

Eckstein, D., M. L. Hutfil & M. Winges. (2019) *Global Climate Risk Index 2019*. Germanwatch eV, Bonn.

Falkenmark, M. (2013) Growing water scarcity in agriculture: future challenge to global water security, *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 371:20120410.

Fendall, L. S. & M. A. Sewell. (2009) Contributing to marine pollution by washing your face: microplastics in facial cleansers, *Marine Pollution Bulletin*, 58(8), pp.1225-1228.

Gleditsch, N. P., R. Nordas & I. Salehyan. (2007) *Climate Change and Conflict: The Migration Link*. International Peace Academy.

Gleick, P. H. (2014) Water, drought, climate change, and conflict in Syria, *Weather, Climate, and Society*, 6(3), pp.331-340.

Gosling, S. N., & N. W. Arnell (2016). A global assessment of the impact of climate change on water scarcity, *Climatic Change*, 134(3), pp.371-385.

Greer, A., Ng, V. & D. Fisman. (2008) Climate change and infectious diseases in North America: the road ahead, *Cmaj*, 178(6), pp.715-722.

Halden, P. (2007) *The Geopolitics of Climate Change: Challenges to the International System*. Stockholm: Swedish Defense Research Agency.

Hartmann, B. (2010) Rethinking Climate Refugees and Climate Conflict: Rhetoric, Reality and the Politics of Policy Discourse, *Journal of International Development*, 22, pp. 233-46

Hendrix, C. S. & S. M. Glaser. (2007) Trends and triggers: Climate, climate change and civil conflict in Sub-Saharan Africa, *Political Geography*, 26(6), pp.695-715.

Huysmans, J. (2006) The Politics of Insecurity: Fear, *Migration and Asylum in the EU*. Routledge.

Johnstone, S. & J. Mazo. (2011) Global warming and the Arab Spring, *Survival*, 53(2), pp. 11-17.

Kakonen, J. (ed.) (1994) *Green Security or Militarized Environment*. Aldershot: Dartmouth Publishing Company.

Kirton, J. J. & E. Kokotsis. (2016) *The global Governance of Climate Change: G7, G20, and UN Leadership*. Routledge.

Klare, M. T. & D. C. Thomas (eds.) (1994) *World Security: Challenges for a New Century*. New York: St. Martin's Press.

Krause, K. & M. C. Williams. (1996) Broadening the agenda of security studies: *politics and methods, Mershon International Studies Review*, 40, pp. 229-54.

Levy, M. A. (1995) *Is the environment a national security issues, International Security*, 20(2), pp. 35-62.

Levy, M. A., C. Thorkelson, C. Vörösmarty, E. Douglas & M. Humphreys. (2005).Freshwater availability anomalies and outbreak of internal war: Results from a global spatial time series analysis, *International Workshop on Human Security and Climate Change, Holmen, Norway*, 21, pp. 970-981.

Litfin, K. (1999) Constructing environmental security and ecological interdependence, *Global Governance*, 5(3), pp.359-78.

Milenkovic, N., M. Damjanovic & M. Ristic. (2005) Study of heavy metal pollution in sediments from the iron gate (Danube River), Serbia and Montenegro, *Polish Journal of Environmental Studies*, 14(6).

Morgera, E. & E. Tsioumani. (2010) Yesterday, today, and tomorrow: Looking afresh at the Convention on Biological Diversity, *Yearbook of International Environmental Law*, 21(1), pp. 3-40.

Myers, N. (1993) Ultimate Security: *The Environmental Basis of Political Stability*. WW Norton & Company, Inc.

National Oceanic and Atmospheric Administration. (2019) Summer 2019 was hottest on record for Northern Hemisphere, 16 September. Available at: https://www.noaa.gov/news/summer-2019-was-hottest-on-record-for-northern-hemisphere

Norgaard, K. M. (2019) Making sense of the spectrum of climate denial, *Critical Policy Studies*, 13(4), pp.437-441.

Oreskes N. (2004) The scientific consensus on climate change, *Science*, 306: 1686.

Perez, I. & C. Wire. (2013) Climate change and rising food prices heightened Arab Spring, *Scientific American*, 4(03).

Podesta, J. & P. Ogden. (2008) Security implications of climate scenario 1: expected climate change over the next thirty years, in K. M: Campbell (ed.) *Climatic Cataclysm: The Foreign Policy and National Security Implications of Climate Change*. Washington: Brookings Institution Press.

Puckett, L. J. (1995) Identifying the major sources of nutrient water pollution, *Environmental Science & Technology*, 29(9), pp.408A-414A.

Rigaud, K. K., A. de Sherbinin, B. Jones, J. Bergmann, V. Clement, K. Ober, K., & Midgley, A. (2018). *Groundswell*. World Bank: Washington DC.

Rosen, A. M. (2015). The wrong solution at the right

time: The failure of the Kyoto Protocol on climate change, *Politics & Policy*, 43(1), pp.30-58.

Roy, M., S. Cawood, M.Hordijk & D.Hulme (Eds.). (2016). *Urban Poverty and Climate Change: Life in the Slums of Asia, Africa and Latin America*. Routledge.

Sanni, M., A. Jalloh, A. Diouf, M. K. Atoyebi, O. E. Ilevbare & S. J. Olotu. (2019) Strengthening climate change adaptation in the cities of west Africa: policy implications for urban resilience, *Handbook of Climate Change Resilience*, pp.1-25.

Schiffman, Garry M. (2016) Economic Security in Collins, A. (ed.) *Contemporary security studies*. Oxford University Press.

Schilling, J., S. L. Nash, T. Ide, J. Scheffran, R. Froese & P. von Prondzinski. (2017) Resilience and environmental security: towards joint application in peacebuilding, *Global Change, Peace & Security, 29(2)*, pp.107-127.

Schwartz, P. and D. Randall. (2003) *An Abrupt Climate Change Scenario and Its Implications for United States National Security*, Defense Technical Information Center.

Smith, D. & J. Vivekananda. 2007. *A Climate of Conflict: The Links between Climate Change, Peace and War*. International Alert. London.

Smith, R. J., R. D. Muir, M. J. Walpole, A. Balmford & N. Leader-Williams. (2003) Governance and the loss of biodiversity, *Nature*, 426(6962), p.67.

Song, C., Wu, L., Xie, Y., He, J., Chen, X., Wang, T., & Dai, Q. (2017) Air pollution in China: status and spatiotemporal variations, *Environmental Pollution, 227*, oo. 334-347.

Terink, W., W.W. Immerzeel & P. Droogers. (2013) Climate change projections of precipitation and reference evapotranspiration for the Middle East and Northern Africa until 2050, *International Journal of Climatology, 33(14)*, pp. 3055-3072.

The Guardian. (2019) 'Worst of wildfires still to come' despite Brazil claiming crisis is under control, 28 August. Available at: https://www.theguardian.com/world/2019/aug/28/brazil-amazon-wildfires-worst-to-come

Tickner, J. A. (1995) Re-visioning security, in (eds.) K. Booth & S. Smith *International Relations Theory Today*. University Park, PA: Pennsylvania State University Press, pp.175-97.

United Nations Climate Change. Background on the UNFCCC: The International Response to Climate Change. Available at http://unfccc.int/essential_background/items/6031.php

Urpelainen, J., & T. Van de Graaf. (2018) United States non-cooperation and the Paris agreement, *Climate Policy*, 18(7), pp.839-851.

Wæver, O. (1995) Securitization and desecuritization in (ed.) R. D. Lipschutz *On Security*, New York: Columbia University Press.

WBGU. 2007. *World in Transition: Climate Change as a Security Risk. Summary for Policy Makers*. German Advisory Council on Global Change.

WBGU. 2008. *Future Bioenergy and Sustainable Land Use*. German Advisory Council on Global Change

Williams, M. C. (2003) Words, images, enemies: securitization and international politics, *International Studies Quarterly*, 47, pp. 511-531.

Wu, W. M., J. Yang, & C. S. Criddle. (2017) Microplastics pollution and reduction strategies, *Frontiers of Environmental Science & Engineering, 11(1)*, p. 6.

Zhang, Y. X., Q. C. Chao, Q. H. Zheng, & L. Huang. (2017) The withdrawal of the US from the Paris Agreement and its impact on global climate change governance, *Advances in Climate Change Research, 8(4)*, pp.213-219.

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