WILL CLIMATE CHANGE INCREASE THE RISK OF DEADLY VIOLENCE IN THE MUSLIM WORLD?

Leila ZAKHIROVA
Concordia College, Moorhead, MN
lzakhiro@cord.edu

Climate change will do more damage to the Muslim world than almost any other place on earth and the link between climate change and conflict is already being manifested in countries such as Syria, Yemen, and Sudan. The Muslim world is most vulnerable to environmentally induced conflicts because it is a region where abject poverty, rapid population growth, food security, shallow water tables, terrorism, and state failure remain critical issues. While some wealthier oil-rich Muslim states might be able to afford protection against rising temperatures, resource poor countries such as Bangladesh, Somalia, and Afghanistan will suffer greatly. Given these realities, we can assume at the very least that in a zone stretching from Morocco to Indonesia the probability of conflict will be greater in areas that are (a) more impacted by climate change and (b) less prepared to cope with the changes. To be sure, there are a number of drivers of conflict in the Muslim world that can be expected to persist into the future, but climate change will only aggravate those drivers and may make things unmanageable in some places.

Why should we care about a warming Muslim world? First, it is generally assumed that armed conflict is potentially widespread

(at least theoretically) but in fact, since the end of the Cold War, most of it has been highly concentrated in a region stretching from Morocco to Indonesia, and it is likely to become even more disproportionately high with global warming. Second, recent discourse on violence suggests that conflict is on the wane but in fact it is likely to increase with warming, particularly in the Muslim world. Third, this is not to suggest that we are in a "clash of civilizations" ala Huntington.[1] If anything, most of the victims of armed conflict thus far have been Muslims. Huntington's culture clash thesis is predicated on religious differences but climate change, ironically, might make part of his prediction come true even if it has little to do with his theoretical drivers. Fourth, conflict in the Muslim world is not likely to be contained in the Muslim world. Some of it will likely spill over into the neighboring countries as Muslims try to flee extreme heatwaves. If the current European migration crisis is any indication, the developed countries' reaction will be to build a wall around the Muslim world, but it is likely to prove ineffective if there are several Syria type civil wars all happening simultaneously. Fifth, much of what we know about conflict etiology is based on analyses undertaken with data from a relatively stable and benign climate regime era. It is quite possible that the known relationships will simply not hold up in this century as the climate will likely to turn malign. Finally, even if there were no climate change problems, we might still anticipate the current concentration of armed conflict in the Muslim world to persist into the future given youth bulges, demographic growth rates, automation in the developed world that precludes the diffusion of industrialization, state repression, etc. Climate change will only ensure that the issues plaguing the Muslim world cannot be managed politically.

The goal of this article is two-fold: (1) to look at the evidence of ongoing conflicts to assess just what role climate change plays in those conflicts; and (2) to ascertain where exactly climate change is likely to be most severe and how might that contribute

to increased conflict in the Muslim world. The question is how global warming is likely to influence the risk of deadly violence in a region that is already afflicted with a greater share of the world's conflicts?

IS ARMED CONFLICT CONCENTRATED IN THE MUSLIM WORLD?

Since the end of the Cold War armed conflicts[2] have been predominately intrastate and most of them have been disproportionately centered in the Muslim world. This has led some to suggest that Muslim countries are relatively more prone to conflict.[3] This is not because conflicts among Muslims have increased, explain Gleditsch and Rudolfsen,[4] but rather other conflicts around the world have generally declined. The world as a whole, in short, is becoming more peaceful, as argued by a number of scholars,[5] but for some reason the Muslim world is not. Steven Pinker and Juan Manuel Santos[6] claim that the arc of conflict is now concentrated between an area extending from Nigeria to Pakistan, which suggests that in addition to asking whether conflict is increasing in the Muslim world, there is also the question of the extent to which violence is concentrated within the Muslim world. Thus, the disproportionality argument cannot be ignored. The summary of armed conflict in the post-Cold War Muslim world is presented in Table 1.

Table 1 points to the intensity of intrastate armed conflict in Muslim-majority countries relative to non-Muslim countries during the 1990–2015 period. According to Table 1, out of 46 Muslim-majority countries, 28 (61% of the Muslim world) have experienced armed conflict of one sort or another over the twenty-five-year period. These include both low-intensity (25–999 battle deaths per calendar year) as well as high-intensity (1000+ deaths) conflicts. Of all the battle deaths between 1990–2015, 59% took

Majority Religion	Number of countries	Number of countries with armed conflict	Total Number of Battle Deaths in armed conflict	% of battle deaths in armed conflict	Total number of terrorism related deaths	% of terrorism related battle deaths
Muslim	46	28 (61%)	566,707	(59)	162,494	(60)
Non-Muslim	148	48 (32%)	394,335	(41)	109,295	(40)
Total	194	76	961,042	100	271,789	100

TABLE 1. Summary of Armed Conflict in the Muslim World, 1990–2015. Sources: For majority religion, see Pew Research Center, "The Global Religious Landscape: A Report on the Size and Distribution of the World's Major Religious Groups as of 2010." Washington, DC: Pew Research Center, 12 December 2012, accessed July 21, 2024. https://www.pewresearch.org/religion/2012/12/18/global-religious-landscape-exec. For armed conflict data see, Uppsala Conflict Data Program (UCDP), Department of Peace and Conflict, https://ucdp.uu.se.

place in Muslim-majority states relative to 41% elsewhere. This is particularly sobering since non-Muslim countries are four times more numerous than Muslim-majority countries in the world. The Muslim world also seems to have a disproportionate number of world's terrorism related deaths (60%).

When the Muslim armed conflict data are plotted over a 25-year period, as in Figure 1, the trend in armed conflict resembles a hockey stick with deaths ramping up post-2011. This spike in battle deaths in the Muslim world is clearly biased by the Iraqi/Syrian conflicts. The question is to what extent non-Iraqi/Syrian events are influenced by one or two interdependent conflicts and what is the extent to which they are climate-induced? In order to see how the disproportionality of conflicts in the Muslim world plays out over time, I replicate Table 1 for successive different time periods:

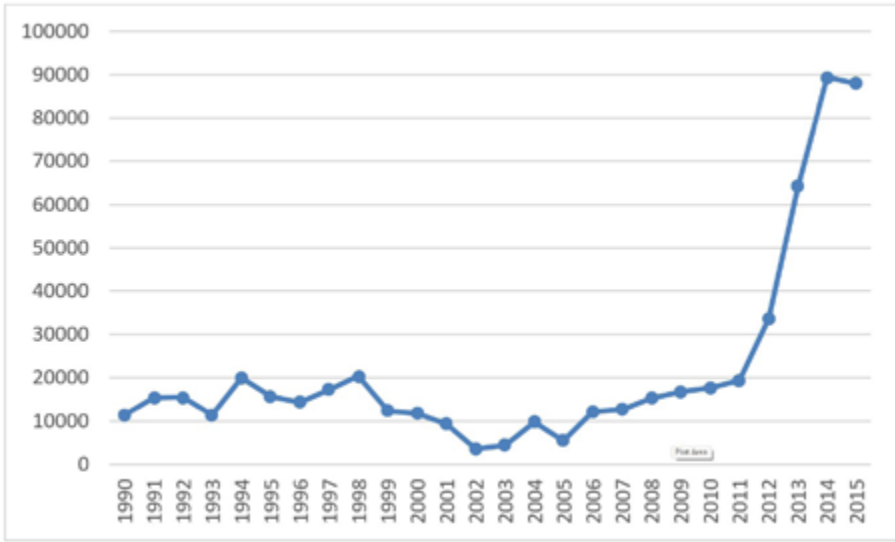

FIGURE 1. Total Annual Battle Related Deaths in Muslim countries, 1990–2015. Source: Uppsala Conflict Data Program (UCDP), https://ucdp.uu.se.

1990–95, 1990–2000, 1990–2005, 1990–2010, and 1990–2015. Table 2 summarizes these results.

Table 2 lends further support to the disproportionality argument. The Muslim countries make up 24% of the world's countries (or 23% of the world's total population) yet they account for at the very minimum 35% of the world's armed conflict (measured in terms of battle deaths) in each time period examined. Table 2 suggests that the Muslim world's disproportionate share of the armed conflict is not exclusively due to the post-2011 events in Syria and Iraq. In other words, while conflict in the post-2011 years spike significantly, violence in the Muslim world has been disproportionately high relative to conflicts elsewhere at least since 1995 and is only becoming more so.

So why is armed conflict concentrated in the Muslim world? Since the end of the Cold War, and particularly since the tragic events of 9/11, Islam became closely associated with political violence. With titles such as "Bad Religion?,"[7] "The Religious Wave,"[8]

Majority Religion	Number of countries	1990–1995 battle deaths	1990–2000 battle deaths	1990–2005 battle deaths	1990–2010 battle deaths	1990–2015 battle deaths
Muslim	46 (24%)	89,362 (35%)	165,257 (39%)	197,556 (39%)	272,233 (43%)	566,707 (59%)
Non-Muslim	148 (76%)	168,395 (65%)	255,407 (61%)	307,919 (61%)	356,235 (57%)	394,335 (41%)
Total	194	257,757	420,664	505,475	628,468	961,042

Table 2. Total Number of Armed Conflict Related Battle Deaths, 1990–2015. Source: Uppsala Conflict Data Program (UCDP), https://ucdp.uu.se.

"Are Muslim Countries More War-Prone?,"[9] "The Clash of Civilizations?,"[10] *Ending Holy Wars*,[11] "Getting Religion?," "The Puzzling Case of Islam and Civil War,"[12] and "Islam's Bloody Innards?,"[13] religion has come to occupy a central place in the study of conflict. A recent wave of terrorist attacks in Europe committed by Muslims in the name of Islam, compounded by the rise of extremist groups such as ISIS, Boko Haram, and Al-Shabab, have only reinforced the association of Islam with conflict. Samuel Huntington,[14] Bernard Lewis,[15] and Monica Toft[16] have argued forcefully about the uniqueness of Islam vis-à-vis conflict. Huntington's (in)famous statement that "Islam has bloody borders and bloody innards"[17] describes contemporary global politics as "the age of Muslim wars"[18] in which Muslims fight each other and fight non-Muslims far more often than other civilizations – all rooted in the "rise of Islamic consciousness."[19]

At the same time, more recent studies have challenged the Islam-is-a-violent-religion thesis by arguing that religion *per se* is not a significant factor in driving conflict when other factors such as economic development, oil dependency, regime type, ethnic diversity,[20] state repression and the youth bulge,[21] or urban

poverty[22] are controlled for. True, Muslim-majority countries are characterized by a higher rate of intrastate conflict, but lumping factors that actually increase the risk of conflict under the umbrella of "Islam" masks such indicators as socioeconomic development, state repression, oil dependence, and youth bulge that highly correlate with conflict elsewhere in the world.[23] Thus, rather than asking whether there is something inherently conflict-prone in Islam, a better question might be whether conflicts are taking place in countries that just happen to be Muslim?

If not religion, what can account for the deadly violence in the Muslim world? Gleditsch and Rudolfsen[24] suggest that violence in the Muslim world could be a reaction to the interventionist policies of major powers (generally Christian-majority western powers intervening in the affairs of generally Muslim-majority states). Whether it is the Soviet Union in Afghanistan during the 1980s, or the post-9/11 US presence in Iraq, Afghanistan, and Libya, or Russia in Syria, the spike in Muslim conflict at least since 2001 could be a reaction in the Muslim world to major power interventions.[25]

Others claim that demographic, socio-economic and political factors better account for the concentration of conflict in the Muslim world. For example, the youth bulge, which is often associated with increased levels of conflict, is much higher in the Muslim world than elsewhere. Two-thirds of all Muslims are under 30. Among all major religious groups, the median age of Muslims is 23 years which is seven years younger than the median age of non-Muslims, which is 30 years.[26] Thus, not only are there already more young people in the Muslim world, but that number, combined with high fertility rates among the Muslims, is likely to get even higher in the coming decades. In addition to the growing youth population, most Muslim countries are plagued with high rates of unemployment. For example, unemployment rates among the youth (15–24 years) in Egypt, Iran, Jordan, Lebanon, Libya, Tunisia, and Yemen are very high, according to a World

Bank report, with an average rate of 22% for young males and 39% for young females.[27] In other words, the world's youth is concentrated in countries that are the least prepared to educate and employ them. The youth unemployment rate, according to the International Labor Organization, is particularly the highest in the Middle East and North Africa.[28]

The Muslim world not only has a bigger youth bulge than other places but according to Michael Mousseau,[29] the Muslim youth is concentrated in the impoverished urban centers with limited employment opportunities and inadequate policing, which make the urban poor excellent recruiting pools for extremist militant groups. As the rural poor migrate to the crowded cities in search of better economic opportunities, "many cannot find jobs on the market and are forced to pledge loyalty to group leaders who pursue their interests off the market in politics with threats and acts of violence."[30] With more than half of the world's population (54%) living in urban areas today and two-thirds (66%) projected by 2050, the coming decades will impose additional challenges on the rapidly urbanizing centers of the developing world that has few resources with which to cope.[31] Thus, sprawling and impoverished cities will become particularly vulnerable to crime and violence as there will be more to fight about and there will be more desperate people prepared to fight.

IS ARMED CONFLICT LIKELY TO INCREASE IN THE MUSLIM WORLD?

Most international relations scholars seem to concur that all forms of conflict (including interstate and intrastate) are on the wane even if they disagree on the reasons for the decline.[32] In this literature, Steven Pinker[33] particularly stands out in persuasively demonstrating the dramatic decline in violence. In his 800-page book, he argues that not only has violence declined over the

course of history but that "we may be living in the most peaceable era in our species' existence."[34] This is largely due to various historical processes and good ideas that have brought out the "better angels" while simultaneously conquering the "inner demons" of human nature. Pinker further suggests that the historical decline in violence is not only real, but it is also likely to persist. This may be a reasonable claim to make given the impressive amount of historical evidence he presents. However, this expectation assumes a relatively benign environment, which means we need to be cautious about extrapolating historical trends into a highly uncertain future. Climate change may not be the principal driver of conflict in the future, but if global warming increases, we have to assume that conflict will likely increase as well.

Climate change has received a great deal of attention and there is some real concern that the coming changes could deal a significant blow to the decline of war thesis. Yet environmentalists often talk about the impact of global warming in very abstract terms. Studies that look at Muslim conflicts similarly engage in past or current trends without much regard for any long-term projections. What I suggest here is to discuss climate change and conflict as increasingly interdependent processes. The negative consequences of climate change are expected to be concentrated in the space in and around the equator which overlaps a great deal with where most of the Muslim states are located. We know that there are climate problems that are already underway in some Muslim states such as Syria, Yemen, Sudan, and Bangladesh. But the impact of climate change on future conflicts is not well understood mainly because few scholars have looked into this question in any systematic way.

Warmer temperatures are likely to increase the risk of violent conflict particularly in less developed countries that are unable to cope with the environmental changes heading their way. The literature directly linking climate to conflict has not, however, been conclusive to date. At best, many argue that climate change could

lead to conflict exclusively via intermediate factors by negatively affecting economic growth or agricultural output.[35] Looking at the long-term variation in temperature and precipitation over the past 50 years, the Dell team finds that higher temperatures, particularly in poor countries, substantially reduce economic growth, agricultural output, industrial output, aggregate investment, while increasing political instability. [36] They conclude that "should future impacts of climate change mirror these historical effects, the negative impact on poor countries may be substantial."[37] Others argue that climate change may undermine human security by reducing access to natural resources that are critical to sustaining livelihoods and by undermining state capacity to act in ways that promote security and peace.[38]

That said, there is a growing body of recent research that has found compelling evidence that links global warming to increased rates of conflict in the world. Berkeley economists have found that higher temperatures and extreme precipitation tend to correlate with a greater incidence of conflict.[39] They argue that because most of the inhabited world is expected to warm 2–4 degrees centigrade by 2050, "amplified rates of human conflict could represent a large and critical impact of anthropogenic climate change."[40] Drawing from various disciplines, the Hsiang team analyzed 60 rigorous quantitative studies on climate and conflict and conclude, for the first time, a striking convergence of results. They found strong causal evidence linking climatic events to armed conflict across a range of spatial and temporal scales and across all major regions of the world. The magnitude of climate's influence is substantial, they argue: "for each one standard deviation (1σ) change in climate toward warmer temperatures or more extreme rainfall, median estimates indicate that the frequency of interpersonal violence rises 4% and the frequency of intergroup conflict rises 14%."[41] The Burke team similarly finds a strong link between higher temperatures and civil war in sub-Saharan Africa, "with warmer years leading to significant increases in the likeli-

hood of war."[42] They also predict "a roughly 54% increase in armed conflict incidence by 2030, or an additional 393,000 battle deaths if future wars are as deadly as recent wars."[43] This suggests that weak or failing states will be particularly prone to climate-induced instability which is likely to lead to more conflicts, not less.

HOW IS WARMING LIKELY TO AFFECT CONFLICT IN THE MUSLIM WORLD?

A positive trend between warming and conflict is already underway. We have evidence of climate-induced conflicts in places like Syria and Yemen.[44] Thus, we are not talking about conflicts that will be happening in some hypothetical future. The question is how representative climate-induced conflicts are within the Muslim world today and how much worse will they get when climate change accelerates by the middle of this century? More importantly, which areas will get hit the hardest and when?

A look at the average temperature highs in the Muslim world over the twenty-five years post-Cold War suggests that the average highs are generally getting higher (see Figure 2). During the same period, Figure 2 also shows that the average temperature in the Muslim world has increased by at least 1 degree centigrade. This is particularly alarming if we are trying to keep the global temperature mean from exceeding the widely accepted target of 1.5 degrees C relative to pre-industrial levels. What is more alarming is that the implications of projected global mean temperature changes tend to underestimate regional variations. This is because global mean temperature implies increases in warm and cold temperature extremes in both land and water. However, warming over land is typically stronger than over the oceans which means extreme temperatures in many regions can increase well beyond 2 degrees C. In fact, the 2 degree C global mean temperature target actually implies at the minimum of 3 degrees C warming par-

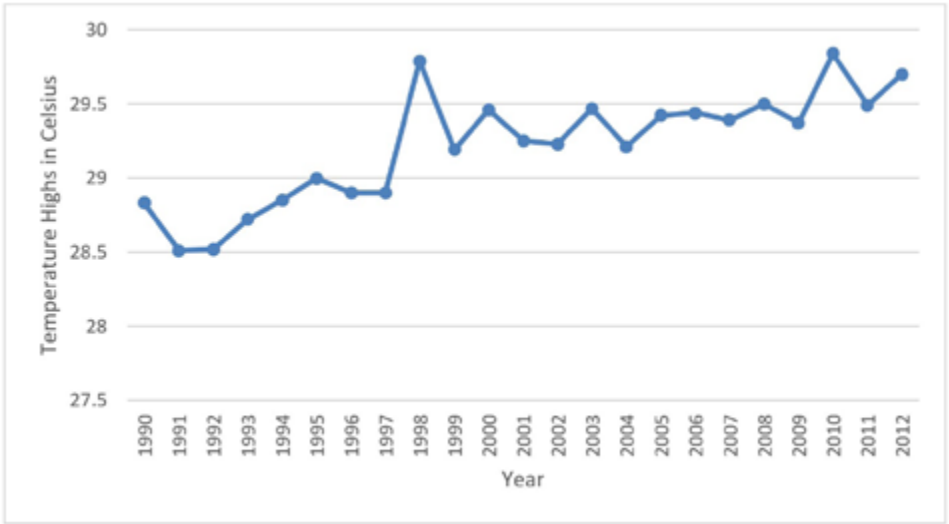

FIGURE 2. Annual Temperature Highs in the Muslim World, 1990–2012. Source: World Bank, Climate Change Knowledge Portal (2024). https://climateknowledgeportal.worldbank.org.

ticularly in places like the Mediterranean region and changes in regional extremes are expected to be greater than those in global mean temperature by a factor of 1.5.[45] Analyses looking at long-term temperature data suggest that the frequency of heat waves has been increasing since the 1970s.[46]

The overall trends in the average temperature in the Muslim world, according to Table 3, is gradually increasing but so is conflict in the same successive periods. If climate change shows a similar trend to the increasing conflict today, as Table 3 suggests, we can expect increased conflict with more warming in the future as well. The data in Table 3 are not meant to establish a causal link between global warming and violence. Whatever the precise role of climate change, it seems probable that further warming will likely contribute to further conflict. Another way of looking at Table 3 data is that warming has been less acute than it may be in the future, which could mean that current findings may underestimate the role of climate in future conflicts.

Muslim countries	1990–1995	1990–2000	1990–2005	1990–2010	1990–2012
Temp Highs	28.73	28.97	29.08	29.18	29.22
Conflict Deaths	89,362 (35%)	165,257 (39%)	197,556 (39%)	272,233 (43%)	566,707 (59%)

TABLE 3: Temperature Highs (Celsius) and Conflict in the Muslim World, 1990–2012. Source: World Bank. Climate Change Knowledge Portal. (2024). https://climateknowledgeportal.worldbank.org.

There are scenarios for alternative futures as in 2, 3, 4, 5, 6 degrees centigrade increase globally. What might we expect in the Muslim world if average temperatures go up by 4 degrees C as opposed to the 2 degrees C that are guaranteed? Table 4 summarizes the costs of various degrees of warming by laying out alternative scenarios given different degrees of change. While these are worse case scenarios, some of the more dire scenarios seem more likely with greater warming particularly in the Muslim world than indicated. We have already seen some temperature increase (1.5 degree Celsius from pre-industrial level) and can anticipate more increases – perhaps in the range of 2 to 6 degrees Celsius – depending in part on how much more carbon dioxide is emitted. The 2-degree Celsius increase that so many of the early global efforts aimed at ameliorating seems pretty much guaranteed. Now the question is how much higher will the temperature rise – 3 degrees? 4 degrees? 6 degrees? And will these numbers be even higher in the Muslim world than in the northern hemisphere?

The question is how various scenarios outlined in Table 4 will translate into Muslim world applications. A series of reports published by the World Bank show that "dramatic climate changes, heat, and weather extremes are already impacting people, damaging crops and coastlines, and putting food, water, and energy security at risk."[47] These reports examine the likely impacts of various degrees of warming above pre-industrial temperatures

on agricultural production, water resources, ecosystem services, and coastal vulnerability. They find that across the Middle East and North Africa and Central Asia (all predominantly Muslim regions), record-breaking temperatures are already "occurring more frequently, rainfall has increased in intensity in some places, while drought-prone regions are getting dryer."[48] Almost in every region, "the poor and underprivileged, as well as the elderly and children, are found to be hit the hardest."[49] and there are a lot more poor and underprivileged in the Muslim world than anywhere else in the world. The report concludes that "climate change might act as a threat multiplier for the security situation in the MENA region by imposing additional pressure on already scarce resources and by reinforcing pre-existing threats connected to migration following forced displacement."[50]

Parts of the Muslim world is already losing all potable water, which comes from either deeply buried aquifers or costly desalinated sea water. Much of the food in the Middle East is grown by over-pumping aquifers which means irrigation ends whenever these wells go dry. Without irrigation, food production cannot be sustained. Overall, a third of the planet's major aquifers are being over pumped, and most of them seriously affecting Muslim countries. The Arabian aquifer system, for instance, accounts for about 84 percent of total freshwater use across the arid Arabian Peninsula, with almost 90 percent of the water used for agriculture.[51] Some 300 million people, most of them in India and Pakistan, use almost 92 percent of the Indus aquifer basin to grow food.[52] Similarly, the Ganges-Brahmaputra basin that includes parts of India, China, Nepal, Bangladesh, and Bhutan, suffers aquifer depletion and groundwater pollution stresses and is home to 10 percent of the planet's population.[53] Finally, the biggest non-renewable aquifer in the world, the Nubian system, which flows under parts of Egypt, Libya, Sudan, and Chad, is over pumped due to unsustainable withdrawal rates and demographic pressures. [54]

Global Warming Scenarios	1–2 degrees C	3–4 degrees C	5–6 degrees C
Drought and desertification	Frequent heat waves	Widespread drought and desertification	Much of the world ceases to be inhabitable
Sea ice and ice sheets	Disappearing of Arctic ice sheet	Melting of Greenland ice sheets	Melting of Antarctic ice sheets
Sea level rise	Several meters	25 meters	75 meters
Eco-systems	One third of species become extinct	Amazon rainforest burns down	Massive species extinction
Human impact	Half a billion people at risk of starvation	Billions become environmental refugees	Catastrophic decline of general population
Climate feedbacks	Possible initiation of soil and ocean carbon feedbacks	Arctic permafrost and ocean algae endangered	Runaway global warming

TABLE 4: Global Warming Scenarios. Sources: Minqi Li, Peak Oil, Climate Change, and the Limits to China's Economic Growth (London: Routledge, 2014): 158; David Spratt and Philip Sutton, Climate Code Red: The Case for a Sustainability Emergency (Scribe US, 2008): 26–32; James Hansen, Storms of My Grandchildren: The Truth about the Coming Climate Catastrophe and Our Last Chance to Save Humanity (New York: Bloomsbury, 2010): 140–171.

In Yemen, prior to the current civil war, 14 of the country's 16 aquifers had been over-pumped, prompting some analysts to call it "a hydrological basket case."[55] With water tables rapidly falling in a country with one of the world's fastest growing population, the Yemenis now import more than 80 percent of their grain. One cannot assume that food imports from outside the Muslim world can be expected to continue at current levels or even to increase

to compensate for deficiencies within the Muslim world. Unlike Saudi Arabia, which can scour the world for more land and water, Yemen, as the poorest of the Arab countries, is facing a bleak future. Already a failing state, with hunger and thirst mounting, Yemen's internal conflicts are likely to persist into the future and spill over onto its neighbors.

Syria had similar water shortage problems prior to its civil war[56] and the government's failure to respond to the ensuing humanitarian crisis formed one of the "triggers of the uprising, feeding a discontent that had long been simmering in rural areas"[57] Precipitation, according to some regional models, is likely to decrease between 10 percent and 20 percent by 2050 in North Africa.[58] With the exception of Egypt, most countries in North Africa (e.g., Algeria, Libya, Morocco, and Tunisia) almost entirely depend on rainfall for agriculture.[59] If current projections of decreasing precipitation come to pass, countries such as Algeria and Morocco could experience a significant decline in agricultural productivity of up to 30 percent.[60] Thus, global warming will seriously limit food production capabilities in much of the Muslim world, which could lead to social collapse, state failure, and increased violence. Climate change will aggravate the already stressed food and water supplies of the Muslim world. For less stable governments, severe water shortages are likely to be detrimental to political stability.[61]

So, what parts of the Muslim world are likely to get hit hardest by global warming? According to NASA's climate change projections, the MENA region along with the southern parts of Central Asia as well as Southwest Asia, including Afghanistan and Pakistan, is expected to get hit the hardest by global warming by the end of this century, exacerbating the already hot and dry environmental conditions. The area around the Persian Gulf – which is a major source of oil and gas consumed globally – is likely to become "uninhabitable" in the second half of this century due to the region's limited water supply and extreme heatwaves which make it "a specific regional hotspot where climate change,

in absence of significant mitigation, is likely to severely impact human habitability in the future."[62] By some accounts, this region is likely to experience temperature levels that are "intolerable to humans owing to the consequences of increasing concentrations of anthropogenic greenhouse gases."[63] Certain cities in the region will be particularly hit the hardest due to extreme and sustained heatwaves. On the list are Abu Dhabi, Dubai, Doha, Dhahran, Bandar Abbas, and Kuwait City – cities that are most vulnerable to temperature highs that are projected to exceed 45 degrees C (104 degrees F) and possibly 60 degrees C (140 degrees F), which is a value close to the highest temperature ever recorded on Earth. [64]

In addition to the Persian Gulf area, the cities on the coast of the Red Sea will also be strongly affected by severe heat waves. In Jeddah and Mecca, for example, annual temperature highs are projected to exceed 55 degrees C (approximately 131 degrees F) with severe consequence to the nearly 2 million Muslim pilgrims who make the pilgrimage to Hajj every year to pray outdoors from dawn to dusk. Since the date for Hajj is based on the lunar calendar, some years the pilgrimage could be impossible if the date falls on summer months for several consecutive years. The fifth pillar of the Muslim faith could be jeopardized by global warming as any outdoor rituals will likely to become hazardous to human health. As the population in the Middle East and North Africa continues to rapidly increase,[65] the rise in annual temperature highs as a result of climate change "would make the present harsh desert environments even harsher," while constraining development along the coasts.[66] A plausible analogy of future climate for many locations in the Middle East, in Pal and Eltahir's views, is the current climate of the desert of Northern Afar on the African side of the Red Sea, "a region with no permanent human settlements owing to its extreme climate."[67]

Others find similar results and suggest that by the middle of the century the maximum temperature during the hottest days in MENA could increase to 46 degrees C (114 degrees F) – which

is 3 degrees higher than the recent average – and reach almost 50 degrees C (122 degrees F) by the end of the century.[68] Nightly temperatures during the summer months are expected to hover above 30 degrees C (86 degrees F). In short, parts of the MENA are projected to experience a temperature increase in excess of 6 degrees C relative to the 1986–2005 period with heat waves expected to occur "ten times more often than they do now."[69] In addition, the duration of heat waves will likely prolong dramatically. For example, between 1986 and 2005, extremely hot days on average lasted about 16 days per year. This number is expected to increase to 80 days by 2050 and to 118 days by 2100. And these are conservative projections based on achieving significant reductions of greenhouse gas emissions after 2040. If current levels of carbon dioxide emissions continue unabated, people living in the MENA region will likely experience closer to 200 unusually hot days, says Panos Hadjinicolaou, a climate change expert.

Surprisingly, climate change is not new to the Middle East and North Africa, which has been through climate changes before in a way that few other places have been, and this region happens to house one-third of the world's Muslims today. What we know from history is that over the past 15,000 years, the region has been hit repeatedly by a series of cold and dry climate episodes with devastating consequences for human systems and behavior (e.g., 10,700 BCE, 8,500 BCE, 7,000 BCE, 4,000 BCE, 2,200 BCE, 1,250 BCE, 450 CE, 950 CE, and 1,400 CE) – all centered in areas that became critical to the Muslim world.[70] In each case, pretty much the same thing happened: food production stopped, urbanization ceased, diseases broke out, wars erupted, governments collapsed, and ultimately, population growth ended. Climate change rarely influenced all of the MENA evenly but the parts it did, experienced similar systemic breakdowns.[71] As extreme heatwaves and water shortages make this region uninhabitable, where will this region's 550 million Muslims go? In the Persian Gulf, there are very few choices for relocation but presumably even those places

will be subject to some of the same environmental pressures. Thus, warming temperatures are likely to contribute to increased migration in the region. According to an atmospheric researcher Johannes Lelieveld, "climate change will significantly worsen the living conditions in the Middle East and North Africa. Prolonged heat waves and desert dust storms can render some regions uninhabitable, which will surely contribute to the pressure to migrate."[72]

IS ARMED CONFLICT LIKELY TO BE CONTAINED IN THE MUSLIM WORLD?

Many European countries are already feeling besieged by a rising tide of refugees and economic migrants fleeing the Middle East and North Africa. Thus far, the European response has been to fortify its borders. Paul Collier, a British economist, has warned that an influx of migrants in densely populated Europe could lead to "prolonged social problems."[73] According to polls, most Europeans want fewer migrants amid worries about unemployment and terrorism. A series of terrorist attacks since 2001 has made Europeans nervous about immigrants particularly from Muslim countries. Thus, popular anxiety has fueled the rise of nationalist parties that discourage immigration. Meanwhile, the worldwide exodus of refugees shows no signs of abating that the United Nations has called it the worst refugee crisis since World War II. According to the UN Refugee Agency, one in every 122 people in the world is now either a refugee, internally displaced, or seeking asylum.[74] The surge in the number of refugees seeking safety is largely driven by the conflicts in Syria, Iraq, Yemen, and Sudan, making the MENA region the world's largest producer of migrants. With European countries closing their doors, eight out of 10 refugees are now residing in countries that are economically and politically unstable.

The developed countries' reaction might be to fortify their borders from an influx of Muslim refugees or migrants fleeing their war-torn homes. But this task will prove increasingly more difficult to achieve as the migrants' home countries become uninhabitable pushing them into neighboring countries. So far, despite all the hype about Europe's migration crisis, most of the world's displaced people have been taken by countries in the Middle East and North Africa (39%), Sub-Saharan Africa (29%), and Asia (14%). By contrast, according to the latest UN Refugee Agency report, Europe has taken only 6% of the world's displaced people. A significant number of these refugees are hosted by just six countries: Turkey, Pakistan, Lebanon, Iran, Ethiopia, and Jordan – all with their own set of problems as well as being the least well equipped to handle the flood of migrants.

We should in the developed world care about conflicts in the Muslim world because it will be difficult for the negative impacts of environmentally induced conflicts to remain isolated to the countries where they originate. Sadly, these conflicts will not be materializing in a decade or two, they are already here. And the rest of the world will have to deal with these problems ranging from humanitarian crises (e.g., Syrian refugees) to terrorism (Boko Haram, a militant group is already exploiting the drought and the Nigerian's government's inability to cope with the weather changes to fill in the void and butcher those who stand in the way). If Muslim politics are tough now, climate change, coupled with extreme poverty and high population growth, will further intensify existing conflicts and most certainly create new ones.

CONCLUSIONS

Some amount of global warming in the coming decades seems quite probable. Just how bad it will become remains to be seen but we seem assured to experience at least more than the 2 degrees

C that has been a target to avoid for so long. However warmer it becomes, the effects around the world will be uneven. States near or on the equator are likely to bear the heaviest brunt of the damage. As it happens, the Muslim world – stretching from Morocco to Indonesia – lies astride the areas most likely to suffer from higher temperatures and declining precipitation. A good number of these Muslim states are also among the least prepared to cope with extreme climate change. Resilience is a fine concept, but it is much easier to adapt to changes if there are some resources with which to work. Many Muslim states lack affluence, economic development, and access to water. Large populations in some cases and still high birth rates do not help. Situated in already relatively warm and arid places, higher temperatures will only make survival more difficult.

What might we anticipate? The Muslim world is already characterized by a disproportionate share of the world's conflict. There is little reason to assume that will change. If global warming increases scarcity – and how can it not? – conflict within the Muslim world as well as between the Muslim world and the non-Muslim world is quite likely to increase despite trends to the contrary in the non-Muslim world. At present, it is mainly Muslims fighting other Muslims. But if the outside world continues to need oil, it will continue to intervene in the Middle East to secure access to energy resources in spite of local turmoil. If Syrian refugees are causing a crisis in Europe and, to a lesser extent, North America today, imagine what the reaction to dealing with many more refugees might be as deteriorating environmental conditions push more people out of their homes into the neighboring countries. Although the lion's share of the terrorism committed by Muslims tends to target other Muslims, that propensity need not persist. In fact, intra-Muslim conflict is unlikely to stay within the Muslim world.

As parts of the Muslim world becomes uninhabitable and other parts become even more immiserated, the odds of fragile auto-

cratic states managing the newly aggravated problems seem low. No doubt, there will be some successful adaptation to the changes in climate within the Muslim world. Yet they seem likely to be the exceptions to the rule. In the past, dealing with the Muslim world has proven difficult at times. Things seem likely to get worse in that respect as the 21st century climate regime deteriorates. While some parts of the global North will be inconvenienced with food production being forced to move north, the Muslim world will not be able to entertain that option. As food, water and even the prospects for eking out livelihoods become scarcer, the problems of the Muslim world will become more acute. We should be able to see this crisis coming. Even so, it is rarely discussed and even less attention is being given to coming to terms with its implications.

Of course, with the advent of global warming there will be a host of other problems with which to deal. Coastal city populations in places like Bangladesh will surely have to move inland but how much farther inland can they go without resistance from inland neighbor countries such as India with equally high population densities? In addition to migration challenges, grain farming areas will need to move north. Water will need to be rationed in some areas in which water is already scarce. But what will be done with and to the Muslim world? It cannot move *en masse* nor can we build a wall around the Muslim world to sequester their problems from the rest of the world. Some petrostates may be able to insulate themselves from the new hardships but most Muslim states will have few resources with which to cope with an even more deteriorated environment. Can we expect much assistance from the already antagonized non-Muslim world which will be attempting to manage its own climate-induced problems? Somehow, an increasingly liberal world characterized by widespread democratization and economic interdependence seems somewhat remote both within and outside the Muslim world. What remain are mitigation and adaptation efforts that will need to be amplified at war time speed. What is the Muslim world doing to adapt to

climate change, if any, and what can the developed world do to help counter some of the possible climate changes? Some suggest sustained military intervention is key to stabilizing the conflictual Muslim world before anything meaningful about climate change can be implemented. But recent experience with military intervention in Afghanistan and Iraq suggests that this strategy has not exactly made these places more peaceful. Foreign aid is badly needed to restore damaged infrastructure in the Muslim world but often times aid ends up being just another form of resource curse at the hands of corrupt and authoritarian leaders. So the Muslim world needs a lot of international assistance to help mitigate the catastrophic impact of climate change but that is difficult enough to achieve in good times and will likely to become impossible if the environment continues to deteriorate while conflict continues to escalate.

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NOTES

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