Blood and Soil: The Dynamic Relationship between Natural Resources and Social Conflict

Alison Heslin (Corresponding Author)
Peter E. de Janosi Postdoctoral Research Fellow
International Institute of Applied Systems Analysis
Schlossplatz 1
A-2361 Laxenburg, Austria
heslin@iiasa.ac.at
+43 2236 807 568

Abstract

With increased demands on natural resources from population growth and climate change, understanding how the environmental and the social interact and what consequences there are for populations facing strained resources is of increasing importance. This study focuses on social conflict, such as riots, protests, and strikes to identify the links between environmental resources, social factors, and conflict, grounded in the understanding that conflict events at times of strained resources often indicate an interaction between resource access and existing social stressors.

Introduction

Despite increasing urbanization worldwide, human populations continue to depend heavily on the natural resources, which surround them. Understanding this interaction between societies and natural resources is critical for the health and stability of a population. Strained resources due to desertification, droughts, floods, or other natural disasters can exacerbate existing tensions and inequalities existing within a community. In times of decreased access to resources, such as food or water, conflict can arise around issues of politics, migration, or economic inequality. Understanding the potential of decreased resource access to mobilize or prolong conflicts is critical for preparing for future changes to temperature, rainfall, or natural disasters.

This study seeks to begin to identify the links between resources and conflict, testing the effects of social and environmental factors on the occurrence and duration of social conflict. I draw upon the Social Conflict Analysis Database to identify instances of social conflict and combine that data with social factors such as income, education, and governance, as well as environmental factors including temperature, rainfall, crop production, and natural disasters.

Literature

With increasing demands on natural resources due to climate change, industrial development, and population growth, understanding how scarce or inaccessible resources, such as food, relate to conflict is critical for security and stability throughout the world. While processes such as climate change, development, and population growth are global in reach, the consequences of these processes and the capacity of individuals and communities to adapt to them are not evenly distributed throughout the world [1]. Differences in which groups are affected by issues such as food scarcity and climate change and how they react to corresponding hardships, such as forced migration, salinization of arable land, or increased natural disasters, can have lasting effects on political stability, social inequality, and development [2].

The hardships corresponding to climate change can be experienced directly through weather events, such as droughts and floods, but also indirectly through stresses on natural resources and increased poverty rates (particularly for those dependent on natural resources). In addition, populations are often found at the intersection of multiple forms of vulnerability, including those vulnerable to the effects of climate change, who are often also exposed to negative consequences of economic globalization [3]. For example, urban poor populations, who are economically disadvantaged, often inhabit unstable housing in

---

[1] W. Neil Adger and P. Mick Kelly, "Social Vulnerability to Climate Change and the Architecture of Entitlements," *Mitigation and Adaptation Strategies for Global Change* 4, no. 3 (1999): 253–66, doi:10.1023/A:1009601904210; Richard S. J Tol et al., "Distributional Aspects of Climate Change Impacts," *Global Environmental Change*, The Benefits of Climate Policy, 14, no. 3 (October 2004): 259–72, doi:10.1016/j.gloenvcha.2004.04.007.

[2] W.n. Adger, "Social and Ecological Resilience: Are They Related?," *Progress in Human Geography* 24, no. 3 (September 2000): 347–64; Jon Barnett and W. Neil Adger, "Climate Change, Human Security and Violent Conflict," *Political Geography*, Climate Change and Conflict, 26, no. 6 (August 2007): 639–55, doi:10.1016/j.polgeo.2007.03.003.

[3] Karen L O'Brien and Robin M Leichenko, "Double Exposure: Assessing the Impacts of Climate Change within the Context of Economic Globalization," *Global Environmental Change* 10, no. 3 (October 2000): 221–32, doi:10.1016/S0959-3780(00)00021-2.

precarious areas of cities. Their residential patterns make them vulnerable not only to changes in wages or prices, but also to natural disasters. Understanding the intersection of resource availability, poverty, and conflict is critical in order to identify which populations are least able to command resources when critical resources are stressed, how those populations react under conditions of scarce necessary resources, and when scarce resources undermine stability and development [4]. This study addresses this intersection by testing the effect of social and environmental factors on the likelihood and duration of conflict as well as various interactions between social and environmental variable.

Previous studies have begun to address this connection between conflict and climate. Barnett and Adger[5] argue that the connection between climate and conflict occurs when weather changes damage natural resources on which a population depends for their livelihood. Hendrix and Salehyan[6] analyze the relationship between rainfall patterns and social conflict, finding that extreme deviations in rainfall amounts, both too much and too little, increases the likelihood of social conflict in Africa. Miguel, Satyanath, and Sergenti[7] use rainfall to instrument economic growth variations and find significant relationships between rainfall fluctuations and the occurrence of civil wars. In their study of India ongoing conflict in India, Wischnath and Buhaug[8] hypothesize that the connection between agricultural production and escalation of conflict occurs by increasing grievances and inequalities, lowering the opportunity costs of rebelling, and increasing recruitment potential.

It is important to understand these mechanisms and detailed causes of conflict in situations where weather differences relate to conflict occurrence in order to address the grievances of the group protesting. Gaining knowledge of which areas and populations may engage in violence, and why specifically they are protesting, can allow for interventions that address the actual concerns of the group rather than resorting to repressive force. This capacity to more completely understand and address the concerns of a resource-stressed population is of serious consequence, as conflict can have a feedback effect, in that it can further limit access to resources such as food and employment, issues that may have sparked violence from the beginning.[9]

Theory and Hypotheses

While preventing conflict may prevent the destruction of certain resources, it is critical to not identify locations prone to conflict under particular climatic conditions strictly for the sake of preventing violent conflict. Identifying the exact temperature variation or natural disaster type that may increase violence can allow for more efficient social control at the expense of identifying the actual, on the ground concerns of the population. The participants in protests and strikes may organize over existing grievances during times of drought or high food prices because the hardship increased resources available to the groups organizing. In this instance it is important to have a more comprehensive understanding of the ways in which the social and environmental interact to mobilize groups around existing issues. In

---

[4] Adger and Kelly, "Social Vulnerability to Climate Change and the Architecture of Entitlements"; Amartya Sen, *Poverty and Famines: An Essay on Entitlement and Deprivation* (New York: Oxford University Press, 1981).

[5] Barnett and Adger, "Climate Change, Human Security and Violent Conflict."

[6] Cullen S. Hendrix and Idean Salehyan, "Climate Change, Rainfall, and Social Conflict in Africa," *Journal of Peace Research* 49, no. 1 (January 1, 2012): 35–50, doi:10.1177/0022343311426165.

[7] Edward Miguel, Shanker Satyanath, and Ernest Sergenti, "Economic Shocks and Civil Conflict: An Instrumental Variables Approach," *Journal of Political Economy* 112, no. 4 (2004): 725–53.

[8] Gerdis Wischnath and Halvard Buhaug, "Rice or Riots: On Food Production and Conflict Severity across India," *Political Geography*, Special Issue: Climate Change and Conflict, 43 (November 2014): 6–15, doi:10.1016/j.polgeo.2014.07.004.

[9] L. Alinovi, G. Hemrich, and L. Russo, *Beyond Relief: Food Security in Protracted Crises.* (UK: Practical Action Publishing, 2008); Daniel Maxwell, "Food Security and Political Stability: A Humanitariam Perspective," in *Food Security and Sociopolitical Stability*, by Christopher Barrett (Oxford, UK: Oxford University Press, 2013), 279–301.

many cases these groups may be seizing an opportunity to fight against oppressive or unjust authority, in which case the goal of research should be to understand how environmental factors interact to facilitate different forms of conflict rather than identifying violence-prone locations for the sake of preventing organization and targeting social control.

In this vein, I seek to identify the social and environmental factors, as well as the interaction between the two, that increase the likelihood of successful organization of social conflict events, such as strikes, protests, and riots. Based on prior research connecting weather events and natural resources to conflict occurrence, I anticipate a relationship between deviations in rainfall and conflict. I will test the relationship on a greatly increased sample encompassing sixteen years and 65 countries. To the analysis of rainfall, I add crop yields to determine whether the relationship between rainfall and conflict operates through agricultural yield or whether the relationship holds even when controlling for agricultural production. Additionally, I include deviations from average temperature to determine whether temperature operates to increase conflict likelihood in the same way that rainfall does. If, as hypothesized in existing literature, climate changes increase conflict likelihood by damaging or limiting resources on which populations depend, we may also expect that increased prices would have a similar effect for those laborers who purchase their food rather than grow themselves. I include the country food price index into my analysis to test the extent to which the food price follows a similar relationship to the hypothesized connection between resources and conflict. Additionally, I include the intersection of rates of urbanization and poverty with food price, as I anticipate that the greater proportion of people in poverty and proportion living in cities, and thus likely not agricultural producers, the stronger the impact of food price increases on their capacity to support themselves.

In addition to those variables related to resource access, I anticipate that conflict likelihood is influenced by social factors, which alter the capacity of a population to organize and assemble. These variables include the extent of democracy in a country, anticipating that the more democratic a country is, the more likely people have existing civil society organizations that are able to mobilize populations without the deterrent of extreme repression in response to their organizing. Having existing organizations is critical for the seemingly sudden up rise of protests, as these events are not as spontaneous as they may appear, often entailing extensive organizing and networks in existence long before the moment of conflict actually occurs. Lastly, I include the levels of education of the population, specifically dividing it by gender and age to determine whether a higher educated young population increases the likelihood that the population engages in social conflict. This increase in education may increase the organizing potential and resources available to the population to address grievances with the state.

Data and Methods

This study seeks to further understand the relationship between natural and social stressors and the occurrence and duration of conflict. The analysis is thus divided into two separate datasets and models. The first tests the occurrence of conflict, using a binary dependent variable for whether or not a social conflict event occurred in that month. For the binary outcome, the unit of analysis is the country-month. The second tests if the significant variables in the first test are also significant predictors of the duration of conflict. In this case, the unit of analysis is an individual conflict event and the dependent variable of interest is continuous, measuring the number of days that a given conflict event occurred.

Dependent Variable

To measure social conflict, I utilize the Social Conflict Analysis Database (SCAD)[10]. SCAD compiles information on social conflict from searches of newspaper articles by country and keyword. The database documents social conflict in Africa, Mexico, Central America, and the Caribbean and includes strikes, riots, protests, government violence, and

[10] Idean Salehyan et al., "Social Conflict in Africa: A New Database," *International Interactions* 38, no. 4 (2012): 503–51.

communal violence. I include those conflict events that began in or after 2000. To test the relationship between the independent variables of interest and the likelihood of conflict, I collapse the data by country-month for January 2000 through December 2015, coding the dependent variable as 1 if one or more social conflicts occurred in that month or as zero if no social conflicts were recorded in the dataset for that country and month. The resulting dataset consists of 12,480 country-months, containing 4,512 in which a conflict event occurred and 7,968 in which no conflict event occurred. In testing relationships with the duration of conflict, only country-months with events are included events occurring after 2000 are included, with the duration of conflict as the dependent variable.

Independent Variables

To supplement the Social Conflict Analysis Database, this study draws upon numerous additional data sources. For environmental factors, the models include country-month level measures of rainfall and temperature from the World Bank Group Climate Change Knowledge Portal[11] as well as crop yield data per country per year from the Food and Agricultural Organization (FAOSTAT)[12]. To include these measures into the model, they were transformed to account for seasonal variation within countries and geographic variation between countries. For temperature and rainfall data, the current month was compared with the average rainfall during that same month over the past ten years, the absolute value of the difference was then included as the monthly measure of rainfall per country, capturing deviations from the recent mean. For crop yield data, I take the difference in crop yield between the prior year and the current year for four staple commodities per country – maize, rice, soy, and wheat. I then average the difference in yield across these four crops per country to create a composite measure of changes in staple crops production per country, accounting for some differences between countries in primary staple crop production. The model also takes into account the number of natural disasters that occurred in each country, drawing on The International Disaster Database.[13]

While changes in natural resources through temperature, rainfall, and agricultural productivity can have serious impacts on societies, their impact is translated through the social systems in which they occur. This analysis of conflict takes into account the societies affected to unpack the relationship between the natural, the social, and conflict. First, the model includes price data on the global price of food as well as country-level price of food using the Consumer Food Price Index for food from FAOSTAT. This measure bridges the natural and social as it is affected by crop production, but also heavily determined by the political economy of food production including production subsidies, tariffs and international trade laws, as well as consumer subsidies. Additionally, I account for the democracy level using the yearly polity score for each country, the proportion of residents living in urban areas, and the average income. Lastly, I include the education level for residents of the country broken down by sex and age, including the mean years of schooling for men and women in four age brackets – 15-19, 20-24, 25-29, and 30-34. These values were available for the years 2000, 2005, 2010, and 2015, therefore mean years of education for the intermediate years were assigned the prior value (for example, 2001-2004 are assigned data from 2000, 2006-2009 are assigned 2005)[14].

In addition to these variables, the models also include interactions between variables hypothesized to be meaningful. First, I include an interaction between the price of food and

---

[11] The World Bank Group, "Climate Change Knowledge Portal 2.0," 2017, http://sdwebx.worldbank.org/climateportal/.

[12] Food and Agriculture Organization of the United Nations, "FAOSTAT: Food and Agriculture Data," 2017.

[13] Center for Research on the Epidemiology of Disasters, "EM-DAT | The International Disasters Database," 2017, http://www.emdat.be/.

[14] Wolfgang Lutz, William P. Butz, and Samir KC, eds., *World Population and Human Capital in the Twenty-First Century* (Oxford, New York: Oxford University Press, 2014).

the average income, as increases in food prices will affect people more severely in locations with low income levels or less expendable income. Additionally, I interact the price of food with the percent of the population living in urban centers from the World Bank urbanization estimates.[15] I also include interaction between the polity score[16], which varies from –10, a heredity monarchy, to 10, a consolidated democracy, and education levels to determine a higher educated population living in a representative regime is more likely to organize social conflict events like protests, strikes, and riots than a less educated or more autocratic counterpart.

Preliminary Results and Discussion

To test the effects of the independent variables on the occurrence of conflict, I utilize logistic regression. Because the study uses panel data - by country and month - in which many observations exist for the same country, the observations are not independent of one another. To account for the correlated errors among units which are introduced with the use of panel data, I use a fixed effects logistic regression, which controls for these unit effects. This model was run first with only the independent variables and then with the introduction of interaction terms. Table 1 shows the results of the two models in understanding whether or not a conflict occurred in a given country-month. In testing the effects of the natural and social factors on the likelihood of an event occurring, the first model yields interesting and some unexpected results. Variables which were found to increase the likelihood of conflict events included the mean years of schooling for men ages 15-19 and 20-24. In these two younger age categories, the higher the mean school years for men in the age groups, the more likely the country would experience a conflict event. Not only are these variables significant, they also have a meaningfully large effect size with a one year increase in mean schooling for 15-19 year olds increasing the likelihood of a conflict event by 1.729 times and for the 20-24 year olds, a one year increase in schooling increased conflict likelihood by 1.541 times. Additionally, in this model, the average years of schooling for women aged 30-34 neared significance (p=.058), with a positive effect on the likelihood of conflict. On the other hand, education levels among the 30-34 year cohort of men had the opposite effect, lowering the likelihood of conflict events (p=0.56).

Outside of education levels, food price (p=0.000), governance structure (p=0.028), and income per capita (p=0.056) each were also significant. Higher Polity scores, meaning more democratic states, lowered the odds of conflict events, while lower income per capita increased the likelihood of conflict events. Food price was also highly significant, but counterintuitively, with an odds ratio between 0 and 1. This indicates that an increase in food prices decreases the likelihood of conflict, though the effect size is quite small.

While social variables had various complex relationships with conflict occurrence, the environmental variables saw much fewer direct effects on conflict. Food prices showed the only consistent association with conflict events, though the price of food likely encompasses some extent of environmental factors such as rainfall and natural disasters else where in the world, which drive the price of food. Further analysis will include environmental factors, which may be more directly influencing the populations, rather than deviations from the country mean of the past 10 years, perhaps local level rainfall or temperature or deviations in rainfall or temperature in crop and cattle producing regions of the country have a larger effect.

The inclusion of interactions among particular independent variables adds some degree of clarity to the results reported in the first logistic regression Model 1. When including the interaction of education with democracy and food price with average income and urbanization levels, the relationship is significant. The interaction between polity and education levels is present with directions of relationship that depend on the age group of

[15] The World Bank, “Urban Population | Data,” 2017, http://data.worldbank.org/indicator/SP.URB.TOTL?view=chart.
[16] Center for Systemic Peace, “The Polity Project: Polity IV Dataset,” 2017.

the population. Younger males' education has positive association while older had negative. These results are consistent with Model 1. In the same way, we can see that food price is important when populations are based more heavily in urban areas, with urbanization and income variables also significant independently. Higher levels of urbanization increase the likelihood of conflict while increased income decreased the likelihood of conflict. The decreased likelihood of conflict during high food prices relationship remains though. It is possible that restricting the dataset to conflict related to food access would show a positive relationship between food price and conflict, rather than in this model in which all forms of social conflict were included, even those which did not relate to food access.

Table 1: Logistic Regression Results of IVs on Protest Occurrence

	Model 1	Model 2
Variable	*Odds Ratio*	*Odds Ratio*
Food Price	0.9957*	0.9966*
Per Capita Income	0.9999 †	0.9995**
Urbanization %	1.0206	1.0444 †
EducationM15-19	1.7293*	1.8881*
EducationM20-24	1.5411*	1.9995**
EducationM30-34	0.5775 †	0.5267*
EducationF20-24	0.8881	0.6379 †
EducationF25-29	0.6863	0.4841*
EducationF30-34	1.7825 †	2.4270**
Polity Score	0.9589*	0.9495
Polity*EduF25-29		1.1190**
Polity*EduF30-34		0.8521***
Polity*EduM20-24		0.9497*
Polity*EduM30-34		1.0854***

FoodPrice*Urban	0.9999
FoodPrice*Income	1.0000*

† p < .1 *p < .05. **p < .01. *** p <.001

Note: Additional age categories of education, which were not significant left out of table.

The second part of the analysis for this study seeks to identify if the significant variables in accounting for riot occurrence also influence the duration of the conflict event. In this test, the dependent variable is no longer a binary variable of whether or not a conflict occurred in the country-month, but rather the data include only country-months in which events occurred and measure the average conflict event's duration in each country-month. As with the logistic regression, the repeated country unit must be accounted for in the model with fixed effects. The regression for duration of conflict was run once including all theorized variables and then a second time including interaction terms. Because the dependent variable is numeric, measured as a mean count of the number of days that a country's monthly conflicts persisted for, logistic regression is not necessary in the second set of models. Coefficients in this case are interpreted as linear regression coefficients rather than odds ratios.

While multiple variables are found to be significant in understanding whether or not a conflict occurs, much of that relationship is not present in determining how long conflicts will continue for once they have begun. In the first model, only food price nears significance, with a negative effect on conflict duration. In the second model, which includes interactions, the significant variables were levels of education and form of governance. These findings are consistent in direction and size of effect as in the logistic regression indicating that more autocratic regimes are likely to have longer conflicts. Women's education in the 15-19 year old category nears significance (p=.098), with a positive effect on duration, meaning that the higher educated the women in that category are, the long conflict events may last. In the case on government structure, the significance and direction are logical, as more limited formal channels through which to address the government may prolong the length of conflict events. In the interaction terms, the governance structures interaction with women's education level in 25-29 year olds is also significant and negative, and the interaction with men's education level in 20-24 year olds is positive.

Table 2: Linear Regression of IVs on Conflict Duration

	Model 1	Model 2
Variable	*Coefficient*	*Coefficient*
Food Price	-0.0186†	-0.0584
Per Capita Income	0.0000	0.0007
Urbanization %	0.0346	0.3308
EducationM15-19	-4.4456	-6.7350
EducationM20-24	4.4712	10.0255
EducationM30-34	-3.7803	1.8671
EducationF20-24	-2.3863	-7.5507
EducationF25-29	-4.2577	-0.6957
EducationF30-34	-0.2857	-1.9714
Polity Score	-0.1858†	-0.4537*
Polity*EduF25-29		-0.1622**
Polity*EduF30-34		0.0285
Polity*EduM20-24		0.1375*

Polity*EduM30-34	0.0251
FoodPrice*Urban	0.0014
FoodPrice*Income	0.0000

† p < .1 *p < .05. **p < .01. *** p <.001

Note: Additional age categories of education, which were not significant left out of table.

Conclusion & Future Research

This study begins a larger project of understanding the connection between environmental factors, such droughts, agricultural production, and food access with social factors including governance, education, and poverty and the occurrence and extent of social conflict. Comparing instances of social conflict throughout Africa, Mexico, Central America, and the Caribbean, I test the relationship between these environmental and social factors and the occurrence and duration of each conflict event. From this analysis, this study finds a significant relationship between many social factors such as democracy and education level with the likelihood of conflict events occurring, as well as a relationship between food access and conflict. These factors were stronger predictors of conflict occurrence than the varying lengths of conflict events once they had begun. Overall, this study contributes the role of education levels as a potentially important variable in understanding both the occurrence and duration of conflicts, one that has not been explored in additional studies of these events. This relationship holds even when controlling for the national income and urbanization. The division of education by age group is critical here as education levels in different age groups have opposite directional effects on conflict, thus compiling them into one category would mask this effect.

Moving forward, this project will incorporate additional sub-national level data on temperature, rainfall, and internal migration. Attempting to uncover the processes by which natural stressors interact with the significant variables such as education and democracy level to facilitate or hinder conflict from occurring. To so I will also subset the conflict data to test if the relationships differ based on the type of conflict event and the motivating cause of the events, which are coded for in the SCAD data. Restricting the conflict data to include only those conflicts relating to food, water, and subsistence, for example, may provide further detail into the role of natural resources in understanding conflict locations. Additionally, where available, local level food price and production data, as well as more local weather information could further contribute to understandings of conflict events.

References

Adger, W. Neil, and P. Mick Kelly. “Social Vulnerability to Climate Change and the Architecture of Entitlements.” *Mitigation and Adaptation Strategies for Global Change* 4, no. 3 (1999): 253–66. doi:10.1023/A:1009601904210.

Adger, W.n. “Social and Ecological Resilience: Are They Related?” *Progress in Human Geography* 24, no. 3 (September 2000): 347–64.

Alinovi, L., G. Hemrich, and L. Russo. *Beyond Relief: Food Security in Protracted Crises.* UK: Practical Action Publishing, 2008.

Barnett, Jon, and W. Neil Adger. “Climate Change, Human Security and Violent Conflict.” *Political Geography*, Climate Change and Conflict, 26, no. 6 (August 2007): 639–55. doi:10.1016/j.polgeo.2007.03.003.

Center for Research on the Epidemiology of Disasters. “EM-DAT | The International Disasters Database,” 2017. http://www.emdat.be/.

Center for Systemic Peace. “The Polity Project: Polity IV Dataset,” 2017.

Food and Agriculture Organization of the United Nations. “FAOSTAT: Food and Agriculture Data,” 2017.

Hendrix, Cullen S., and Idean Salehyan. “Climate Change, Rainfall, and Social Conflict in Africa.” *Journal of Peace Research* 49, no. 1 (January 1, 2012): 35–50. doi:10.1177/0022343311426165.

Lutz, Wolfgang, William P. Butz, and Samir KC, eds. *World Population and Human Capital in the Twenty-First Century*. Oxford, New York: Oxford University Press, 2014.

Maxwell, Daniel. “Food Security and Political Stability: A Humanitariam Perspective.” In *Food Security and Sociopolitical Stability*, by Christopher Barrett, 279–301. Oxford, UK: Oxford University Press, 2013.

Miguel, Edward, Shanker Satyanath, and Ernest Sergenti. “Economic Shocks and Civil Conflict: An Instrumental Variables Approach.” *Journal of Political Economy* 112, no. 4 (2004): 725–53.

O’Brien, Karen L, and Robin M Leichenko. “Double Exposure: Assessing the Impacts of Climate Change within the Context of Economic Globalization.” *Global Environmental Change* 10, no. 3 (October 2000): 221–32. doi:10.1016/S0959-3780(00)00021-2.

Salehyan, Idean, Cullen S. Hendrix, Hamner Jesse, Christina Case, Christopher Linebarger, Emily Stull, and Jennifer Williams. “Social Conflict in Africa: A New Database.” *International Interactions* 38, no. 4 (2012): 503–51.

Sen, Amartya. *Poverty and Famines: An Essay on Entitlement and Deprivation*. New York: Oxford University Press, 1981.

The World Bank. “Urban Population | Data,” 2017. http://data.worldbank.org/indicator/SP.URB.TOTL?view=chart.

The World Bank Group. “Climate Change Knowledge Portal 2.0,” 2017. http://sdwebx.worldbank.org/climateportal/.

Tol, Richard S. J, Thomas E Downing, Onno J Kuik, and Joel B Smith. “Distributional Aspects of Climate Change Impacts.” *Global Environmental Change*, The Benefits of Climate Policy, 14, no. 3 (October 2004): 259–72. doi:10.1016/j.gloenvcha.2004.04.007.

Wischnath, Gerdis, and Halvard Buhaug. “Rice or Riots: On Food Production and Conflict Severity across India.” *Political Geography*, Special Issue: Climate Change and Conflict, 43 (November 2014): 6–15. doi:10.1016/j.polgeo.2014.07.004.