Political Geography 50 (2016) 33–47

Contents lists available at ScienceDirect

Political Geography

journal homepage: www.elsevier.com/locate/polgeo

Climate shocks and conflict: Evidence from colonial Nigeria

Kostadis J. Papaioannou *

Department of Rural and Environmental History, Wageningen University, Wageningen, The Netherlands

ARTICLE INFO

Article history:
Available online 13 October 2015

Keywords:
Climate shocks
Conflict
Africa
Colonialism

ABSTRACT

This paper offers a historical micro-level analysis of the impact of climate shocks on the incidence of civil conflict in colonial Nigeria (1912–1945). Primary historical sources on court cases, prisoners and homicides are used to capture conflict. To measure climate shocks we use the deviation from long-term rainfall patterns, capturing both drought and excessive rainfall. We find a robust and significant curvilinear (U-shaped) relationship between rainfall deviations and conflict intensity, which tends to be stronger in agro-ecological zones that are least resilient to climatic variability (such as Guinean Savannah) and where (pre-) colonial political structures were less centralized. We find evidence that the relationship is weaker in areas that specialize in the production of export crops (such as cocoa and palm oil) compared to subsistence farming areas, suggesting that agricultural diversification acts as an insurance mechanism against the whims of nature. Additional historical information on food shortages, crop-price spikes and outbreaks of violence is used to explore the climate–conflict connection in greater detail.

Introduction

> "*With few stocks in hand, one year's shortfall could easily be translated into a famine*"
>
> –Megan Vaughan (2007[1987], p. 5)

There is a growing body of literature across multiple scholarly disciplines, including economics, political science and geography, that aims to better understand the impact of climate change on human and social behavior. This literature is inspired by growing public concerns about the potentially distortive effects of climate change on societal cohesion. The literature also raises awareness of global interrelatedness (Johnstone & Mazo, 2011). For example, the exceptionally dry winter in China in 2010–2011 led to global wheat shortages. These shortages had a particularly severe impact on Egypt, the world's largest wheat importer, where, during the period November 2010 to March 2011, bread prices soared to a level that was unaffordable for most low-income households. This is now believed to have planted the seeds that, along with other social, economic and political factors, eventually yielded the Arab Spring in Egypt and beyond (Sternberg, 2012). The potential impact of climate-induced resource scarcities is even larger in sub-Saharan Africa. As many as 95 percent of the crops cultivated today are rain-fed, while less than 5 percent of all cultivated land is suitable for irrigation (Calzadilla, Zhu, Rehdanz, Tol, & Ringler, 2013). Consequently, extreme rainfall anomalies in the form of either drought or floods can easily destroy harvests, jeopardize food security and increase resource competition over cropland and pastures.

The contribution of this study to existing empirical analyses is fivefold. First, it measures climate shocks through deviations from long-term rainfall patterns in a nonlinear (U-shaped) relation, capturing both drought and excessive rainfall, instead of focusing on droughts only. Second, it introduces a new set of conflict variables. The standard conflict measure usually takes the form of a dummy variable (0,1) on the basis of an arbitrary threshold of 25 deaths in order to fit econometric specifications (Buhaug, 2010; Hendrix & Salehyan, 2012; Raleigh, Linke, Hegre, & Karlsen, 2010). However, such dichotomous variables neglect a great deal of additional information on the severity of conflict, since the incidence of one more than 25 battle deaths is set equal to, for instance, 125 battle deaths. This study adopts four different continuous dependent variables to capture varying magnitudes of conflict. Third, the literature is dominated by large cross-country regressions that use rather short time frames; these fail to shed light on more localized effects of climatic variability in the long-run. Such research designs are mainly invoked by data availability problems. Although the present historical study is also constrained by data limitations, using colonial Nigeria as the case allows us to conduct a panel analysis on a provincial level for a period of over 30 years (1912–1945). Fourth, almost all studies in this field are solely based on econometric correlations, and make no attempt to contextualize their findings using qualitative evidence. This study uses primary

* Department of Rural and Environmental History, Wageningen University, PO Box 8130, 6700 EW Wageningen, The Netherlands. Tel.: +31633738179; Fax: +31-(0)317-482584.
E-mail address: kostadis.papaioannou@wur.nl.

http://dx.doi.org/10.1016/j.polgeo.2015.07.001
0962-6298/

historical sources (newspapers, government reports) to track food shortages, crop-price spikes and outbreaks of violence, in order to back up the findings of the regression analysis.

Last but not least, this study aims to expand existing research agendas to historical periods by merging the theoretical and empirical insights of two strands of literature: the *environmental security* literature, which seeks to investigate whether climate-induced scarcities lead to conflict; and the *economic historical* literature, which assesses the welfare effects of different colonial institutional arrangements and modes of economic specialization (such as the cash-crop revolution). The *environmental security* literature has not reached consensus on the linkage between climate and conflict. Hsiang, Burke, and Miguel (2013) claim that climate change may be partly responsible for occasional outbreaks of violence and, more generally, greater economic and political instability. Previous studies have blamed climatic variability for increasing the likelihood of civil wars, or even for directly causing them (Burke, Miguel, Satyanath, Dykema, & Lobell, 2009; Miguel, Satyanath, & Sergenti, 2004). These findings have been criticized by other researchers who have pointed to weaknesses in the construction of the climatological variables (Ciccone, 2011), and the level of aggregation of the conflict variables used (Fjelde & von Uexkull, 2012). In line with Fjelde and von Uexkull (2012), this paper will not argue that climate shocks lead to widespread civil conflict, but rather that the enhanced competition over scarce resources leads to disputes and clashes on a smaller communal scale.

The term "conflict" will be used in its broadest definition in order to encompass a wide range of violent incidents. We observe two distinct categories of communal conflict: (a) civil unrest, such as theft, raiding of livestock, assaults, land disputes between individual resource users, homicides and general armed violence, and (b) small scale communal violence between identifiable social/ethnic groups, such as violent and non-violent actions to evict certain resource users, land disputes between cattle-herders and farmers and large-scale destruction of villages. In spite of their calamitous impact on civilian life and property, non-state inter and intracommunal conflicts have received limited attention in the literature.

The *economic historical literature* largely agrees that African economies have expanded, to varying degrees, in response to increasing colonial trade and agricultural commercialization. Yet, the extent to which ordinary Africans have benefitted from such developments remains unclear (Hopkins, 1973; Rodney, 1978). This debate has led to two rather opposing views. The "neo-Marxists" or "dependency theorists" hold that the introduction of new cash crops (such as cocoa) or the expansion of existing cash crops (including palm oil, rubber, coffee and cotton) in Africa has destroyed farmers' traditional insurance mechanisms by inhibiting food production, without replacing them with any new form of security (Vaughan, 2007[1987]; Watts, 1983). The alternative view maintains that crop commercialization has provided the means to increase farmers' incomes through the increased benefits reaped from international and inter-regional trade. This diversified farmers' production and therefore limited the vulnerability of cash-crop farmers to the vagaries of climate (Berry, 1975; Fafchamps, 1992). This paper uses closely documented historical sources to answer the underlying question stemming from the aforementioned debate: "Were the cash-crop provinces more – or less – susceptible to climate-induced conflict? Did the introduction of cash crops benefit the local societies, or did it make them more vulnerable to erratic weather fluctuations?"

Colonial Nigeria offers an interesting case for several reasons. As West Africa's largest and most populous nation, it contains within its borders a wide range of geographical (such as agro-ecological zones) and institutional (such as political entities) features; consequently, meaningful comparisons can be derived. Additionally, the time frame of this study guarantees a rather uniform institutional framework under British colonial rule; 1912 marked the end of effective resistance to British rule and the establishment of the borders of the Nigerian colonial state, while 1945 saw the start of serious internal resistance to colonial policies before the independence movement gained any real power.

The sources used are the annual reports filed by the colonial administration. These reports were filed by political departments, and give information and explanations on all incidences of resistance and conflict considered worthy of mention, along with their likely causes. This information will be supplemented and supported by the reports of the police, prison and military departments. Moreover, these reports provide substantial information on both the background and returns of climate-related data, which allowed us to create balanced panel data ($n = 20$, $t = 35$) of all the administrative provinces in colonial Nigeria.

Overall, the results suggest a strong relationship between rainfall deviations and conflict intensity, which tends to be stronger in agro-ecological zones that are least resilient to climatic variability (such as Guinean savannah) and where (pre-) colonial political structures were less centralized. We also find evidence that the relationship is weaker in areas that specialize in the production of export crops. This is a topic of considerable urgency today as the process of global climate change accelerates, generating more severe and unpredictable weather events, as well as more erratic rainfall patterns.

The paper proceeds as follows. First, it reviews the theoretical and empirical environmental security literature, and discusses the Nigerian colonial context in terms of geographical characteristics, political structures and economic activity. Next, it describes the baseline model, the data and the estimation methodology. Then, it reports the empirical results of the various measures. Finally, it provides detailed evidence from a number of historical cases in colonial Nigeria, and identifies the mechanisms through which climate-induced scarcities led to conflict. A discussion on future research directions concludes the paper.

Climate shocks and conflict in colonial Nigeria

Theory

The primary theoretical relationship between climate shocks and conflict runs via the increased *scarcity* of vital resources such as food and fresh water. A harvest failure leading to food shortages or unexpected declines in freshwater supplies intensifies the competition over access to water and land, and increases the possibility of conflict (Homer-Dixon, 1999). The principal criticism of this simple theoretical argument is that it neglects socio-political and economic contextual factors that play a role in mediating or aggravating the effects of climate-induced scarcities (Bächler, Böge, Klötzli, Libiszewski, & Spillmann, 1996; Gleditsch, 1998). This criticism has led to the development of more specific, context-dependent, theoretical mechanisms to explain the causal pathways between climate, demography, environment and conflict (Kahl, 2006).

Even though a large volume of recently published studies aims to link climate-induced scarcities to different incidents of conflict, there is no consensus yet on precisely how these mechanisms operate (Buhaug, 2010). The problem is that most of the research so far has focused on large-scale conflict, such as civil wars (Burke et al., 2009; Miguel et al., 2004). The use of civil war as the dependent variable has been severely criticized on both methodological grounds (Ciccone, 2011) and those of the proposed causal mechanisms (Buhaug, 2010; Gleditsch, 1998). Kahl (2006) and Homer-Dixon (1999) have pointed out that demographic and environmental pressures are more prone to cause inter-communal mini-scale conflict than to cause widespread civil conflict. Recent research has been gradually moving away from larger cross-national conflict studies