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The devil is in the details: An investigation of the relationships between conflict, food price and climate across Africa☆

Clionadh Raleigh [a,*], Hyun Jin Choi [b], Dominic Kniveton [a]

[a] University of Sussex, United Kingdom
[b] Kyunghee University, South Korea

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ABSTRACT

This study investigates the relationship between violent conflict, food price, and climate variability at the subnational level. Using disaggregated data on 113 African markets from January 1997 to April 2010, interrelationships between the three variables are analyzed in simultaneous equation models. We find that: (i) a positive feedback exists between food price and violence – higher food prices increase conflict rates within markets and conflict increases food prices; (ii) anomalously dry conditions are associated with increased frequencies of conflict; and (iii) decreased rainfall exerts an indirect effect on conflict through its impact on food prices. These findings suggest that the negative effects of climate variability on conflict can be mitigated by interventions and effective price management in local markets. Creating environments in which food prices are stable and reliable, and markets are accessible and safe, can lower the impacts of both climate change and conflict feedbacks.

1. How food price, climate and conflict are locally bound and inter-related

In this article, we explore how mediating factors are critical components of climate security. We investigate whether food insecurity, and in particular food price, may serve as just such a mediating factor. Food price is a key indicator because it acts as a local and dynamic measure of scarcity and competition, and hence an appropriate proxy for food insecurity, and may influence the variable forms of violent collective action occurring across developing countries.

The dynamics, scale and direction of mediating relationships between climate, food price and conflict has recently caught the attention of researchers, who generally find positive links between food price increases and violence. Yet, studies differ on the type, scale and evidence of the relationship between prices and conflict: Bellemare (2014) links monthly global food price data with media reports of riots within countries between 1990 and 2011; Smith (2014) finds sudden, monthly, increases in domestic prices of 'food baskets' increases the probability of urban unrest; and Hendrix and Brinkman (2013) regard food insecurity and rising prices as a 'threat multiplier' for civil conflicts, with a focus on riots.

Previous research largely focuses on 'food riots' that occurred in 2007–2008; yet a focus on riots implies that these actions are the most obvious response to food insecurity, and limits the range of political expression that can manifest from pressure, scarcity or marginalization as experienced by groups in developing countries. It also obscures how food prices and insecurity play into a range of other conflict inducing factors, as opposed to being a solitary trigger (see Demarest, 2014). We contend that how food price and climate influence political violence is largely determined by the goals and coordination abilities of affected groups, who incorporate the experiences of marginalization and hardship into their respective conflict strategies.

Additional issues that we address here is how the scale of these phenomena is a key feature in their relationships, and how climate, conflict and food price may exhibit non-linear and interactive relationships. We posit that the key attribute of these instabilities is their local nature: the price of commodities sold in local and regional African markets are largely unaffected by global prices and shifts; a wide range of political violence is localized; and climate and environmental change is mainly experienced and adapted to on the local level. Tests on the subnational scale are therefore the main way to accommodate the reality of how these three factors interact. We suggest that future interactions between

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* Corresponding author. Tel.: +44 07793026900.
E-mail address: C.Raleigh@sussex.ac.uk (C. Raleigh).

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food price and violence can be best addressed through local political intervention, aid and state capacity.

This article is the first to model the relationship between climate, food price and conflict sub-nationally, over time and across multiple states. By concentrating on the parameters of subnational relationships, we can more accurately capture the mechanisms that underlie variation and change, and identify the ways in which endogenous factors respond to stimuli. Further, in treating these instabilities as continuous and varying, we model the presumed interrelationships that now underscore policy narratives and future directions of development aid and humanitarian assistance. Here, we aim to address whether exogenous climate shifts increase conflict rates and volatility, how and whether food price fluctuations increase conflict, and finally, if there an indirect relationship between climate change and conflict through the impact of food price.

We find that a feedback exists between food price and political violence: higher food prices increase conflict within markets, and conflict increases food price. Lower than expected levels of rainfall directly increase food price and indirectly increase conflict through its impact on food price. These results mainly suggest that conflict rates and cycles can be contained through interventions and effective price management in local markets. Creating environments in which food prices are stable and reliable, and markets are accessible and safe, can lower the impacts of both climate change and conflict feedbacks. Hence local institutions have a significant role to play in instability, environmental and food security management.

These results have a larger significance through their assertions of how governance can attend to this issue: food security is a key development priority for all African states as over 60% of Africans are episodically food insecure and one quarter are chronically food insecure, defined as situations in which people spend up to half of income on food (Barrett, 2008; Swan et al., 2010; Arndt et al., 2008). The margins for impending food price crises continue to narrow as the majority of rural and urban Africans are now food purchasers instead of solely producers (Poulton et al., 2006: 343; Barrett, 2008; Swan et al., 2010; Maxwell et al., 2010). Understanding the interaction between climate, food and political instability is critical for both governments and citizens.

The article proceeds as follows: we review the recent literature on food price and conflict, and climate's impact on both conflict and price. We then present a unique interpretation of the sequential and interactive relationships and feedbacks between these three instabilities. This is followed by a discussion of data, measures and simultaneous equations model results, and finally, a discussion centred on the implications for the African continent.

2. Existing evidence and remaining questions about the relationships between climate, food price, and political violence across Africa

A key advance of this study is the assessment and modelling of subnational patterns of, and dynamics between, instabilities. Existing literature argues that direct, linear relationships should exist between climate and conflict, food price and conflict, and climate and food price. However, there is little in the way of complementary conclusions in this literature, in part due to the different scales and mechanisms employed to test presumed relationships. Indeed, the environmental security literature is characterized by opposite and conditional results that often obscure links between physical antecedents and political consequences.

2.1. Food price and conflict

The food crisis of 2007–2008 led to a wave of research correlating global food price changes to increases in political violence, often in the forms of 'food riots'. What constitutes a food riot, and comparisons between other forms of conflict, are often not systematic in this literature (Demarest, 2014). Indeed, in some cases (see Bellemare, 2014), the number of food riot reports, instead of actual events, is the object of study Bellemare (2014), Hendrix et al. (2009), Lagi et al. (2011), and Bereneza and Lee (2013), as well as multiple aid agencies and multilateral organizations (see Pomeroy, 2008; Lacey, 2008), argue that increases in African rioting was due to high and rising international commodity prices. Smith (2014) finds the same relationship between national price indices and specifically 'urban' unrest. The correlation between international food prices and presumed 'anti-government' demonstrators is, to Arezeki and Brückner (2011), a powerful effect that is stronger in low-income countries because of the greater sensitivity of poor households to price increases. In these cases, price increases lead to conflict over price stability or volatility (see Barrett and Bellemare, 2011). The underlying presumption is that poor populations protest how governments expose them to high, unpredictable prices that create scarcity and competition for necessary, but limited, resources.

Commodities and price differences may also affect a group's willingness to engage in different forms of violence: Besley and Persson (2008) find that the risk of civil conflict grows as a country's import prices increase and erode real incomes. This correlation is confirmed in a Colombian study where Dube and Vargas (2013) report that two primary commodities alter conflict risks differently: in rural, coffee growing areas, militia violence is reduced when export prices rise for coffee. However, in resource wealthy regions where oil is a capital intensive source of income for rebels and paramilitary groups, higher export prices for oil increases violence (Hendrix and Salehyan, 2012). In studies with alternative measures of the poor's access to food, countries with lower per capita caloric intake are associated with greater probability of civil conflict (Pinstrup-Andersen and Shimokawa, 2008), even when accounting for their levels of economic development (Sobek and Boehmer, 2008). The main mechanisms linking commodity prices to multiple forms of political violence is increased grievances due to scarcity, or opportunities for income generation.

In unstable states, a feedback between food price and conflict is expected to occur as political violence exerts a negative effect on local market functioning and leads to higher food prices and volatility (Devereux and Maxwell, 2001; Auyero and Moran, 2007). Commodity prices may rise due to excessive risks and transport costs, harvest costs, and market security costs. Another possibility is that food aid found in high conflict areas will corrupt market costs and keep prices artificially low (Maxwell et al., 2010). This suggests that price volatility, rather than price increases, is more likely in conflict affected regions.

2.2. Climate, prices and conflict

A rapidly changing climate, food availability and access, increased competition and conflict are central tenets of environmental security discourse (Barnett, 2010). The direct relationship between rainfall variation and conflict has been tested on a range of spatial scales, and across multiple types of conflict. The mechanism(s) through which climate and weather affects violence is largely unsubstantiated, but scarcity, competition, and strategic opportunity are frequently presented as likely explanations. The "scarcity" perspective suggests that increased conflict follows depressed environmental conditions, creating marginalization and intense competition for resources. By contrast, the resource "abundance" perspective suggests that the rainy season encourages rent-seeking behaviour, and thereby facilitates the recruitment of people for violent acts.