

DANGEROUSLY HUNGRY

The Link Between Food Insecurity and Conflict



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World Food
Program USA

“For the man who is extremely and dangerously hungry, no other interests exist but food. He dreams food, he remembers food, he thinks about food, he emotes only about food, he perceives only food, and he wants only food.”

— **Psychologist Abraham Maslow, 1943**

Cover: Pastoralists like these in Sub-Saharan Africa are experiencing more frequent challenges to their livelihoods due to livestock theft and competition for increasingly scarce land and water resources. Climate and economic shocks like these are two of the primary drivers of food-related instability.

Photo: WFP/Michael Tewelde/2023/Ethiopia

World Food Program USA recognizes that people experience hunger and poverty due to external factors beyond their control. People are not inherently hungry, poor or vulnerable.



Some scholars theorize that the origins of Syria's conflict involve the migration of rural farmers into urban areas after the country's multi-year drought. Eleven years later, that pattern persists with farmers like Samra being forced to migrate to cities due to low rainfall. Her hands are cracked and stained from her job harvesting crops.

Photo: WFP/Hussam Al Saleh/2023/Syria

Dangerously Hungry

The Link Between Food Insecurity and Conflict



Food insecurity is often the last straw leading to instability, as was the case in Sri Lanka in March of 2022. The capitol city of Colombo (shown here), was ground zero for the country's economic crisis, which was brewing for more than a decade. When COVID-19 and Russia's invasion of Ukraine increased the cost of essential goods, protests began.

Photo: WFP/Josh Estey/2022/Sri Lanka

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In Haiti, Ghislaine has been challenged by steep rises in food prices reminiscent of the 2007/08 global food price crisis. That economic shock led to social unrest in at least 40 low- and middle-income countries and was widely recognized as leading to regime change in Haiti.

**Photo: WFP/Theresa Piorr/2022/
Haiti**

Introduction

In December 2017, World Food Program USA published a report titled *Winning the Peace: Hunger and Instability*. That report, a review of nearly two decades of academic research, provided rigorous empirical evidence of what we have long known to be anecdotally true: Food insecurity is not only a byproduct of conflict but also a driver of it. *Winning the Peace* compiled data from 53 peer-reviewed academic studies produced between 1998 and 2016. Across those studies, researchers tested 11 drivers of food insecurity, ranging from price spikes to droughts, and linked them to nine different types of instability, ranging from protests to interstate conflict.

Five years ago, the evidence linking food insecurity to global instability was growing and becoming highly convincing. *Winning the Peace* showed that hunger was a recruitment tactic for violent extremists, that competition for diminishing agricultural resources like land and water was driving social unrest, and that food access constraints (i.e., high prices) in urban areas were especially likely to produce conflict. While there is almost never a single cause of conflict, it was clear that food insecurity was capable of driving or exacerbating instability.

When *Winning the Peace* was published in late 2017, the world was facing the prospect of four famines in Nigeria, South Sudan, Yemen and Somalia. For the first time in decades, global hunger had begun to increase. In 2020, the COVID-19 pandemic disrupted global food supply chains, led to widespread unemployment and exacted a terrible price on the global economy. As a result, tens of millions more people were driven into extreme hunger. Russia's invasion of Ukraine in February 2022 put even greater pressure on the global food system by trapping millions of metric tons of grain inside Ukraine and causing a dramatic rise in global food, fuel and fertilizer prices. Today, the number of people facing crisis levels of hunger around the world has risen from 108 million in 2017 to more than 345 million. As global hunger grows unabated in 2023, instability is predictably increasing in tandem.

Defining “Food-Related Instability”

In this report, the term food-related instability refers to both violent and non-violent conflict arising from food insecurity which results from events that affect an individual’s, community’s or country’s food availability, access or utilization.

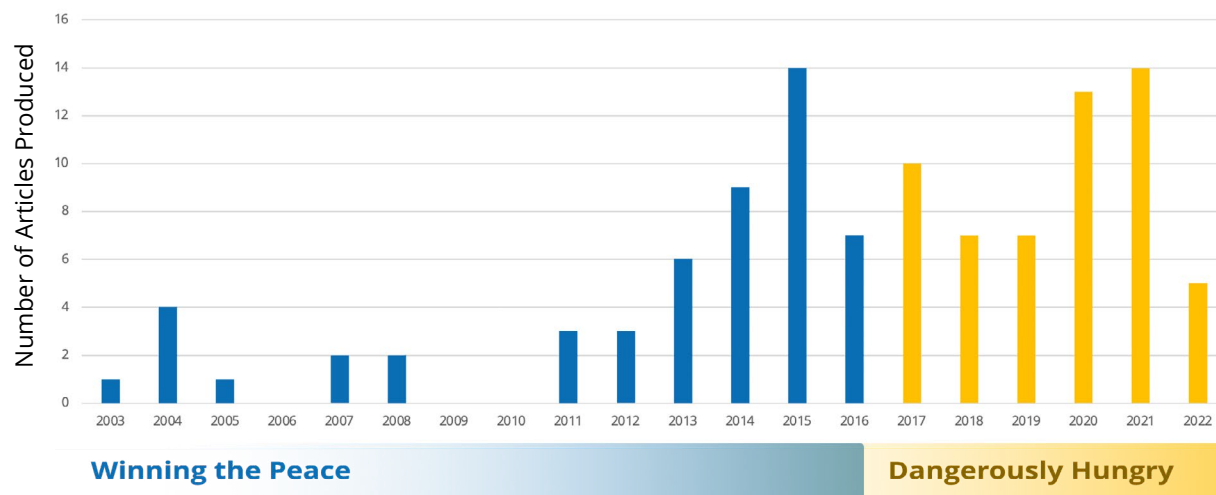
While it has long been known that conflict produces food insecurity, *Dangerously Hungry* examines that relationship in the inverse. Studies included in this literature review explicitly test food insecurity’s impact — quantitatively and qualitatively — on conflict.

New Data and Trends

This report, *Dangerously Hungry*, captures the tremendous growth in food-related instability literature since *Winning the Peace* was published in 2017 (see Annex 1 on Methodology). In the last five years, researchers have produced at least 60 peer-reviewed journal articles demonstrating how food insecurity itself drives conflict. As a result, more than half of all peer-reviewed literature published on this topic over the past 20 years has been published in the last five years alone (see Figure 1). The growth in peer-reviewed literature on food-related instability has been made possible, in part, by improved tracking of conflict events around the world,ⁱ the use of novel methodologies and datasets, and an increase in research on food-related instability in previously unstudied contexts.

i. Most studies in this review draw conflict data from one of two sources: the Armed Conflict Location and Event Dataset (ACLED) or the Uppsala Conflict Data Program Georeferenced Events Dataset (UCDP). ACLED was launched in 2009 and tracks political violence, demonstrations, and select non-violent activities around the world. UCDP, meanwhile, was established in the 1980s and provides time-series data on organized violence. It is widely considered the most longstanding data collection project for civil war.

Figure 1. Peer-Reviewed Literature on Food-Related Instability



With the benefit of time and new research, our understanding of food-related instability and its many dimensions has improved since *Winning the Peace's* publication. Specifically, there is:

- A greater understanding of rebel/terrorist recruitment based on food insecurity and poor socio-economic conditions.
- A more nuanced understanding of how rebel groups interact with agricultural communities in securing food, sometimes in cooperation with them and other times through force and coercion.
- An increase in the number of peer-reviewed studies examining food-related instability through the lens of climate emergencies.
- Greater documentation of conflict between agriculturalists and pastoralists over natural resources like land and water.
- Advances in literature and international humanitarian law related to the use of food as a weapon of war.

Key Findings

Dangerously Hungry builds upon the findings in *Winning the Peace* by bringing our understanding of food-related instability into the present. The key findings of this report are as follows:

- Since 2017, researchers have empirically connected 12 specific drivers of hunger (e.g., crop yields, food prices) to eight distinct types of instability and conflict ranging from protests and riots to civil war (see Figure 3).
- The drivers of food-related instability can be grouped into three main categories: the climate crisis, resource conflict and economic shocks.
- Over the past five years, half of all peer-reviewed studies in this review have examined food-related instability through the lens of the climate crisis.
- Food insecurity alone rarely produces conflict. Instead, people must also be motivated to choose conflict over peace. Those motivations can be grouped into three distinct categories: desperation, grievance or governance.
- Hunger is not a necessary precondition for food-related instability. Instead, conflict is often the product of perceived threats to food availability, access and/or utilization. Therefore, people participating in violent conflict are not always experiencing hunger. The inverse is also true: People experiencing hunger are not always violent.
- Food-related instability can be driven by both food scarcity and abundance, sometimes simultaneously.
- Food price riots and protests are most common in urban areas. More extreme forms of food-related instability, like terrorism and civil war, often begin in rural areas farther from the reach of government authorities.

In the following sections of this report, drivers and motivators are discussed in detail and a novel conceptual framework for food-related instability is introduced. Three emerging themes — urbanization, food assistance's role in combatting food-related instability and the use of food as a weapon of war — are then discussed as areas for continued research.



Mahamat Kary is a corn farmer in Central Africa, where farmer-herder conflict has increased greatly in the last decade due to drought, desertification and other effects of climate change.

**Photo: WFP/Evelyn Fey/
2022/Chad**

The Three Drivers of Food-Related Instability

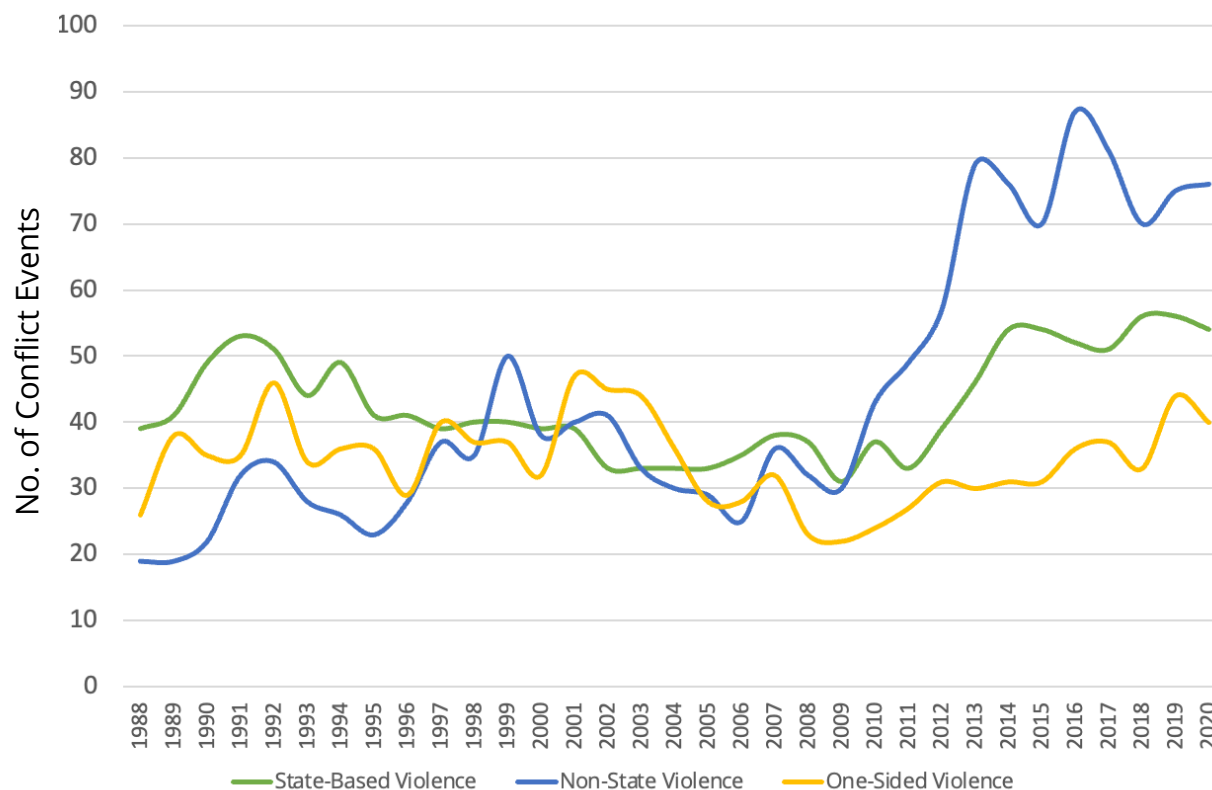
Defining “Food Security”

The most widely adopted definition of food security was conceived by the United Nations’ Committee on World Food Security to describe a situation where “all people — at all times — have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life.” Hence, food security is commonly understood to have four dimensions: availability, accessibility, utilization and stability. When these dimensions are consistently met, food is abundantly available, affordable and meets nutritional requirements. If any of these dimensions are lacking, populations are considered food insecure.

Food insecurity today is predominantly driven by conflict, climate-related disasters and economic conditions. According to the latest Global Report on Food Crises published in 2022 193 million people in 53 countries were affected by severe acute hunger in the year prior (IPC3+)ⁱⁱ. Approximately 70% of these people faced crisis levels of hunger because of human-made conflict while the remaining 30% were primarily affected by the climate crisis or economic shocks. Although the COVID-19 pandemic drove millions more people into acute hunger because of lost livelihoods and economic stagnation, conflict remains the single largest driver of food insecurity on the planet. The number of conflicts around the world has grown by more than 60% over the past three decades, often waged between non-state actors and international terrorist groups (Figure 2).

ii. The Integrated Food Security Phase Classification system (IPC) is a classification system that provides governments, UN agencies, NGOs, and civil society a common standard for diagnosing acute food insecurity that is informed by internationally recognized scientific standards. The scale ranges from 1-5 with level 3 being crisis, level 4 being emergency and level 5 being catastrophe/famine.

Figure 2. Number of Global Conflict Events Over Time



The drivers of food-related instability are not always the same as the drivers of hunger (e.g., conflict, climate emergencies and economic shocks), although there is considerable overlap. The literature shows that food insecurity — not hunger — is the necessary precondition for food-related instability. Hunger — a feeling of discomfort caused by a lack of food — is an outcome of food insecurity, but food-related instability does not require populations to experience hunger. They must only *believe* food is inaccessible because of price or perceived risks — present or future — to their food or nutrition availability.

In other words, people participating in violent conflict are not always experiencing hunger. The inverse is also true: people experiencing hunger do not always participate in violent conflict. Based on the independent variables tested in these peer-reviewed studies, three drivers of food-related instability can be identified (see Table 1).

The Food Insecurity and Conflict Feedback Loop

In studying the relationship between food insecurity and instability, researchers must begin with an independent variable, or a variable to be manipulated. In this review, independent variables related to food availability include agricultural production or yield. Independent variables related to food access most often include food prices, and independent variables related to food utilization — although limited — include protein availability. A feedback loop between food insecurity and conflict is a challenge for researchers studying food-related instability primarily because of two factors: co-determination and reverse causation. Co-determination occurs when an uncontrolled or “confounding” variable affects both independent and dependent variables (e.g., where poverty produces both food insecurity and conflict independently). Reverse causation (or simultaneity), meanwhile, occurs in the context of a “causal loop” where the dependent variable acts on the independent variable (e.g., where conflict is both caused by and produces food insecurity). Researchers overcome these challenges by using different data in different locations and utilizing control variables. Over time, their confidence in the impact of one variable on another has improved and a clearer understanding of the food instability nexus has emerged in academic literature.

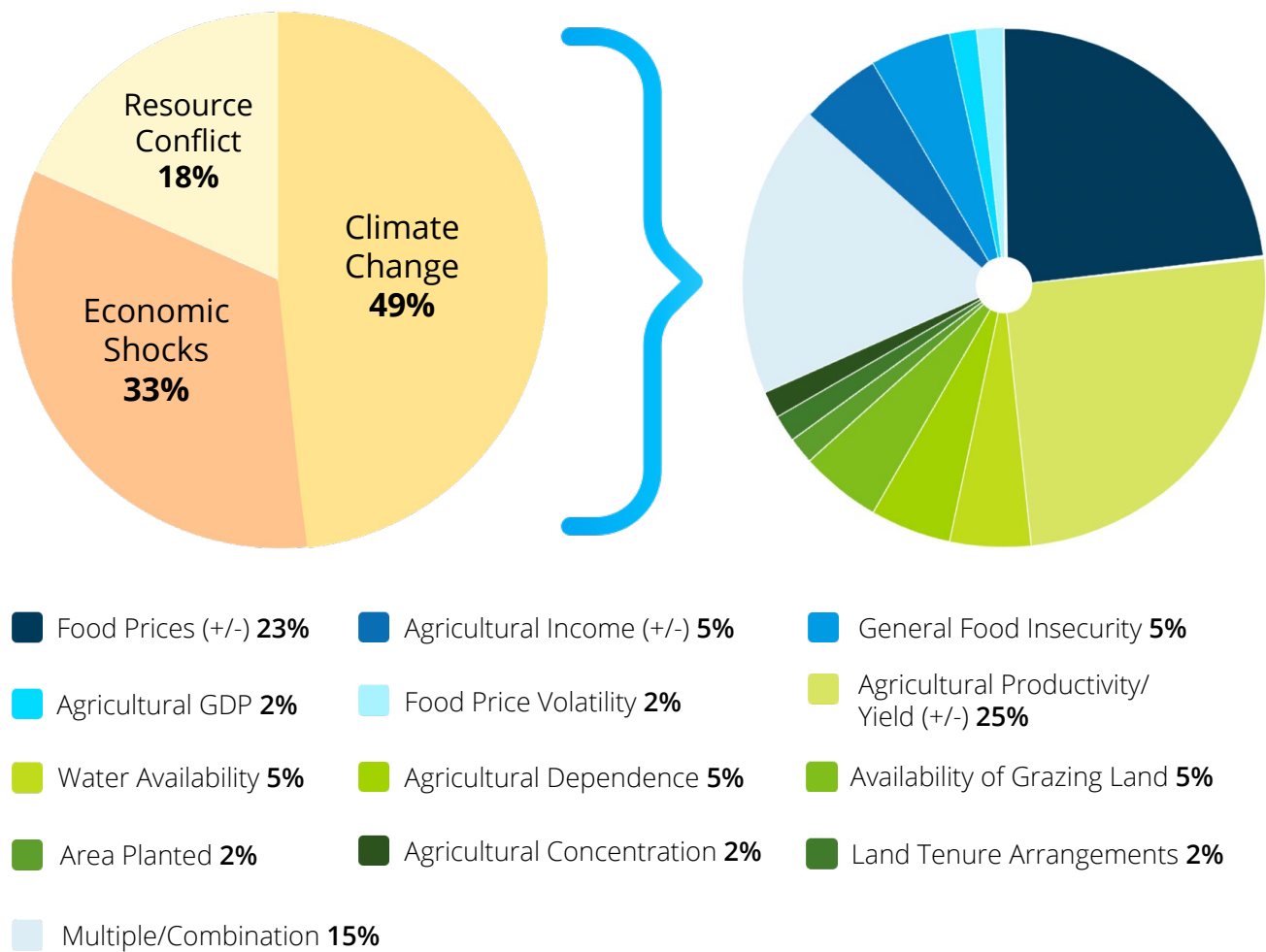
Table 1. Three Drivers of Food-Related Instability

Climate Crisis	Resource Conflict	Economic Shocks
Extreme weather events or long-term impacts of the climate crisis that result in resource conflicts or economic shocks.	Competition over key agricultural inputs like land, water or control of agricultural production.	Socio-economic conditions related to food price and income shocks.

Within these three drivers, researchers tested 12 independent variables for their effect on conflict (see Figure 3).

Figure 3. The 12 Variables of Food-Related Instability

Some studies in this review (n=32) begin by examining economic shocks (e.g., food prices) or resource competition (e.g., water availability), regardless of their origins. Other studies (n=28) begin with climate change impacts like drought and temperature changes and examine the downstream effects of those events on economic shocks and resource competition. Almost 50% of peer-reviewed articles in this report examine the relationship between food insecurity and conflict through the lens of climate change. For that reason, the climate crisis is considered a stand-alone driver of food-related instability.



The Climate Crisis

In recent decades, the frequency and magnitude of climate-related disasters have increased dramatically. Today, nearly 80% of the world's hungriest people live in disaster-prone countries. Flooding, tropical storms, desertification and multi-year drought are among the many visible examples of the climate crisis. As these events have become more common over the past decade, the link between their impact and conflict has increasingly been the subject of academic research.

Traditional security studies have expanded beyond the territorial and state sovereignty disputes of the last century into resource and environmental conflicts.¹ Almost 50% of the peer-reviewed articles in this report examine the relationship between food insecurity and conflict through the lens of the climate crisis. That represents a 10% increase in studies of this kind since the publication of *Winning the Peace* five years ago. In this data set, authors studied climate crisis impacts such as drought, sea level rise and desertification, as well as precipitation and temperature increases or decreases, for their effects on food-related instability.

The literature confirms that the link between climate and conflict exists but that the relationship is deeply complex. Given the kaleidoscope of socio-economic and socio-political factors that must overlap for extreme weather events to morph into conflict, the climate crisis is most commonly considered a “threat multiplier” in security studies. Additionally, many studies in the climate-conflict literature focus on short-term weather variability rather than long-term climate events. And yet, some direct impacts of the climate crisis on conflict have been validated by focusing on resource scarcity and physiological impacts on humans that produce discomfort and can lead to aggression. Indirect — and more contested — pathways include climate-related impacts on human migration or economic factors like household income and GDP.²

The most convincing studies of the indirect relationship between the climate crisis and conflict, though, are about food systems, primarily because they are highly susceptible to the immediate and devastating impacts of extreme weather events. In this sample, some studies show a direct and intuitive relationship between climate crisis impacts and food-related instability. Jun, for example, shows that high temperatures during corn growing seasons in sub-Saharan Africa reduced yields and led to a rise in civil conflict between 1970 and 2012.³ The author suggests that with continued warming, civil conflict in the region is expected to increase by over 30%. Maertens finds that below-average rainfall can increase the likelihood of civil

war in Africa by as much as 2.3%.⁴ In Somalia specifically, decreases in annual precipitation across the country correlated with an increase in domestic terrorist attacks between 1991 and 2019.⁵

However, a decrease in rainfall doesn't necessarily increase the risk of conflict. Eklund et al., for example, challenges the drought-migration-conflict narrative often associated with the origins of the 2011 Syrian conflict. Using satellite data on farmland, the authors argue that Syria's agricultural sector recovered quickly after the 2007-2009 drought and that unrest was concentrated in areas that faced less severe impacts of the drought. Instead, the authors suggest that insufficient attention has been paid to fuel and fertilizer subsidy cuts and unsustainable agricultural practices in explaining the onset of violence.⁶ Crost et al., meanwhile, write that the seasonality of precipitation changes matters greatly. They argue that in the Philippines, increased rainfall during the dry season decreases the risk of violent events while more rainfall during the wet season increases the risk of violent events.⁷

Extreme weather events produce both economic shocks and resource conflicts. Linke and Ruether, for example, examine the effects of precipitation changes on violent events initiated by both the government and rebels in Syria between 2011 and 2019.⁸ They find that dry conditions during critical growing seasons led to an increase in violence, likely from each party's effort to secure access to dwindling food supplies. "To secure food supplies and revenue," they note, "rebel forces will be motivated to use violence to capture agriculture. In hotly contested Idlib and Aleppo, for example, government and rebel frontlines shifted village-by-village as both sides sought to control farmland during various periods of the war."

Research also shows that the relationship between climate and conflict can be mitigated by farmers' adaptation to extreme weather events.ⁱⁱⁱ In one instance, von Uexkull notes that farming communities showing higher levels of resilience to climate extremes (as measured through household surveys) are less likely to support political violence.⁹ Similarly, Mary notes that while extreme changes in rainfall do contribute to an increase in religious violence in parts of India, that impact is largely eliminated by the presence of dams and access to irrigation.¹⁰ Similarly, improved agricultural incomes can have important effects on "the opportunity cost of

iii. Resilience refers the ability to absorb, adapt, and transform livelihoods, to bounce back in the face of different shocks or a collection of stressors. It commonly includes access to social networks, basic services, and other assets.

becoming a soldier,” in the words of one author.¹¹ In agricultural areas, they write, increases in food prices often raise the incomes of farmers and thereby “generate opportunity-cost incentives for workers not to join armies engaged in organized violence.”

Resource Conflict

Research on the “resource curse” has been with us since Jeffrey Sachs and Andrew Warner’s seminal work in 1997. As the theory goes, resource-rich countries tend to experience higher levels of violent conflict. The unequal distribution of critical resources and/or their revenues can both support rebellion and cause grievances among civilians. Access to oil and minerals has long been the subject of this literature, but access to land, water and agricultural production are increasingly strong predictors of violence as well.¹² In this data set, researchers studying food-related instability resulting from resource conflict measured the effects of the following variables on conflict:

- Availability of grazing land
- Land tenure arrangements
- Water availability
- Agricultural area planted
- Agricultural concentration
- Agricultural productivity/yield
- Agricultural dependence

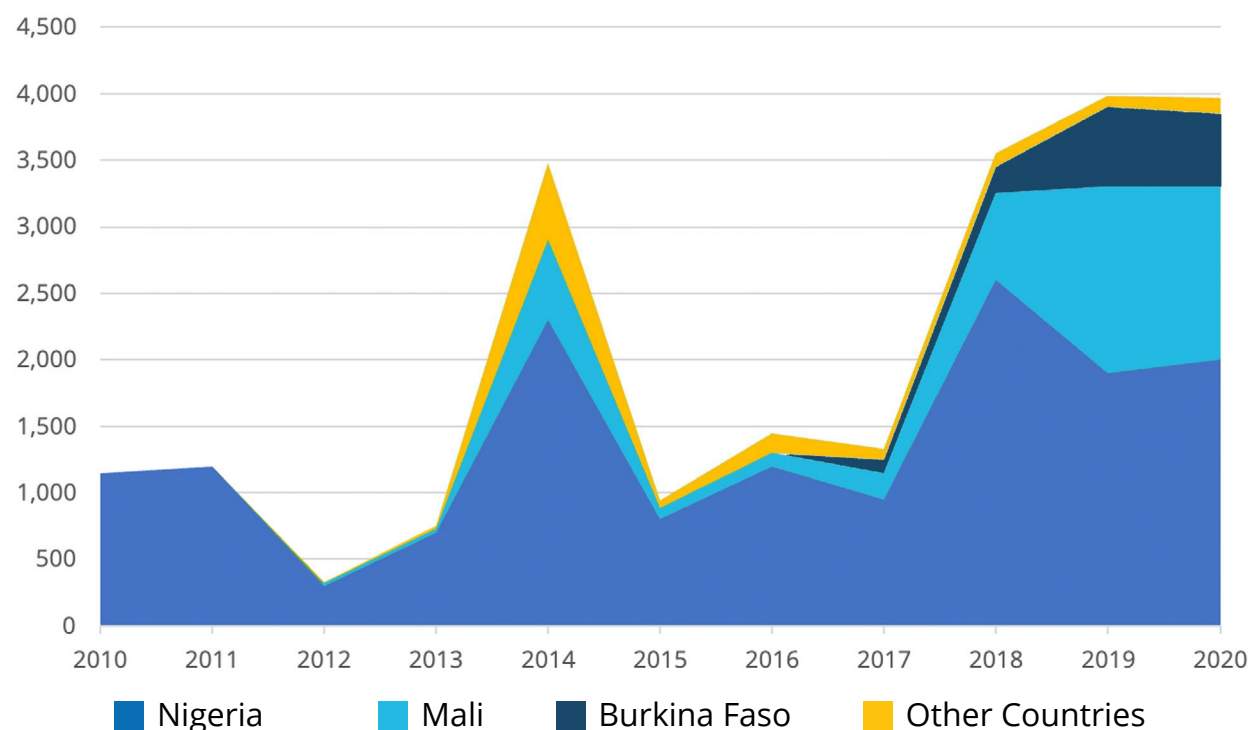
The Syrian civil war has long been linked to multi-year droughts in the country between 2007 and 2010. However, Karnieli et al. suggest that the Turkish policy of diverting water from the Euphrates River was also a major driver. Using satellite images of vegetation cover, the authors demonstrate that the productivity of summer-irrigated crops declined severely in Syria in 2011 compared to similar crops in Turkey, both of which relied heavily on irrigation water from the Euphrates.¹³ In Indonesia, researchers have linked low rainfall during growing seasons to an increase in civil conflict, although that relationship too was mitigated by access to irrigation infrastructure.¹⁴

Among the most studied examples of food-related instability is conflict between pastoralists and farmers in the African Sahel. Farmer-herder conflict or “pastoralist violence” has increased greatly in the last decade in West and Central Africa, particularly in Nigeria, central Mali and northern Burkina Faso (see Figure 4). According

to the African Center for Strategic Studies, more than 15,000 people have been killed in farmer-herder related conflicts in the last decade. Pastoralists are experiencing more frequent challenges to their livelihoods because of livestock theft and competition for increasingly scarce land and water resources due to land use changes, political disenfranchisement and the climate crisis.

Weak governance has also contributed to the growth of terrorist organizations and non-state armed groups. These groups exploit existing vulnerabilities to recruit members, especially pastoralists. Both real and perceived associations between pastoralists and terrorist organizations by farmers and other groups further ignite tensions into full-scale violence. Ethnic and cultural divisions are often at the center of these identity- or religious-based conflicts.

Figure 4. Incidences of Farmer-Herder Violence in the Sahel



Source: Armed Conflict Location and Event Data Project; Adapted from African Center for Strategic Studies

Most previous research on food-related instability focuses on food scarcity. However, in some cases, agricultural abundance has also been linked to violence. Koren, for example, in studying the impacts of wheat and corn production across Africa, suggests that “contrary to previous expectations, conflict is driven by higher yields, on average, and not by scarcity.”¹⁵ In these situations of abundance, rebel

groups are more likely to use violence to secure access to food resources. Indeed, one study showed that the probability of rebel attacks increased significantly in areas with high agricultural potential.¹⁶ This is commonly referred to as “strategic conflict.” What the authors are referring to in this literature, however, is best considered “relative abundance”. That is, conflict over pockets of agricultural productivity in otherwise scarce settings.

Food is a basic need for rebel groups, just as it is for other populations. “An army marches on its stomach,” Napoleon Bonaparte famously quipped. “Groups that can access more nutritious food can not only support more troops, but also keep their morale high, which motivates members to fight toward a common goal,” according to Koren. “Where rebels are able to secure access to more staples, they engage in more conflict-related activity even if the state maintains high presence in these regions.”¹⁷ Food insecurity can raise the cost of mounting an insurgency, leading to the victimization of people who produce and hold food. Violence against civilians, in other words, can be a resource mobilization strategy.^{iv}

Notably, not all strategic conflict is undertaken by extremists. Markowitz, for example, in studying areas where cash crops were grown in Kyrgyzstan in 2010, chronicles incidents of localized violence after southern elites in the country mobilized gangs and militias to attack mostly unarmed civilians. The violence was prompted by proposed land reform measures that would have challenged elites’ control over agricultural production.¹⁸ “Imperceptible shifts in the politics of rent seeking can foster open competition among local elites resulting in violent consequences,” the authors write.^v

Consistent with other research in the “resource curse” space, increases in the price of high value agricultural commodities have also been linked to conflicts. Crost and Felter, for example, show that increases in the price of the Philippines’s largest export crop, bananas, led to an increase in violent conflict and insurgency-controlled territory in the country.¹⁹ The authors note that “our results are consistent with a mechanism in which insurgents fund their operations by extorting large agricultural export firms.” The same is true of palm oil production in Indonesia.²⁰

iv. The tactic of violence and co-opting food becomes less useful to rebels when they are portraying themselves as an alternative to the government, able to provide for “people left behind.” In such cases, reluctant cooperation between extremist groups and local populations is often necessary.

v. Rent seeking is a form of corruption in which elites seek to grow their wealth by manipulating the social or political environment, exploiting resources for which they have not invested in themselves. It is commonly associated with title ownership of land that is worked by others.

Economic Shocks

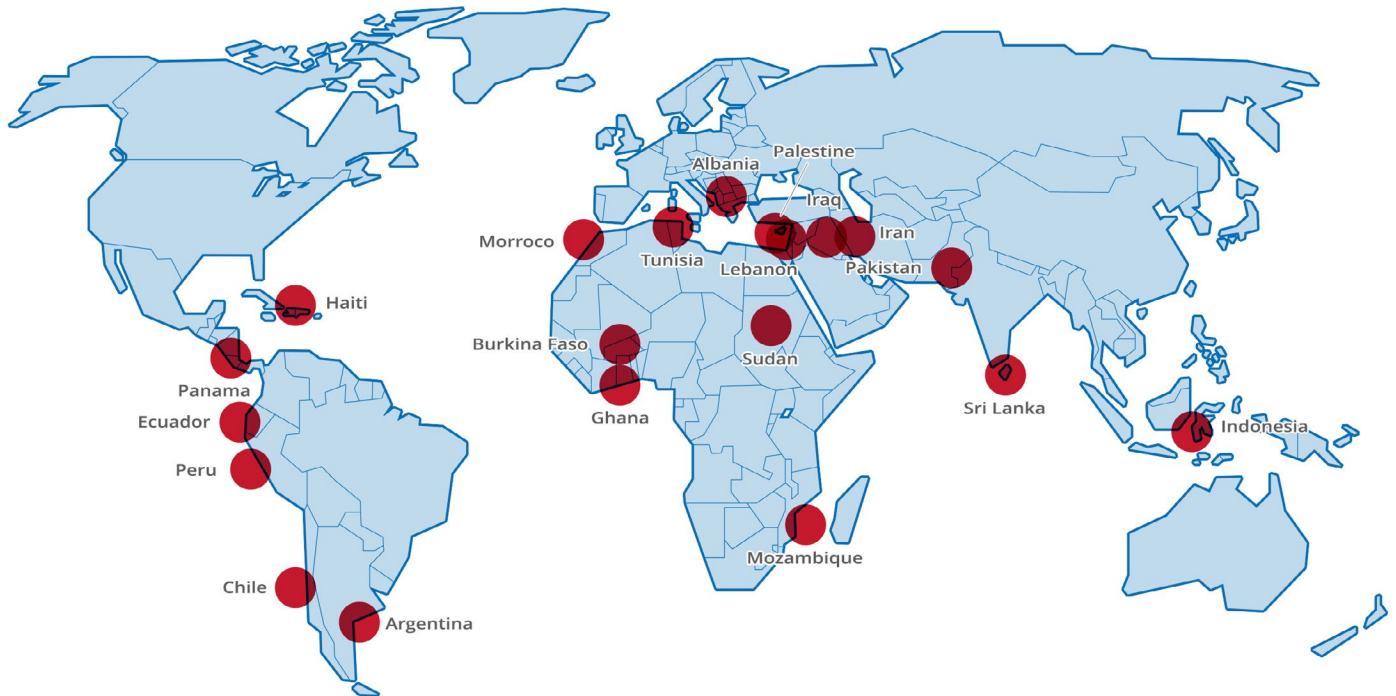
The 2007/08 global food price crisis led to social unrest in at least 40 low- and middle-income countries in what has been termed the “Silent Tsunami” and was the subject of significant attention in *Winning the Peace*. The extreme food price increases in 2007/08 were precipitated by slowing global agricultural growth, higher energy costs and speculation in financial markets. Russia, Ukraine, Australia and the European Union faced two consecutive years of drought prior to the crisis. This greatly reduced their output of grain, oilseeds and rice. Food prices were further exacerbated by fuel and fertilizer costs having doubled between 2002 and 2007. Many countries responded with export bans and panic buying to rebuild their stocks, which put further upward pressure on prices. Food price spikes in that period were widely recognized as leading to regime change in Haiti and Madagascar. A second wave of price spikes, owing to agricultural commodity production shocks on the Eurasian continent in 2011, has also been linked to the rise of the Arab Spring in the Middle East.^{21,22,23}

In the *Dangerously Hungry* data set, researchers examining food-related instability resulting from economic shocks have built on the myriad studies resulting from the 2007-2008 global food price crisis and have advanced our understanding of other economic drivers of food-related instability. Specially, researchers have measured the effects of the following economic variables on conflict:

- Food prices
- Agricultural income
- Food price volatility
- Agricultural GDP
- Perceived food insecurity

Food price riots and protests remain among the most widely cited examples of food-related instability in this review. The 2022 food price crisis bears remarkable similarities to 2008. According to analysis from the International Food Policy Research Institute, food prices were on the rise due to “uneven recovery from the COVID-19 crisis from surges in global demand and supply disruptions from transport and logistics.”²⁴ This confluence of stressors resulted in a global market that was unprepared for the wheat, oilseed, fuel and fertilizer supply disruptions caused by Russia’s invasion of Ukraine. By the summer of 2022, more than 20 countries were facing protests and riots related, at least in part, to high food prices (Figure 5). In July, the first national government fell: Sri Lanka.

Figure 5. Countries Experiencing Food-Related Protests in 2022



The economic crisis in Sri Lanka had been brewing for more than a decade with a steady accumulation of foreign debt and dwindling fiscal reserves. These trends were met by abrupt shocks to Sri Lanka's economy: the COVID-19 pandemic and Russia's invasion of Ukraine, both of which put upward pressure on the cost of essential goods in the country including food. At the same time, an unsuccessful policy to prohibit the use of synthetic fertilizers in Sri Lanka led to declining yields for major export crops, including rice and tea. In March of 2022, protests began over the state of the country's economy. In July, after months of sustained protests over high food and fuel costs, rioters entered and occupied the home of President Gotabaya Rajapaksa, which forced him to flee the country. The case of Sri Lanka highlights an important truism of food-related instability: Food insecurity alone is almost never the sole driver of instability in a country, but it can — and often is — the straw that breaks the camel's back. People do not stand idly by when they cannot feed themselves or their families.

Haiti, in events reminiscent of a decade prior, was beset in 2022 by gang violence, food and fuel blockades, and protests that continued for months in response to global food price increases and poor policies that exacerbated food insecurity. By December, nearly half the population was experiencing severe hunger and pockets of famine were recorded for the first time ever in the country. Haiti, in other words,

is becoming a perennial example of the dangerous feedback loop between food insecurity and instability.

Peer-reviewed research on the 2022 global food price crisis is still forthcoming, but several authors have already estimated the downstream effects it has had, and will continue to have, on conflict. McGuirk and Burke, for example, have studied the impact of Russia's war on Ukraine—specifically its effect on violence in Africa—through producer and consumer price indexes. They estimate that “the weighted average effect of the Russian invasion to be an increase in intergroup conflict in Africa of 5.3%.”

The effects of rising food prices on conflict events in a country depend heavily on the geography, commodities and affected populations being studied. In middle- and low-income countries, the livelihoods of many families are based on selling agricultural commodities as well as buying goods from their local markets. Abidoye and Cali, for example, using household survey data in Nigeria, find that commodity price increases have a conflict-reducing effect for selling households and a conflict-increasing effect for buying households.²⁵ These findings are echoed at the global level by McGuirk and Burke.²⁶ Blair et al., meanwhile, find that price increases for labor-intensive agricultural commodities “generate employment and thus raise the opportunity cost of fighting.”²⁷ It follows that the most common studies of food-related instability related to food price increases tend to center on urban areas in low-income countries.²⁸

Food price riots are also often associated with grievances over other socio-economic factors. A unique study using Twitter data in Kenya produced by Koren et al., for example, determines that food insecurity alone is not likely to provoke violent unrest in urban areas, but “if urbanites experience both food and water insecurity, social unrest ensues, not only because the two staple insecurities are present, but because they reinforce each other.”²⁹ Similarly, Rudolfson finds — intuitively — that food price riots are more common in settings where families spend a large percentage, usually over 40%, of their total income on food.³⁰ Gustafson, meanwhile, shows that food price increases are more likely to produce instability when they are coupled with high levels of unemployment.³¹

Commodity type matters greatly in determining whether food price increases or decreases result in food-related instability. For example, foods with cultural significance are more likely to incite widespread unrest. This is why staple products of

national significance — e.g. the “pasta riots” in Italy, “tortilla riots” in Mexico and “bread riots” in the Middle East — often lend their names to social unrest.³² In Sudan, Chen et al. note that a price increase in one crop can have a cascading effect across others, increasing the likelihood of conflict outbreaks. “Wheat price fluctuations appear as a root driver of conflict through sorghum and millet prices,” the authors note. “We find that rising wheat price causes sorghum prices to increase, perhaps due to the weak substitution effects.”³³

Studies of food-related instability resulting from economic shocks are not limited to food prices. Diamond-Smith et al. for example, examine the impacts of general food insecurity on intimate partner violence in Nepal. Using data from a national demographic and health survey, they find that about half of all married women surveyed suffered from food insecurity and 10% experienced emotional, sexual and physical types of intimate partner violence (IPV) from their spouses. The authors suggest that food insecurity “is significantly associated with increased odds of experiencing [IPV].” Women that do not earn their own income or rely on their husbands for food are more likely to experience violence and to remain in abusive relationships.

Rising costs of foods with cultural significance are more likely to incite widespread unrest than other kinds of food – e.g., the “pasta riots” in Italy, “tortilla riots” in Mexico and “bread riots” in the Middle East.

**Photo: WFP/Saleh Hayyan/2021/
Nicaragua**



The Three Motivators of Food-Related Instability

Modern conflicts are almost never driven by a single cause. Food insecurity is often referred to as “the straw that breaks the camel’s back” or a “threat multiplier” in conflict events. It is true that food insecurity alone is often not enough to produce conflict — it must also be met with external motivators that cause people to resort to violence over peace. Those motivators can be based on opportunity costs (i.e., does the cost of engaging in violence exceed the benefits of peace?), issues of identity (i.e., engaging in conflict over perceived or real inequalities or discrimination, often linked to ethnic or group affiliations) or perceptions of a government’s response to a crisis. The social, economic and political foundations of conflict can thus be captured in three interrelated motivators: desperation, grievance and governance (Table 2).

Table 2. Motivators of Food-Related Instability

Desperation	Grievance	Governance
A compelling opportunity cost of inaction, expected economic returns or an exploitable inability to meet one’s basic needs.	Preexisting societal schisms, inequalities or relative deprivation, often between distinct ethnic groups, that result in coordinated or collective action.	The failure of a state to prevent food insecurity and provide security or basic services, often influenced by regime type (e.g., democratic or authoritarian).

Desperation

Often, the strongest motivator for participation in conflict is economic. This is sometimes referred to as the “opportunity cost thesis,” which states that when incomes are low and expected returns from fighting outweigh the benefits of traditional economic activity, one’s motivation to join a militia or rebellion increases. Researchers often refer to this motivator as “greed,” a reference to the material

benefits — even extreme wealth — often anticipated by groups staging rebellion. In the case of recruitment of food-insecure populations to extremist movements, though, it is not one's desire for wealth but one's inability to meet their basic needs that is exploited. This is not greed, but desperation.

In interviews with former al-Shabaab fighters in Somalia, for example, “socio-economic conditions were the most common motivator for joining.”³⁴ The authors of that study spoke to one fighter who “explained that he and his friends were lured with promises of a mobile phone and \$50 a month upon joining.” Other terrorist organizations have participated in similar recruitment tactics. The Islamic State, for example, is known to have offered refugees food and cash payments of up to \$1,000 to join,³⁵ and Boko Haram has been shown to provide meals and loans to prospective recruits.³⁶

The power of desperation-based recruitment techniques is amplified by extremist organizations' tactics of capturing critical resources as they take over new territory and then use those resources to further recruit people into their organizations. Desperation is also among the leading motivators for protests and riots in response to rapid increases in food prices. This is especially true in low-income countries where families spend a higher proportion of their income on food, which causes them to be extremely vulnerable to even modest food price increases.

Grievance

One major criticism of the opportunity-cost framework (i.e., individual greed or desperation) is its “inattention to the roles of social networks and collective agency in shaping political mobilization.”³⁷ Although it is true that individuals are motivated to engage in violence due to unemployment, wage losses and rising costs of living (including food costs), collective agency — or a force that brings people together — is also required for higher levels of violence. In the words of Buhaug et al., “it is when individuals become cognizant of their shared misery and, further, believe that this can be successfully remedied through coordinated action that we see collective mobilization.” Food price riots are a good example of this phenomenon, with high food prices — especially for foods of cultural importance — serving as a “symbolic issue” with broad appeal across ethnic groups and classes. As one author notes, “the existence of cross-cutting grievances [like food price spikes] increase the emergence of nonviolent action in ethnically excluded and diverse locations, which are otherwise constrained by social divisions.”³⁸

Grievances, though, do not always transcend ethnic divisions. In many cases, food insecurity forces further awareness of broader socio-political inequalities like discrimination based on ethnicity, religion or political underrepresentation. This is sometimes referred to as the “relative deprivation theory.” It is defined by one author in this study as “the difference between the standards that a group perceives they ‘ought’ to be living by and the standards that they actually are living by. When this perceived imbalance ratio grows to a certain threshold, political violence is more likely.”³⁹ Food insecurity can cause existing schisms in society to fracture further, a condition that forces the formation of — or further entrenchment in — group identities.

Governance

Ever present in debates between “greed-” and “grievance-driven” conflicts is the role of government. The inability of a government to ensure an adequate food supply for its people can lead to questions over a government’s legitimacy and efficacy and serve as an example of its failure to fulfill its people’s most basic needs. In a 2017 report by the United Nations Development Programme, the authors note that “71% of voluntary recruits [to extremist groups] identified government action as the final trigger that motivated them to join the organization.”⁴⁰ The governance motivator is determined, in part, by government capacity and regime type.

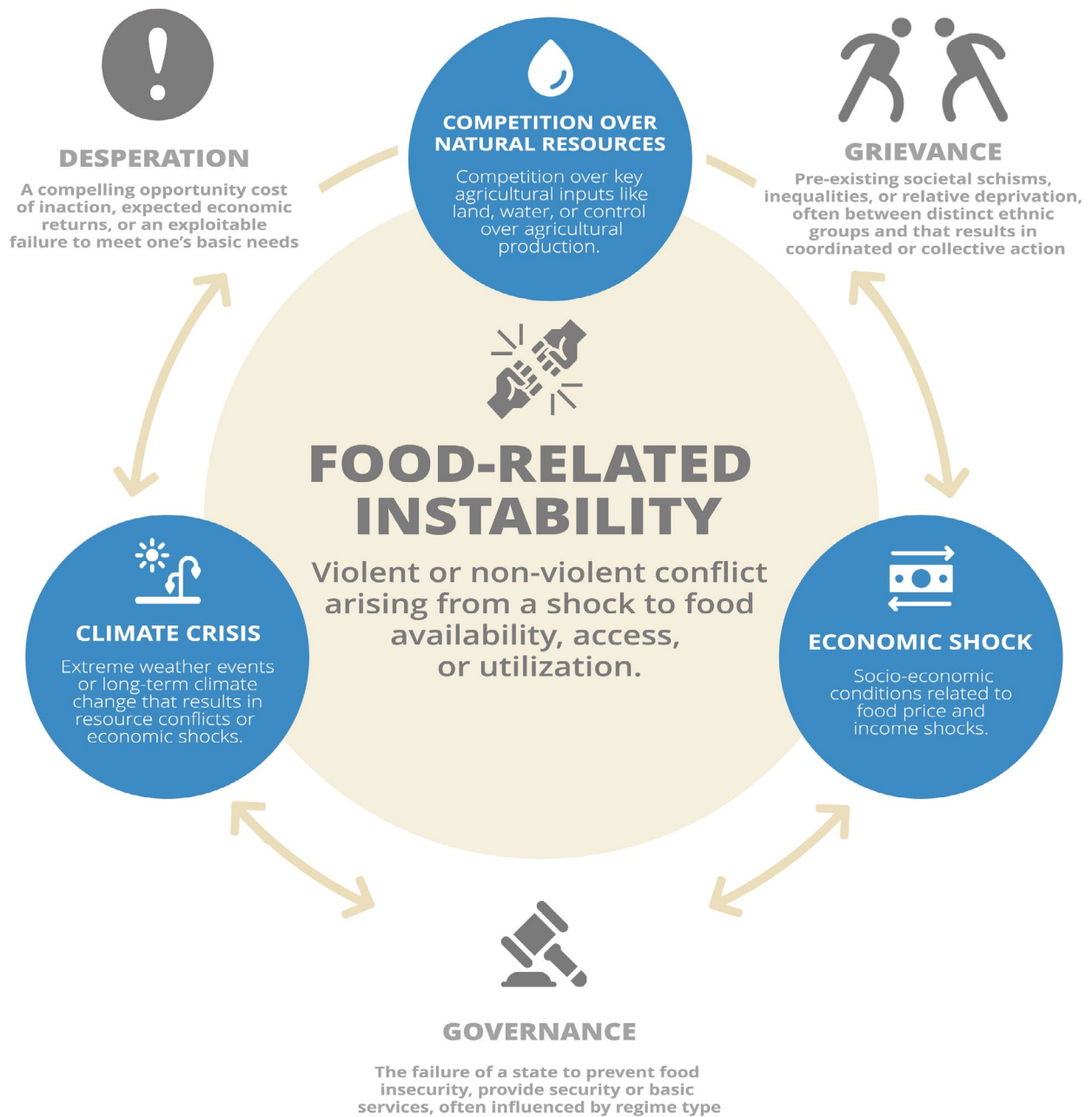
Limited government capacity to provide services or policing can create a “vacuum effect,” a dynamic that provides an opening for rebel groups to offer an alternative and suggest that they themselves could provide those basic services to people. The Shining Path in Peru, for example, came to power through its “People’s War” in the 1980s by exploiting grievances towards the existing government and providing resources, including food, to rural populations in the Southern Highlands. “Terror groups such as Boko Haram, Al Shabaab and the Islamic State in Iraq and Syria (ISIS),” notes one author, “attempt to run parallel states by amassing food and other resources, creating a pool of sympathizers, and recruiting children and young people. To gain public support, these groups have used tactics such as the distribution of food in drought-affected areas, rebranding food aid to falsely claim credit for it and the creation of anti-state rhetoric in food and water-scarce environments.”⁴¹

The vacuum effect is most powerful in rural areas that are difficult to police. “Geographically, rebellion tends to be more of a rural phenomenon while terrorism is

more of an urban phenomenon. Because rebel organizations rely on greater numbers of people, they benefit from environments that make state governance and surveillance difficult."⁴² This vacuum effect can also be multiplied by rebel groups blaming outsiders (e.g., "the West") for creating the conditions for a government to fail to meet the needs of its people, contributing to an ideological justification for rebel-led intervention. In countries where one political party garners most of its support from a single ethnic group, the likelihood of governance-driven motivations for violence increases.

And yet, protests and riots are more common in democracies where freedom of speech, association, and civil and political rights are more abundant.⁴³ Meanwhile, in authoritarian regimes, the opportunity cost of participating in demonstrations is high, and so the absence of demonstrations or protests does not necessarily indicate the absence of desperation or grievances. As one author in our study notes, "When grievances do not translate into action, it can be a sign of state constraints on civil and political society, and not necessarily the absence of discontent."⁴⁴ This difference in regime type (i.e., democratic or authoritarian) ultimately influences the levels and types of violence expressed and experienced. In other words, protests related to food prices are not inherently "bad." In fact, the risk of more extreme forms of violence is higher in places where protest is stifled. It is in these contexts where food-related instabilities carry the greatest risk of metastasizing into damaging forms of organized violence.

Figure 6. The Link Between Food Insecurity and Conflict



**3 Drivers - 3 Motivators - 12 Variables
8 Resulting Conflict Types**



For generations, global hunger was a rural phenomenon. Today, most refugees and internally displaced people don't live in isolated camps but in urban cities. Ghufran and her children live in Aleppo, with an estimated population of 2 million people, after being repeatedly forced from their homes by conflict and natural disasters. Now, she must tightly ration her children's meals, lest they run out of food before the end of the month.

Photo: WFP/Hussam Al Saleh/2023/Syria

Emerging Themes

As the hunger-conflict literature has grown in recent years, it has shined a light on new, emerging themes in food-related instability. At the same time, trends in global hunger have changed over the past five years and created new contexts in which to study the food-related instability relationship. The COVID-19 pandemic, for example, changed the face of food insecurity around the world as it pushed millions of low- and middle-income urbanites into hunger, many for the first time. As conflict continues to spread around the world, humanitarian and development organizations are working in increasingly complicated environments with tremendous constraints on reaching populations in need. Finally, Russia's invasion of Ukraine has caused researchers, legal theorists and commentators to focus with new vigor on the use of food as a weapon of war and its challenges to international humanitarian and human rights law.

Urban Hunger

For generations, global hunger was a rural phenomenon. Indeed, over half of all people facing chronic hunger today are in the business of growing food. But the pace of urbanization around the world has quickened, and cities have struggled to sustainably meet the needs of booming urban populations. Urban households are considerably more reliant on markets than rural farming communities and – in low-income countries – often spend upwards of 60% of their income on food. The COVID-19 pandemic thrust almost 100 million more people into poverty, most of them living in urban areas where pandemic lockdowns and containment measures were especially strict. Before the pandemic, these urbanites were part of the planet's myriad informal labor markets who earned just enough money to survive from one day to the next. Recent events have caused observers to challenge the long-standing "truism" that hunger is most severe and intractable in rural places.

Urbanization has profound impacts on food-related instability and vice versa, which is why migration has long been a part of the food-related instability conversation. Some of the most compelling theories regarding the origins of the Syrian conflict in 2011, for example, involve the migration of rural farmers into urban areas in the aftermath of the country's multi-year drought. Syria was also hosting more than 1 million Iraqi refugees at the time.⁴⁵ It was theorized that the large influx in urban migrants—driven by neighboring conflicts and extreme weather

events—led to conflicts over scarce resources in urban settings and provided the spark needed for civil war.

Today, approximately 90 million people around the world have been forced to leave their homes because of violence, conflict and persecution.⁴⁶ Furthermore, most people that cross borders are not living in refugee camps but in the urban areas of low- and middle-income countries. This creates new competition over limited resources, including housing, humanitarian aid and social protections.

Since most food price riots occur in places where people can easily mobilize through online social networks and word of mouth, the rise in urban hunger — driven by both internal and external migration — is likely to lead to an increase in protests and riots related to food access and availability. Approximately 70% of all food produced globally is consumed in cities, and most low- and middle-income countries are net importers of food. Urban areas, in other words, are highly dependent on imports to meet food needs. People living in cities also tend to be younger than average, with almost two-thirds of people living in urban areas expected to be below the age of 18 by 2030. Younger populations are more likely to be connected to social media networks that allow them to organize quickly.

There are many novel challenges to providing assistance to people suffering from food emergencies in cities. Many urban residents living in poverty — especially new arrivals, seasonal migrants and refugees — live in places not officially recognized by local governments and frequently change locations, so they do not benefit from state protections. Hunger in urban areas is often distributed geographically, unlike rural hunger which tends to affect entire communities at once. Taken together, as hunger continues to grow in cities around the world, it will have dramatic effects on global stability and place new demands on governments and humanitarian organizations alike.

Food Assistance

As the studies in this report show, resource abundance can drive food-related instability as much as resource scarcity. That dynamic naturally begs the question: Can food assistance itself lead to a reduction in conflict and produce peaceful benefits?

There is considerable evidence that food-related humanitarian and development interventions can help address the “root causes” of conflict, mainly through increasing agricultural productivity and equipping national governments with systems and resources to respond to food-security shocks before citizens become violent.^{47,48} In a case study of four United Nations World Food Programme (WFP) operations, for example, the Stockholm International Peace Research Institute found that the provision of food assistance helped to build social cohesion and improve relationships between and within communities, increased opportunity and inclusion for young people, and generally increased citizen-state trust.⁴⁹

Still, the provision of aid resources in any conflict setting can affect patterns of violence and introduce new risks.⁵⁰ In the worst-case scenario, provision of food aid can lead to the targeting of humanitarian actors and produce conflicts over humanitarian resources.⁵¹ Humanitarian organizations operate on principles of neutrality, impartiality and the principle of “do no harm.” They take painstaking measures to ensure food assistance is delivered to their intended beneficiaries and comply with donor government requirements to avoid inadvertently providing resources to terrorist groups. As with any entity in violent conflict settings, humanitarian organizations are increasingly challenged by having to adapt and improve the conflict-sensitivity of their programming. Further complicating these efforts is the ambiguity inherent in international humanitarian law and international human rights law to effectively hold individuals and groups accountable for deliberately using food as a weapon of war.

Food as a Weapon of War

Since the publication of *Winning the Peace*, several key developments have occurred that have thrown the food insecurity-conflict relationship into even sharper relief. In May of 2018, the United Nations Security Council (UNSC) adopted Resolution 2417 that condemned the use of food as a weapon of war and drew the world’s attention to food-related instability. In October of 2020, the U.N. World Food Programme was awarded the Nobel Peace Prize in “recognition of the important link between conflict and hunger and the critical role that food assistance plays in supporting the first step towards peace and stability.” That award further elevated awareness around the ways conflict produces food insecurity while also acknowledging that the relationship works in both directions.

Despite these recognitions, it remains challenging to assign responsibility — to individuals or nations — for actions resulting in widespread hunger or famine.

International humanitarian law (e.g., the Geneva Conventions) governs conduct during war and international human rights law governs conduct during peacetime. Yet both are ambiguous on the use of food as a weapon of war. UNSC 2417 does not go as far as to assign criminal responsibility or the threat of prosecution before domestic or international courts. There is no mention at all, in fact, of the International Criminal Court. Even in situations where warring parties deny humanitarian access to starving populations, they have so far escaped litigation. The same is true where forced displacement of civilians has led to crisis levels of hunger. The nature of armed conflict today has shifted substantially toward non-state actors and less traditional international warfare of the sort that led to the U.N.'s establishment at the end of World War II, further challenging the international regime's ability to act on "starvation crimes."^{vi}

vi. Even in times of peace, the right to food is a contested topic. While it is formally codified in the International Covenant on Economic, Social and Cultural Rights, many theorists have argued that the obligations of states remain unclearly formulated and do not lend themselves to judicial action to determine whether the right to food has been violated.



By June of 2023, nearly 225,000 people in Somalia are expected to face catastrophic levels of hunger. Two-year-old Mashallah is already one of them: He shows all the signs of severe acute malnourishment. World leaders must address hunger emergencies like these before they metastasize into large-scale security threats.

Photo: WFP/Samantha Reinders/2022/Somalia

Conclusion

Through centuries of advancement, human beings have crafted countless strategies to end hunger and conflict separately, but we have only just begun to understand how to treat these two plagues together. While we have long known that hunger is a byproduct of war, the ways in which food insecurity itself contributes to perilous instability has long belonged to the realm of the anecdotal. But the last five years have produced a wealth of new research that illuminates this relationship on a global scale. *Dangerously Hungry* seeks to further advance our understanding of the food-conflict dynamic in service of crafting new hunger-fighting strategies that simultaneously foster greater global stability.

The implications are clear: One of the most effective ways to reduce global instability is to ensure food security for those who cannot feed themselves or their families. The United States has long led the effort to fight global hunger – not only because it is a moral imperative, but because it is economically and strategically smart. Today, it is clearer than ever before that providing international food assistance and strengthening other countries' food systems have immediate, positive impacts on the national security of the United States. Modern conflicts are not confined by political borders and so we must address hunger emergencies before they metastasize into large-scale security threats.

That food insecurity is of consequence to the U.S.' own national security is also becoming more mainstream among U.S. lawmakers and officials. In October 2022, the Biden Administration released an updated U.S. National Security Strategy, a document produced semi-annually since the mid-1980s. At the time of its writing, 349 million people in 79 countries faced crisis levels of hunger and almost 1 million people in Somalia, Afghanistan, Ethiopia, Haiti, South Sudan and Yemen were experiencing famine-like conditions — record levels of global hunger. The 2022 U.S. National Security Strategy cited “food” on 30 occasions, more than double the highest-ever number of references in a strategy document and more than 10 times the number of references than the previous strategy.

The U.S. government increasingly recognizes that global food security is synonymous with U.S. national security. Accordingly, in a similar action to that of the UNSC, in late 2022 the U.S. Senate and Congress passed resolutions —

S.Res.669 and H.Res.922 — condemning the use of food as a weapon of war and bringing new resources to bear on the problem of food-related instability. We are now less than a decade away from the Sustainable Development Goal of ending global hunger by 2030, so the message is urgent and loud: Zero Hunger will not be achieved without first putting an end to conflict. What *Dangerously Hungry* also demonstrates is that ending conflict will not be possible if food insecurity itself metastasizes into unrest and violence.

Annex 1. Methodology

For this report, the Web of Science academic database was queried — a resource containing 90 million peer-reviewed journal articles — to exhaustively catalogue the relevant literature on food-related instability produced after 2017. Our word search combinations yielded 8,425 articles matching those terms. Three researchers reviewed each article abstract and the results were reconciled and reduced to 158 priority articles grouped into three tiers. A total of 60 articles were included in Tier 1, or those that directly address the impacts of food-insecurity on conflict. A secondary review of cited materials in each Tier 1 article was conducted to ensure the comprehensiveness of the systematic review.

Boolean Search Terms for “Food-Related Instability”

(“food” OR “food *security” OR “famine” OR “agricult*” OR “nutrition*” OR “*nourishment” OR “hunger”) AND (“conflict” OR “riot*” OR “insurgenc*” OR “unrest” OR “violen*” OR “war” OR “*stability” OR “violent conflict” OR “national security”)

Annex 2. Sub-Categories of Conflict

Defining conflict is no easy task. Conflict can be considered violent (e.g., armed conflict or terrorism) or non-violent (e.g., protest and demonstrations), involve both government and non-state actors and can be one-sided (e.g., violence against civilians) or multi-sided (e.g., civil war or civil conflict), among other distinctions. We adopt the following sub-categories of conflict.

Civil War	A conflict between opposing groups of citizens of the same country resulting in > 1,000 deaths.
Civil Conflict	A conflict between opposing groups of citizens of the same country resulting in > 25 deaths.
General Armed Conflict	A conflict between opposing groups of citizens of the same country resulting in > 1 death.
Resource Conflict	Disagreements and disputes over access to, control, and use of natural resources (e.g., water and land).
Protests and Riots	An organized public demonstration of disapproval or a disturbance of the peace created by an assemblage of people acting with a common purpose and in a violent manner.
Terrorism	The unlawful use of violence and intimidation, especially against civilians, in the pursuit of political aims.
Violence Against Civilians	Acts that, using force, harm or damage civilians or civilian targets, including lethal as well as nonlethal forms of violence.

Source: Armed Conflict Location & Event Dataset and Uppsala Conflict Data Program (UCDP)

Annex 3. Tier 1 Academic Articles on Food-Related Instability (n=60)

#	Author	Title	Year	Journal	Country	Time Period	Summary of Relevant Findings
1	Breckner and Sunde	Temperature extremes, global warming, and armed conflict: new insights from high resolution data	2019	World Development	Africa	1997-2015	"These (occurrence of temperature extremes on conflict incidence) effects increase with the severity of the extreme in terms of its duration, and are larger in densely populated regions, in regions with lower agricultural productivity as measured by caloric yield, and in regions with more pronounced land degradation."
2	Buhaug et al.	A Conditional Model of Local Income Shock and Civil Conflict	2021	The Journal of Politics	Global	1970-2013	"Although severe income loss has a modest effect on the average ethnic group's propensity to rebel, recently downgraded groups become significantly more conflict prone in the aftermath of a local economic shock.... Consistent with theory, we find that this relationship is most powerful among recently downgraded groups, especially in the context of agricultural dependence and low local level of development.... Sustained investments in poor, agrarian regions may make marginalized rural communities more resilient to weather extremes and dampen a potential trigger effect. However, technological advances and productivity improvements do not address underlying causes of collective frustration related to unequal land distribution, underdeveloped property rights, corruption, lack of political representation, and various forms of overt and covert state-sponsored discrimination."
3	Doring	Come rain, or come wells: How access to groundwater affects communal violence	2020	Political Geography	Africa and the Middle East	1990-2014	"In Sub-Saharan Africa, having both low rainfall and low access to groundwater means the likelihood of communal conflict increases in comparison to areas where either water source is more abundant. This, however, does not hold for the full sample including all of Africa and the Middle East. Furthermore, securing safe access to groundwater is crucial in more populous areas because the likelihood of communal violence is particularly increased with both more difficult access to groundwater and high population density."
4	Eklund et al.	Societal drought vulnerability and the Syrian climate-conflict nexus are better explained by agriculture than meteorology	2022	Communications Earth & Environment		2007-2009	"We show that making assumptions about causal mechanisms that link weather extremes and drought via agricultural collapse oversimplifies a complex system. The effects of a drought are not only determined by its severity in meteorological terms, but also by the ability of the affected agricultural system to recover."
5	Gatti et al.	Can irrigation infrastructure mitigate the effect of rainfall shocks on conflict? Evidence from Indonesia	2020	American Journal of Agricultural Economics	Indonesia	1998-2014	"This article provides evidence that rainfall shocks affect conflict through their effect on agricultural production and that irrigation infrastructure can mitigate this effect. Using data from Indonesia, we document that low rainfall during the agricultural season decreases agricultural production and increases civil conflict. We then show that the rainfall-conflict link is attenuated by the presence of irrigation infrastructure in a district. This attenuating effect is specific to irrigation infrastructure; we find no evidence for a similar effect of hydropower dams. Our results are stronger for small-scale conflicts over natural resources and popular justice than for conflicts over ethnic identity or ethnic separatism."

6	Jun	Temperature, maize yield, and civil conflicts in sub-Saharan Africa	2017	Climatic Change	sub-Saharan Africa	1970-2012	<p>"Our empirical results confirm effects of temperature on the incidence of civil conflict. The key findings are as follows: (i) between 1970 and 2012 in sub-Saharan Africa, a high temperature during maize growing season reduced the crop's yield, which in turn increased the incidence of civil conflict and (ii) future expected warming is expected to increase civil conflict incidence by 33% in the period 2031–2050, and by 100% in the period 2081–3010, compared to levels between 1981 and 2000."</p>
7	Vesco et al.	Climate variability, crop and conflict: Exploring the impacts of spatial concentration in agricultural production	2021	Journal of Peace Research	Global	1982-2015	<p>"Our results show that the negative impacts of climate variability led to an increase in the spatial concentration of agricultural production within countries. In turn, the combined effect of climate extremes and crop production concentration increases the predicted probability of conflict onset by up to 14% in agriculturally dependent countries."</p>
8	Crost et al.	Climate change, agricultural production and civil conflict: Evidence from the Philippines	2018	Journal of Environmental Economics and Management	Philippines	2001-2009	<p>"We find that an increase in dry-season rainfall leads to an increase in agricultural production and dampens conflict intensity. By contrast, an increase in wet-season rainfall is harmful to crops and produces more conflict. Consistent with the hypothesis that rebel groups gain strength after a bad harvest, we find that negative rainfall shocks lead to an increase in conflict incidents initiated by insurgents but not by government forces. These results suggest that the predicted shift towards wetter wet seasons and drier dry seasons will lead to more civil conflict even if annual rainfall totals remain stable."</p>
9	Maertens	Adverse Rainfall Shocks and Civil War: Myth or Reality?	2020	Journal of Conflict Resolution	Africa	1981-2013	<p>"I find that a negative rainfall shock that takes a country from the 50th to the 25th percentile of the distribution of agricultural rainfall increases the risk of civil war onset and incidence in Africa by 2.2 and 2.3 percentage points, respectively. A positive shock that takes a country from the 50th to the 75th percentile of the distribution of agricultural rainfall decreases the risk of civil war onset and incidence by 0.6 and 0.8 percentage points, respectively. Nevertheless, large enough positive shocks have the opposite effect, increasing civil war onset and incidence risk. Going from the 50th to the 90th percentile of the distribution of agricultural rainfall increases the risk of civil war onset and incidence by 1 and 0.7 percentage points, respectively...Hence, increases in rainfall lower the risk of civil war and conflict at low levels and raise the risk of war and conflict at high levels."</p>
10	Cabot	Climate Change, Security Risks and Conflict Reduction in Africa: A Case Study of Farmer-Herder Conflicts over Natural Resources in Côte d'Ivoire, Ghana and Burkina Faso 1960–2000	2017	Springer (book)	Burkina Faso, Ivory Coast, and Ghana	1960-2000	<p>"...the study demonstrates that, under certain circumstances, climate change can destabilize human security and that the agro-pastoral communities of West Africa are likely to experience such security threats...Across the three countries, lower levels of conflict are found when integration policies are implemented and land rights are distributed equitably between users."</p>
11	Goyette and Smaoui	Low Agricultural Potential Exacerbates the Effect of Temperature on Civil Conflicts	2021	Ecological Economics	Global	1946-2014	<p>"We find that there is a significantly higher probability to be in conflict when annual temperature deviates from its mean in a country with low agricultural potential relative to a country with high agricultural potential...The baseline results show that, when agricultural potential is low, a one Celsius deviation in temperature from its annual (or decennial mean) is associated with a 3.7% [1.1%] increase in conflict incidence relative to better endowed countries. However, when agricultural potential is high, a one Celsius deviation in temperature from its annual [decennial] mean is associated with a 4% [2%] decrease in conflict incidence relative to poorly endowed countries."</p>

12	Helman et al.	Climate has Contrasting Direct and Indirect Effects on Armed Conflicts	2020	Environmental Research Letters	Africa and the Middle East	1970-2012	<p>"Consistent with previous studies, violent conflicts are mostly found in agriculture-dependent areas, low socioeconomic areas and close to political borders in both regions... the association between violence and agricultural dependence was about fourfold greater in the ME, in spite of the larger average agricultural area in Africa [14% compared to 11% for the ME], likely because of lower mean annual rainfall and therefore greater agricultural vulnerability to drought and water scarcity... temperature and rainfall direct effects on conflict risk seem to be stronger than any indirect effect through resources such as water availability and agricultural production... Our results demonstrate that no single proposed climate-conflict mechanism can alone explain the empirical patterns that underlie the climate-conflict linkage across contrasting regions or countries, and that this linkage is more complex than some analyses have previously suggested."</p>
13	Koubi	Climate Change and Conflict	2019	Annual Review of Political Science	Global	2019	<p>"The literature shows that climatic conditions breed conflict in fertile grounds: In regions dependent on agriculture and in combination and interaction with other socioeconomic and political factors such as a low level of economic development and political marginalization... drought and conflict coexist mostly in countries or regions that already suffer from adverse climatic changes, are highly dependent on agriculture for income and food generation, have few capabilities to cope with climatic changes, and are characterized by preexisting tensions and conflict."</p>
14	Linke and Ruether	Weather, Wheat and War: Security Implications of Climate Variability for Conflict in Syria	2021	Journal of Peace Research	Syria	2011-2019	<p>"We find that violent events initiated by the government and rebel groups are both more likely during the growing season than other times of the year. There is also evidence that dry conditions during the growing season led to an increase in government-initiated attacks over the duration of the war. We find the strongest relationship between precipitation deficits and both government- and rebel-initiated violence in later years of the war... To secure food supplies and revenues, government and rebel forces alike will be motivated to use violence to capture agriculture. In hotly contested Idlib and Aleppo, for example, government and rebel front lines shifted village-by-village as both sides sought to control farmland during various periods of the war... Destroying crops can give the government a strategic advantage by reducing food security within opposition regions..."</p>
15	Roche et al	Climate Change and the Opportunity Cost of Conflict	2020	PNAS	Theoretical	N/A	<p>"The nonlinear and highly local effect of climate on agricultural income has been highlighted in several studies and has a strong qualitative impact on conflict incentives. It emerges from a combination of natural (timing of rain events), technical (crop choice), economic (agricultural prices) and institutional (insurance and regulation) processes that were often put in place precisely to decouple income from climate variability. However, as climate variability begins to exceed historical ranges, these hedging mechanisms may become less effective... Although war occurs in bad years, conflict may decrease if agents expect more frequent bad years."</p>
16	von Uexkull, N. et al.	Drought, Resilience and Support for Violence: Household Survey Evidence From DR Congo	2020	Journal of Conflict Resolution	Democratic Republic of Congo	2017	<p>"We find that less resilient respondents who report having experienced drought and associated losses are more likely to be supportive of the use of political violence."</p>
17	Waha et al.	Climate Change Impacts in the Middle East and Northern Africa (MENA) Region and their Implications for Vulnerable Population Groups	2017	Regional Environmental Change	Middle East and North Africa	2010-2017	<p>"Climate change might act as a threat multiplier in the MENA region by placing additional pressure on already scarce resources and by reinforcing preexisting threats such as political instability, poverty and unemployment. Jointly with lacking additional elements of human security, e.g., water, food, energy and health, this can create the potential for social uprising and violent conflict. However, establishing a direct link between climate change and conflicts in MENA is challenging due to contradictory conclusions and methods."</p>

18	Jones et al.	Food Scarcity and State Vulnerability: Unpacking the Link Between Climate Variability and Violent Unrest	2017	Journal of Peace Research	Africa	1991-2011	"...state vulnerability moderates the impact of food insecurity on the likelihood of violence. We also find that capable governance is an even better guarantor of peace than good weather...addressing state vulnerability is crucial to breaking the link between food insecurity and violence. Reducing vulnerability can address the two main channels through which sudden increases in food insecurity contribute or directly produce violent protests and riots: decreasing food availability and highlighting food entitlements."
19	Yang et al.	Causality of Climate, Food Production and Conflict Over the Last Two Millennia in the Hexi Corridor, China	2020	Science of the Total Environment	China	0-2000 (two millennia)	"The statistical significance of the causality linkages between climate variability, bio-productivity, grain yield, migration and conflict suggests that climate variability is not the direct causative agent of these phenomena, but that climate reduced food production which gradually lead to migration and conflicts...The present analysis suggests that climate variability in the Hexi Corridor has not directly led to human migration, but that climate-induced food shortages over regional and long-term scales were the direct trigger of nomads moving southward and conflicts arising between nomadic and agricultural civilizations throughout Chinese history."
20	Ishak	Murder Nature: Weather and Violent Crime in Rural Brazil	2022	World Development	Brazil	1991-2015	"I document that adverse weather shocks in the form of droughts lead to a significant increase in violent crime in rural regions. This effect appears to persist beyond the growing season and over the medium run in contrast to the conventional view perceiving weather effects as transitory. To explain this persistence, I show that weather fluctuations are positively associated not only with agriculture yields, but also with the overall economic activity. Moreover, evidence shows the dominance of opportunity cost mechanism reflected in the fluctuations of the earnings especially for the agriculture and unskilled workers, giving credence that it is indeed the income that matters and not the general socio-economic conditions."
21	Blakeslee and Fishman	Weather Shocks, Agriculture and Crime: Evidence From India	2018	Journal of Human Resources	India	1971-2000	"We find that drought and heat exert a strong impact on virtually all types of crimes, that the impact on property crimes is larger than for violent crimes...Weather shocks associated with increases in crime are also generally found to reduce agricultural incomes, plausibly suggesting a role for agricultural income shocks in mediating the observed relationship, consistent with a lengthy literature on the economic determinants of crime and group conflict."
22	Mary	Dams Mitigate the Effect of Rainfall Shocks on Hindus-Muslims Riots	2021	World Development	India	1950-1995	"We find that while (fractional) rainfall shocks affect agricultural production and religious violence in rain-fed districts, they have no effect on agricultural production and religious violence in dam-fed districts. In other words, dams fully mitigate the effect of rainfall shocks on agricultural output and religious violence in the Indian context." [Note: this is a replication study of Sarson (2015), which was included in the original Winning the Peace data set]
23	Wakdok and Bleischwitz	Climate Change, Security and the Resource Nexus: Case Study of Northern Nigeria and Lake Chad	2021	Sustainability	Northern Nigeria and Lake Chad	2020	"...climate change patterns leading to low rainfalls and approaching deserts, particularly in the last three decades, are responsible for the upsurge in the southward migration of the nomads searching for pasture and water... Because the herdsmen are mainly Fulani and predominantly Muslim, while several farming communities in the central part are largely Christian, the conflicts sometimes assume a religious dimension...A relevant observation in our case is the increasing ruthlessness of some attacks. Amidst different attacks on farming communities, an estimated 500 villagers were reportedly killed by suspected armed herdsmen in the farming community of Dogo Nahawa in 2010, and about 100 people were also killed in Barkin Ladi in June 2018, again by suspected armed herdsmen, all in Plateau State."

24	De Juan and Wegenast	Temperatures, Food Riots and Adaptation: A Long-Term Historical Analysis of England	2020	Journal of Peace Research	England	1500-1817	<p>"Our models show that there was more unrest in colder years than in years with more favorable weather conditions... We find associations between weather conditions and unrest to be highly inconsistent over time and driven primarily by individual decades of the 18th century... [this data] lend support to previous research in that they show that associations between weather conditions and unrest can also be observed in other historical time periods (i.e. the 18th century) and are not confined to recent and rather short time periods that most research has focused on (i.e. the 1990s and early 2000s)... [the results] underscore the temporal heterogeneity of effects and caution against any simple extrapolation of current effects of environmental conditions into the future."</p>
25	Adelaja et al.	Food Insecurity and Terrorism	2018	Applied Economic Perspectives and Policy	Global	2000-2014	<p>"we empirically find that greater food availability is associated with greater incidence of terrorism, but better food access is associated with reduced terrorism activities."</p>
26	Regan and Young	Climate Change in the Horn of Africa: Causations for Violent Extremism	2022	Behavioral Sciences of Terrorism and Political Aggression	Somalia	1991-2019	<p>"The research findings conclude that variables related to climate change were associated with reported terrorism incidents in Somalia... decreases in annual mean precipitation correlated with terrorism attacks in Somalia... With less food and limited economic opportunities, young men are more inclined to engage in political violence and participate in illicit industries... annual mean temperature and annual sorghum production had no statistical relationship to reported terrorism incidents in Somalia."</p>
27	Schon and Nemeth	Moving Into Terrorism: How Climate-Induced Rural-Urban Migration May Increase the Risk of Terrorism	2022	Terrorism and Political Violence	Global	2021	<p>"We have argued that climate change increases the risk of terrorism via rural-urban migration... While terrorism is primarily a threat to urban areas, climate change disproportionately threatens rural areas. This is due to climate change most directly affecting agriculture... Rural-urban migration is far from inevitable in response to climate change, but it is far more likely if farmers are unable to adjust their livelihood strategies."</p>
28	Bagozzi et al.	Droughts, Land Appropriation and Rebel Violence in the Developing World	2017	Journal of Politics	Global	1995-2008	<p>Droughts can increase the incidence of rebel-perpetuated atrocities against civilians in agricultural areas of developing countries ... When severe droughts occur ... agricultural resources are diminished ... leading civilians to allocate more agricultural supplies for consumption and to invest more in defending their diminished supplies. ... This strategy drives rebels (to) induce civilians to flee their land or otherwise give up food resources.</p>
29	Manotas-Hidalgo et al.	The Role of Ethnic Characteristics in the Effect of Income Shocks on African Conflict	2021	World Development	Africa		<p>"Focusing on the direct effect, droughts during the growing season have a clear positive impact on riots... the result suggests an important role of the opportunity cost of becoming a soldier: in food-producing areas, increases in food prices raise the real value of salaries and generate opportunity-cost incentives for workers not to join armies engaged in organized violence... recruitment activity of organized violent groups is more successful if there is a sense of grievance in some ethnic groups, whereas this is much less important to become a temporary rioter... we find that the ACLED category violence against civilians has more determinants in common with factor conflict than with riots. Therefore, differentiating between organized and non-organized conflict can be more informative than between factor and output conflict."</p>

30	Rezaeed-aryakenari et al.	Food Price Volatilities and Civilian Victimization in Africa	2020	Conflict Management and Peace Science	Africa	1997-2010	<p>"The results show that increases in food insecurity substantially raise the likelihood of insurgent groups committing violence against civilians and that districts with a higher proportion of agricultural land are at greatest risk of civilian victimization by rebel groups during these episodes of food insecurity... Our findings show that food insecurity, operationalized as the local food price in a given district-month, increases the likelihood and number of violent attacks against civilians by non-state actors—namely rebel groups. We also find that, while cultivated regions experience a lower level of violence against civilians during times of food security, these areas are more prone to be targeted by rebel groups during periods of food insecurity and experience higher numbers of civilian fatalities. Finally, the results also reveal that, under certain circumstances, rebel violence against civilians is lowered as parties try to cooperate when food insecurity is present."</p>
31	Abidoye and Cali	Income Shocks and Conflict: Evidence From Nigeria	2021	Journal of African Economies	Nigeria	Since 2000	<p>"Consistent with the opportunity costs mechanism of conflict, price increases of commodities produced by the households have a conflict-reducing effect, while the opposite is true for prices of consumed commodities. . . Civil conflicts are also fought over the control of valuable economic resources, i.e., the "prize" of the conflict."</p>
32	Grost and Felter	Export Crops and Civil Conflict	2020	Journal of the European Economic Association	Philippines	2001-2009	<p>"We exploit movements in world market prices combined with geographic variation in crop production to show that increases in the value of bananas, the country's biggest export crop, caused an increase in conflict violence and insurgent-controlled territory in the Philippines. This effect was concentrated in provinces where bananas are produced in large plantations with areas greater than 25 hectares. Our results are consistent with a mechanism in which insurgents fund their operations by extorting large agricultural export firms."</p>
33	Blair et al.	Do Commodity Price Shocks Cause Armed Conflict? A Meta-Analysis of Natural Experiments	2021	American Political Science Review	Global	2010-2020	<p>"We show that commodity price changes, on average, do not change the likelihood of conflict...In line with theory, we find price increases for labor-intensive agricultural commodities reduce conflict, while increases in the price of oil, a capital-intensive commodity, provoke conflict... These divergent results match theoretical predictions that price increases for labor- intensive commodities such as agricultural goods generate employment and thus raise the opportunity cost of fighting."</p>
34	Markowitz	The Resource Curse Reconsidered: Cash Crops and Local Violence in Kyrgyzstan	2017		Kyrgyzstan	2010	<p>"It is often noted in resource curse literature that agricultural economies are less conflict-prone than countries managing mobile, high-value resources. In the vast literature linking resource endowment and conflict, cash crop economies are often considered immune to civil violence...But many incidents of violence— especially local violence—are in fact occurring in cash crop economies...At the center of the 2010 violence were members of Kyrgyzstan's southern elite who mobilized various ad hoc gangs, militias, and local security personnel in coordinated attacks against (largely unarmed) civilians...elites in the country's southern regions took action when they were threatened with the loss of political posts and access to patronage and protection that would enable them to retain access to rents, either by commanding cash crop production or controlling illicit markets... While cash crop economies appear to be durable, therefore, this stability is misleading and it rests upon local elites' continued access to rents. Beneath the surface, imperceptible shifts in the politics of rent seeking can foster open competition among local elites resulting in violent consequences."</p>

35	Koren et al.	Food and Water Insecurity as Causes of Social Unrest: Evidence from Geolocated Twitter Data	2021	Journal of Peace Research	Kenya	2017-2019	<p>"...while staple insecurities – independently – are insufficient in motivating unrest in urban areas, especially if people have developed coping mechanisms to the effects of climatic variability, their concatenation can generate a compound shock that does provide a strong enough motivation to protest...if urbanites experience both food and water insecurity, social unrest ensues, not only because the two staple insecurities are present, but because they reinforce each other....Our findings also suggest that such shocks are more likely to generate nonviolent rather than violent responses. This could be unique to Kenya, a state where politics – while sometimes contentious – have rarely deteriorated to the level of civil war. However, an alternative proposition is that this is how people in urban areas primarily respond to staple insecurity shocks..."</p> <p>"Our results suggest that food price volatility does contribute significantly to conflict events... Greater democracy can engender more conflict, but in a non-linear fashion... Greater income equality or middle-class share of income results in greater political unrest... The growth in per-capita income is significant and has the right negative sign, indicating that richer countries face less food price related political unrest."</p>
36	Murshed et al.	Food Insecurity and Conflict Events in Africa	2018	Peace Economics, Peace Science and Public Policy	Africa	2000-2015	<p>"This example [Somalia] suggests food security is not simply one of human security but is bound up with wider issues of state security. Indeed, one of the core findings of recent climate security research is the risk of internal conflict in agriculturally dependent societies. So, even if the initial effects are on human security, they may escalate to state security threats under certain conditions. Security risks also extend to food importers who may face higher global prices if climate disruptions increase prices on key food-stuffs like wheat. The effects of drought and disrupted agricultural exports on global food prices were implicated in the onset of the Arab Spring protest movements. Though states may insulate their populations from these effects through social policies (Hendrix & Haggard, 2015), academic research has found support for the increased risks of riots and protests if global prices are passed on to domestic consumers."</p>
37	Busby	Beyond Internal Conflict: The Emergent Practice of Climate Security	2021	Journal of Peace Research	Global	2005-2020	<p>"...wheat price fluctuations appear as root driver of conflict through sorghum and millet prices... We find that rising wheat price causes sorghum price to increase, perhaps due to the weak substitution effects. Our graphical representation illustrates that the increase in the cereal prices causes a surge of conflict outbreaks... While conflict dynamics are multifaceted and have many drivers, our results clearly establish cereal prices play a vital role in conflict onset. Moreover, in order to promote peacebuilding and to mitigate conflicts, controlling imported wheat prices and supply is important for the Sudanese government."</p>
38	Chen et al.	The Relationship Between Conflict Events and Commodity Prices in Sudan	2018	Journal of Policy Modeling	Sudan	2011-2012	<p>"I find strong evidence that food price spikes increase the likelihood of nonviolent action in politically excluded and ethnically diverse locations... These results provide strong evidence that the existence of cross-cutting grievances increase the emergence of nonviolent action in ethnically excluded and diverse locations, which are otherwise constrained by social divisions."</p>
39	Abbs	The Hunger Games: Food Prices, Ethnic Cleavages and Nonviolent Unrest in Africa	2020	Journal of Peace Research	Africa	1990-2008	

40	Hossain and Scott-Villiers	Purchasing and Protesting: Power From Below in the Global Food Crisis	2019	IDS Bulletin	Global	2007-2012	"Across a range of cultures, places, and political economies, the common experience of rapid rises in the price of staple goods was of a sharp uptick in the commodification of relationships between people and food. The multitude of everyday actions and reactions to rising prices reinforced higher order processes such as agro-food industrialization, global food market penetration, rural dispossession, environmental degradation, agrarian and labor market change, urbanization, and change in gender relations...While people everywhere adjusted to higher food prices by changing how they earned and what they ate, it would be inaccurate to view them as victims without agency in this process. There were positive choices towards a more commoditized life. Some resisted the risks that reliance on the markets could mean, taking collective action to protest shocks to the foundations of everyday life, and to demand public action for protection"
41	Gustafson	Hunger to Violence: Explaining the Violent Escalation of Nonviolent Demonstrations		Journal of Conflict Resolution	Africa and Latin America	1991-2017	"I find support for my hypotheses that violent escalation is more likely when the food price increases; unemployment rate is high, and events are spontaneous. Additionally, I find a strong interactive effect between food price changes and the unemployment rate which suggests that violent escalation is especially likely when both of these values are high...My results suggest that food security and employment assurance are essential components in mitigating the risk of violent escalation. Interestingly, food prices seem to affect the probability of escalation more than the unemployment rate."
42	Bush and Martiniello	Food Riots and Protest: Agrarian Modernizations and Structural Crises	2017	World Development	Uganda, Burkina Faso, Egypt and Tunisia	2008-2011	"...in all cases there is an underlying anti-democratic, authoritarian attempt by states to offset long-term crises of capitalist accumulation with short-term repression. That then leads to another round of conflict thereby merely postponing further protest. Food riots and protests are always political. They can give voice to the exploitative processes and social relations of production around which food producers and consumers mobilize."
43	Newman	Hungry or Hungry for Change? Food Riots and Political Conflict, 2005-2015	2020	Studies in Conflict and Terrorism	Global	2005-2015	"Social unrest related to food price grievances also tended to occur in urban settings in societies in which a high proportion of household income is spent on food—particularly those above 40% — and that have relatively weak state capacity. This unrest also tended to occur in societies that are relatively food insecure, as measured by undernourishment....food protests and riots are more frequent in democracies or partial democracies...Social unrest related to food prices is more frequent in societies with lower levels of social protection."
44	Rudolfson	Food Price Increase and Urban Unrest: The Role of Societal Organizations	2021	Journal of Peace Research	Africa	1990-2014	"...the findings suggest that repression of societal organizations decreases the likelihood of unrest when food prices rise... the article argues that the manifestation of unrest when food prices increase is moderated by the degree to which the state represses societal organizations. Civil and political society have the potential to channel collective dissent around food-related grievances, as these organizations provide existing mobilization structures that people can draw on to engage in collective action."
45	Grasse	Oil Crops and Social Conflict: Evidence From Indonesia	2022	Journal of Conflict Resolution	Indonesia		"I find when oil palm grows more valuable and expands within producing districts, violent resource conflicts increase."
46	McGuirk and Burke	The Economic Origins of Conflict in Africa	2020	Journal of Political Economy	Global	1989-2010; 2010-2050	"In food-producing areas, higher prices reduce conflict over the control of territory ("factor conflict") and increase conflict over the appropriation of surplus ("output conflict"). We argue that this difference arises because higher prices increase the opportunity cost of soldiering for producers while simultaneously inducing consumers to appropriate surplus as real wages fall. In areas without crop agriculture, higher prices increase both forms of conflict."

47	Heslin	Riots and Resources: How Food Access Affects Collective Violence	2021	Journal of Peace Research	Bangladesh and India	2007-2008	"While media accounts highlighted food access as the primary concern of food rioters, this study argues that many 'food riots' were not, in fact, directly motivated by food access. Rather, changes to food access can aid in mobilizing protests around a range of grievances, some unrelated to food access...While food prices can play a role in mobilizing claims-making, if the primary issue is not food access, then strictly addressing food prices will not address what the populations are protesting...in both cases, food prices were not the primary issue raised by those in the affected communities."
48	Guardado	Land Tenure, Price Shocks and Insurgency: Evidence From Peru and Colombia	2018	World Development	Peru and Colombia	1980-2005	"... estimates show that exogenous negative price shocks increase the intensity of conflict in districts with a greater presence of individual ownership, relative to other types of land tenure. The finding is consistent with small landowners in the export sector experiencing a sharper downturn in labor market outcomes thus reducing the opportunity cost of participating in insurgent groups...individuals working under agricultural contracts assuming greater risk and more exposed to the volatility of international markets (e.g. small landowners) will devote more labor to conflict activities in the presence of negative income shocks than those less exposed (sharecroppers and communal land). That is, when the economy is bad, those living under land institutions are relatively more affected by income shocks and may find it less costly to contribute to an on-going conflict effort."
49	Gimenez-Gomez and Zergawu	The Impact of Social Heterogeneity and Commodity Price Shocks on Civil Conflicts	2018	Journal of Policy Modeling	Global	1970-2014	"...we find out that in ethnically polarized societies, the commodity export price shocks increase violence. Nonetheless, in ethnically and religiously fractionalized societies (as well as religiously polarized), the effect of commodity export price shocks on civil conflicts depends on the type of income shocks and category of commodity...during overall price shocks, the more ethnically polarized the society, the graver the adverse effect of price changes, and thus the higher the probability of civil conflicts....When the capital-intensive commodities price decline, the probability of conflict decrease in ethnically fractionalized societies. Whereas the violence will increase in religiously polarized and fractionalized communities. The labor-intensive commodities prices decrease also leading to similar outcomes in terms of increasing civil conflicts in religiously polarized and fractionalized societies."
50	Schellens and Belyazid	Revisiting the Contested Role of Natural Resources in Violent Conflict Risk through Machine Learning	2020	Sustainability	Global	1989-2014	"...the results show that variables such as access to water and food security are important predictors of conflict, while resource rents and oil and ore exports are relatively less important than other natural resource variables, contrasting what prior research has suggested."
51	Karnieli et al.	Was Drought Really the Trigger Behind the Syrian Civil War in 2011?	2019	Water	Syria	2007-2010	"We conclude that the Turkish policy of unilaterally diverting the Euphrates water was the main reason for the agricultural collapse and subsequent instability in Syria in 2011. The obvious inference is that while prolonged drought exacerbated conditions, unsustainable anthropogenic water management in Turkey was the proximate cause behind the Syrian uprising."
52	Koren	Food Abundance and Violent Conflict in Africa	2018	American Journal of Agricultural Economics	Africa	1998-2008	"...limitations on food access at both the local and national levels in many developing African countries force most armed groups and communities to depend on locally-produced food. These actors are therefore likely to use violence to establish control over more food resources or be stationed where more food is available, suggesting that food abundance might also be driving conflict...The findings show that, contrary to previous expectations, conflict is driven by higher yields, on average, and not by scarcity...agricultural regions experience relatively high levels of violent conflict that are, to a large extent, driven by the type and amount of food resources produced there..."

53	Koren	Food Resources and Strategic Conflict	2019	Journal of Conflict Resolution	Africa	1998-2008	"...food support is crucial in facilitating military operations in these contexts and using a statistical estimator that is the structural equivalent of my theoretical argument, I confirm these expectations at the highly localized level. Indeed, once the direct effects of food support on the strategic behaviors of different actors are isolated and disaggregated, we identify a positive and substantive relationship between food productivity and localized conflict...reducing asymmetries in access to food or increasing overall food security levels within the country can reduce the need for armed groups to violently compete over these resources...rebels' probability of attacking significantly increases in areas with more staple cropland...the probability that the state will defend against attacks significantly increases in areas and years with higher values of Wheat Productivity, compared with a scenario where no food support is provided."
54	Idowu	Urban Violence Dimension in Nigeria: Farmers and Herders Onslaught	2017	Agathos	Nigeria	2013-2016	"There have been at least 370 clashes involving herdsmen and farmers in Nigeria in the last five years, compared to just 20 in the 15 years before that, according to data from the Lagos-based research firm SB Morgen...This paper shows that in 2014, more than 1,200 people lost their lives, according to the most recent Global Terrorism Index. This made the Fulani militia the world's fourth deadliest militant group."
55	Koren	Food, State Power and Rebellion: The Case of Maize	2018	International Interactions	Global	1993-2008	"Evidence shows that natural resources affect the fighting capacity of rebel groups; yet, by focusing on lucrative resources that are rare in most rebellion-afflicted countries, such as oil and diamonds, scholars neglected one necessary input for rebellion: staple crops. Focusing on maize, the world's most prevalent staple, this study argues that, as one of the most important resources for rebel groups, maize can have a destabilizing effect on the state's ability to thwart rebellion...this study establishes that, indeed, more access to staple crops effectively reduces the ability of the state to deter rebellions. Groups that can access more nutritious food can not only support more troops, but also keep their morale high, which motivates members to fight toward a common goal... Where rebels are able to secure access to more staples, they engage in more conflict-related activity even if the state maintains high presence in these regions."
56	Kishindo and Mvula	Malawi's Land Problem and Potential for Rural Conflict	2017	Journal of Contemporary African Studies	Malawi	2017	"The government's response to land poverty has so far been focused on the creation of resettlement schemes. As such initiatives are expensive, they have tended to be piecemeal and benefit only a small fraction of land poor families. Frustrated land poor families have now resorted to land encroachment on privately held land...The existence of land perceived to be idle, or owned by people deemed not to have a legitimate claim to it is an incentive to land invasion by landless local families. The emergence in Mulanje and Thyolo of organizations dedicated to the restitution of land to indigenous communities marks the beginning of a confrontational stage in post-independence land relations which could result in undesirable consequences."
57	Marcantonio et al.	Farmer Perceptions of Conflict Related to Water in Zambia	2018	Sustainability	Zambia	2015	"We find that the majority of our respondents (75%) think of conflict as misunderstood-ings or disagreements between people and that 91% of our sample has experienced past conflict, 70% expect to experience future conflict, and 58% expect to experience future physical violent conflict. When asked about the sources of conflict, respondents mainly mention land grabbing, crop damage by animals, and politics rather than water related issues. However, we find a significant relationship between perceptions of future rainfall decreasing and future physical violent conflict. These results imply that even though respondents do not think water scarcity is a direct source of conflict, the perception of decreased rain in the future is significantly related to the perception that future conflict and future physical violent conflict will occur."

58	Bellinger	Domestic Terrorism in the Developing World: Role of Food Security	2021	Journal of International Relations and Development	Global	1980-2011	"The primary results in model 2 indicate that food security is statistically significant where higher levels of food security are associated with fewer domestic terrorist attacks...Substantively, a one unit increase in protein supply decreases the rate of terrorism by 1.7%."
59	Diamond-Smith et al.	Food Insecurity and Intimate Partner Violence Among Married Women in Nepal	2019	Journal of Global Health	Nepal	2011	"About half of married women in our sample experience food insecurity and approximately 10% of women experienced each of the three different types of Intimate Partner Violence (IPV) in the past 12 months: emotional, sexual and physical. Food insecurity is significantly associated with increased odds of experiencing emotional or physical IPV, but not sexual IPV, after adjusting for individual and household level demographic variables."
60	Koren and Ba-gozi	Living Off the Land: The Connection Between Cropland, Food Security and Violence Against Civilians	2017	Journal of Peace Research	Africa	1997-2009	"Armed groups have shorter horizons of interaction with locals, while the need to obtain food for immediate use becomes more acute. Civilians view armed actors' promises as less credible, becoming more concerned that the area will be taken over by a different group that may punish those who supported the previous occupier. This makes the use of violence against civilians more optimal for armed troops, as the benefits associated with securing maximum food access through this immediate strategy outweigh the costs of foregone cooperation and access to food in the future."

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