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### Violent conflicts and food security in Cameroon

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#### Abstract

The objective of this paper is to analyse the effect of violent conflicts on household food security in Cameroon. The data used come from the fourth Cameroon Household Survey (ECAM 4) for food security and from the Armed Conflict Location and Event Data (ACLED) database for violent conflicts. By merging these data with geolocation information, a sample of 10,303 households spread throughout the country was selected. The estimation of the ordered Logit model shows that the occurrence of violent conflict has a negative effect on household food security. This result is robust when considering the intensity of armed conflict as measured by the number of deaths recorded. The discussion of transmission channels provides insights for policy makers and humanitarian organisations.

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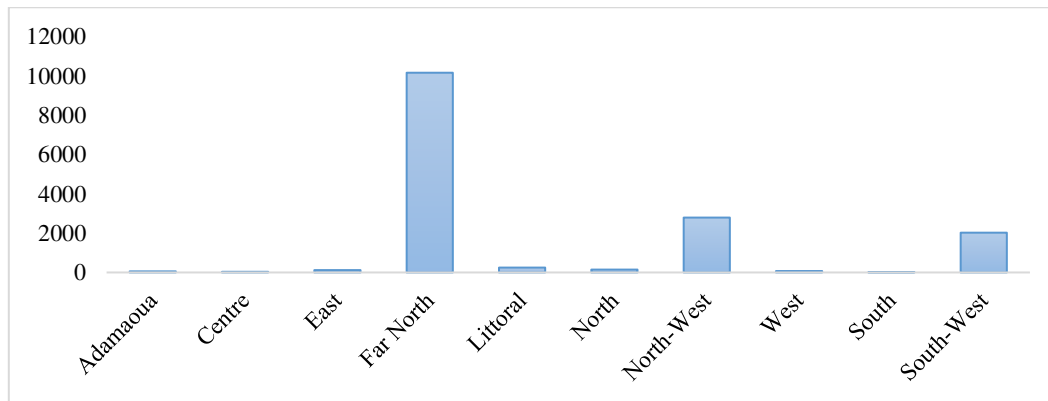
# 1. Introduction

For several decades, Africa has been the scene of political crises and numerous conflicts. These can be political tensions, recurrent instabilities or real wars such as the one that hit Angola from 1975 to 1991, Liberia from 1989 to 1996 and Somalia from 1988 to 1999. Central Africa in general and Cameroon in particular is no stranger to conflict<sup>1</sup>. Since 2013, Boko Haram attacks have spread to the North of Cameroon with serious socio-economic consequences but also to Niger and Chad (Issa 2014). When the northern regions (North and Far North) of Cameroon suffered the first consequences of the Boko Haram insurgency, they were just emerging from a long security crisis due to the phenomenon of highway robbery and hostage taking (Issa 2010). This situation of insecurity of the populations in the far North is inseparable from a regional environment characterised by the security instability of neighbouring states.

The consequences of the conflict perpetrated by Boko Haram in the affected areas are considerable: from the destruction of infrastructure to the decomposition of the social fabric, not to mention the loss of human life. More than 20,000 people have been killed since 2009, with 8,852 in 2015 alone, and the massive displacement of the populations into neighbouring countries (OCHA 2016). In Nigeria, 2.15 million internally displaced persons (IDPs), 241,000 IDPs and refugees in Niger, 117,000 in Chad and 262,000 in Cameroon (OCHA 2016). The displaced exerted a strong socio-demographic pressure on the host communities, which are themselves generally poor and destitute.

The other regions of the country are not spared from violent conflicts. The Far North is the region most exposed to violent conflict with 10162 deaths over the period 2008 to 2020, which can be explained by the conflict against the Islamist sect Boko Haram in this region bordering Nigeria. This is followed by the North West and South West regions with 2792 and 2024 deaths respectively over the same period.

**Figure 1: Prevalence of death by region in Cameroon**



**Source: ACLED (2008-2020).**

Indeed, the claims of secessionists in the North-West and South-West regions have now taken the form of terrorism with disastrous consequences for the population. The conflict has killed at least 1,850 people since September 2017 (OCHA 2019) and is now affecting French-speaking regions. About 20 attacks and fires have taken place in the Western (in Menoua division, Bamboutos and Noun) and Littoral (in the localities of Mbanga, Njombe-Penja and Mpenda Mboko) regions, causing numerous deaths and significant material damage. At least 235

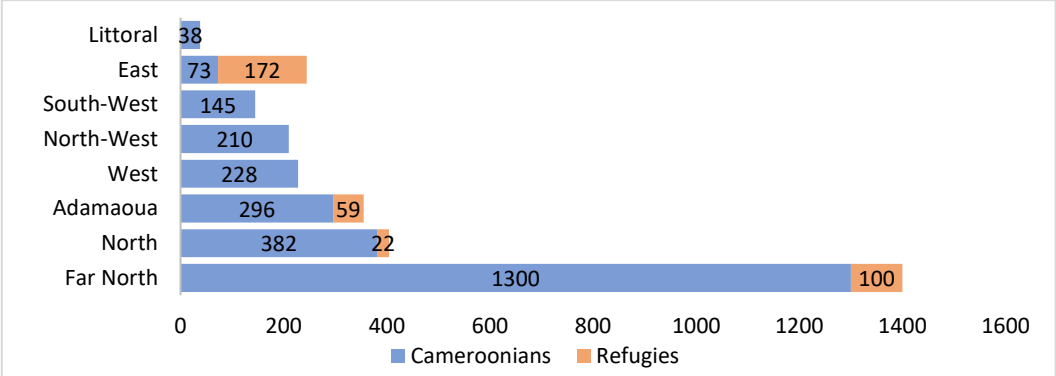
<sup>1</sup> In recent years, the main source of fighting has been between the member countries of the Lake Chad Basin Commission (Cameroon, Niger, Nigeria, Chad) and members of the Boko Haram Islamist sect. The Boko Haram Islamist sect developed in Nigeria before gradually spreading to neighbouring countries.

military and police officers, 650 civilians and nearly 1,000 suspected separatists were killed (ICG 2017). The Socio-political tensions in the North-West and South-West regions have resulted into massive loss of life, destruction of property and forceful displacement of people. In these two regions, the social and humanitarian consequences include the closure of several primary and secondary schools, the destruction of more than 170 villages, 530,000 internally displaced persons (IDPs) and 35,000 refugees in neighbouring Nigeria, most of them women and children (OCHA 2019). The conflict is also devastating for the local economy, which accounts for about one fifth of the country's gross domestic product (GICAM 2018).

The populations of the localities exposed to the conflicts are finding it difficult to carry out their activities, particularly agricultural activities, which is their main source of livelihood. Similarly, economic activities such as petty trade, trade in small livestock and poultry, which are the main resources for financing consumer spending, are also affected. Violent conflict has disastrous effects on the local economy, exacerbates people's ability to feed themselves adequately and can lead to persistent food insecurity.

In 2018, according to the World Food Program 3.9 million people are food insecure in Cameroon (WFP 2018). The majority of the people identified by the WFP are located in the three northern regions of the country: Adamawa, North, and Far North. Specifically, 11.2% are in the Far North region, of which 1% are severely food insecure, and 11.1% in the North region, which remains the most food insecure. 10% for the East region, and 7.5% for the Adamawa region (WFP 2019). 7.6% of households have unusually sold animals in the Far North to meet their food needs. The abandonment of agricultural activities by the population for mining activities in the Eastern region. Robberies and the recurrence of agropastoral conflicts discourage agropastoral activity in the East region. The massive displacement of the population in the North-West and South-West regions due to insecurity is a factor that aggravates and severely affects their already fragile food practices (WFP 2019).

**Figure 2: Situation of food security by region in Cameroun (in thousands)**



Source: OCHA (2019).

This study questions the effect of violent conflicts on food security in Cameroon. Such questions are not new in the literature (Brück *et al.* 2019; Justin *et al.* 2019). Indeed, theoretical and empirical works at the micro level all show a negative impact of violent conflicts on food security (Martin-Shields and Stojetz 2018). This negative impact can be transmitted through different channels, affecting one of the pillars of food security<sup>2</sup> and leading to food insecurity

<sup>2</sup> For the United Nations Fund for Agriculture (FAO), food security exists when all human beings have, at all times, physical and economic access to sufficient, healthy and nutritious food to meet their energy needs and their food preferences to lead a healthy and active lifestyle. Food insecurity is when food is not available, or individuals or households do not have the means to obtain it, when it is not available at all times, and when individuals or

situations. Violent conflicts generally affect the *availability* of agricultural products. Indeed, the presence of conflict can lead to scenes of looting, destruction of crops and cultivated areas (Serneels and Verpoorten 2015; Verwimp and Munoz-Mora 2018) and situations of forceful migration. As such Baliki *et al.* (2018) state that the conflict in Syria has caused more than 6 million displaced people, who are food insecure. In Rwanda, Akresh *et al.* (2011) find that the effects of civil war on child stunting in northern Rwanda are very similar and compare these effects to those of a crop failure in southern regions that was not due to conflict. The analysis shows important differences between conflict and non-conflict shocks.

*Accessibility* can be affected by violent conflict at two levels: physically and economically. Physically, insofar as the presence of violent conflicts can lead to the loss of commercial activity, the destruction of infrastructure such as bridges, markets, fields and roads, and the disappearance of all centralised supply and demand of food products (Kah 2017). Economically, the presence of conflict creates a scarcity of foodstuffs, leading to inflationary situations, which in turn reduces the purchasing power of households and can lead to food insecurity. In the region of Mopti in northern Mali, Tranchant *et al.* (2019) showed that despite the availability of food aid programs in the region during conflicts, the likelihood of households receiving aid decreases when armed groups are present in the region. Using a multivariate model, D'Souza and Jolliffe (2013) find that in Afghanistan, levels of conflict and food security are negatively correlated. But also, that households in provinces with higher levels of conflict experience moderate declines in food security due to higher staple food prices compared to households in provinces with lower levels of conflict. Authors found that the increase in wheat flour prices led to a decline in household food security, but do not consider the conflict dimensions in their analysis. *Stability* measures dependence on food imports. Several studies examining the impact of international food prices due to conflict at the national level show that many conflict-affected fragile countries are net food importers, which is reasonable given the current insecurity situation.

Violent conflict affects *utilization* mainly in terms of anthropometric scores. Indeed, a large number of studies have highlighted the short-term adverse effects of exposure to conflict on the nutritional status of children (Akresh *et al.* 2011; Akresh *et al.* 2012b). Bundervoet *et al.* (2009) show in Burundi that children aged 0-5 years born in areas affected by civil war violence have significantly lower anthropometric scores than children born in other areas. Similarly, several other studies report consistent negative effects on anthropometric scores among children in various conflict-affected contexts, including Rwanda where Akresh *et al.* (2011) show that due to conflict-induced crop failures, children have standard deviations of 0.173 in height for age. In addition, there is a significant negative impact for all children born during the civil war in the region, with a standard deviation of 0.823 below height-for-age at the 1% significance level. Likewise, Tranchant *et al.* (2019) showed that during the conflict the calorific and micronutrient intake decreased between 2012 and 2017; this is particularly marked for proteins and iron, the average consumption of which is 10% lower.

From a long-term perspective, Akresh *et al.* (2012a) provide evidence that the magnitude of negative impacts due to exposure to conflict can vary considerably 40 years after the end of the conflict. For example, they show that women who were exposed to the Nigerian civil war in Biafra between the ages of 0 and 3 years are, on average, 0.75 centimetres (cm) shorter than unexposed women of the same age. Women who were exposed between the ages of 13 and 16 are 4.53 centimetres (cm) shorter than unexposed women of the same age. Similar studies report consistent negative effects on anthropometric outcomes in children in a range of conflict-

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households cannot afford it, not able to consume them (FAO 2013). FAO thus classifies food security in four dimensions: Availability, Accessibility, Stability and Use (FAO 2013).

affected contexts, including Angola, Colombia, Ethiopia, Côte d'Ivoire, Mexico and Gaza (Arcand *et al.* 2015; Akresh *et al.* 2012b; Minoiu and Shemyakina 2014; Tranchant *et al.* 2014; Dabalen and Paul 2014; Brück *et al.* 2019).

However, there are very few studies in Central Africa in general and in Cameroon in particular that focus on the local<sup>3</sup> impact of conflict on the consumption expenditure channel to explain household food security. Moreover, the issues of armed conflict and food security remain a major concern at the national and international levels through the Sustainable Development Goals (SDGs), specifically Goal 2 on ensuring food security and eliminating hunger in all its forms, and Goal 16 on promoting peaceful societies. To our knowledge, the only studies that have focused on the aspect of food expenditure are those of Verwimp and Muñoz-Mora (2018) and D'Souza and Jolliffe (2013). This study thus adds to the existing literature by having Cameroon as a practical framework for analysis. The study is timely for the Country given the increasing security threat and food insecurity in the conflict affected areas of the country.

The objective of this paper is thus to examine the effects of violent conflict on household food security in Cameroon. Therefore, the hypothesis is that the occurrence of violent conflicts negatively affects household food security in Cameroon. Away from this introductory section, the second section presents the methodological approach that will help in obtaining the results to be presented in the third section. The fourth section will discuss the transmission channels of violent conflicts on the dimensions of food security, while the conclusions and recommendations will be the subject of the fifth section.

## **2. Methodology**

### **2.1. Study data**

The data used came from two (02) sources. The conflict data is taken from the ACLED (Armed Conflict Location and Event Data) database<sup>4</sup>. The conflict data for Cameroon is available for the period 1997 to 2021, the study period is 2008 to 2014. The fundamental unit of observation for ACLED is the event. Conflict events always involve two actors: a group of rebels, opponents, and a government, and are coded to occur at a specific location on a specific day. Most events are battles, but other types of data are recorded such as demonstrations, riots, targeted attacks on civilians, explosions, spontaneous demonstrations, mass arrests, destruction of property that can lead to the loss of life.

Data on food security come from the fourth Cameroon Household Survey (ECAM 4) of 2014 in Cameroon, which follows ECAM 1 of 1996, ECAM 2 of 2001, as well as ECAM 3 of 2007 and covered the entire population. It was initiated by the government of Cameroon to identify recurrent household poverty, inequality and livelihoods issues in order to guide development policies. The motivation for choosing ECAM 4 is that from 2007 to 2014, several conflict events such as the 2008 hunger riots, the massive influx of Central African refugees in the Eastern region and the war against Boko Haram in the far North impacted the daily lives of households in these localities and spilled over into other regions of Cameroon. However, since the ECAM 4 database is appropriate for measuring household poverty, the availability of data limits the measurement of food security to the dimension of financial accessibility through household food consumption expenditure. Taking into account missing data, restricts the final sample to 10,303 households.

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<sup>3</sup> In CEMAC (Cameroon, Congo, Gabon, Equatorial Guinea, Central African Republic, Chad) in general and Cameroon in particular.

<sup>4</sup> Openly available at [www.acled.com/datasets](http://www.acled.com/datasets).

The two databases have been merged from the enumeration areas in each of the database. The enumeration area is the main unit of reference in which the populations to be observed are located. It may be composed of a part of a neighbourhood in urban areas, or of one or more villages in rural areas.

## 2.2. Measurement of variables

### 2.2.1. Variable of interest: violent conflicts

Based on the works of Ibanez and Eduardo (2008) and Justin *et al.* (2019), we understand violent conflict by two (02) distinct variables: the presence per district of a conflict event, and the fatality per district due to battles, explosions, protests, violence against civilians and strategic development.

Violent conflict then appears as two (02) variables, namely: a binary variable, the presence by district which takes into account the presence of any conflicting event and a discrete variable, the number of fatalities by district which takes into account the intensity of violent conflict. This is presented as follows (Brück *et al.* 2013):

- Presence by district which takes the value 1 if there was the presence of a conflict event in the district of residence of the household between 2008 and 2014; 0 if not.
- Fatalities by district which refers to the number of deaths recorded in the district of residence of the household between 2008 and 2014.

### 2.2.2. Construction of the dependent variable: food security

The CARI<sup>5</sup> methodology was designed by the World Food Programme (WFP) for food insecurity assessments and aims to estimate the number of food insecure people in a target population. This method is used for national and sub-regional assessments as well as for more specific areas such as refugee settlements. The CARI approach is quantitative and provides a classification of the prevalence of food insecurity in the target population and defines the four food security statuses as follows:

- **Severe food insecure:** A household is said to be "severely food insecure" if it has a very deficient food consumption or experiences a very significant loss of livelihoods that will lead to significant deficits in food consumption or worse.
- **Moderately food insecure:** A household is 'moderately food insecure' if it has a deficient food consumption or cannot meet its minimum food needs without resorting to irreversible coping strategies.
- **Borderline food secure:** A household is said to be 'borderline food secured' if it has just adequate food consumption without resorting to irreversible coping strategies. Such a household cannot afford some essential non-food expenditures.
- **Food secure:** A household is 'food secured' if it is able to meet its essential food and non-food needs without resorting to atypical coping strategies.

The three indicators that make up the CARI reporting table are the FCS (Food Consumption Score), the share of food expenditure in total expenditure collected, and the livelihoods-based coping strategies indicator. Given that our database (ECAM4) is not a food security-specific database, that is does not take into account all aspects of food security, namely Food Consumption Scores (FCS) and livelihoods-based coping strategies, it only takes into account food expenditure in total expenditure.

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<sup>5</sup> Consolidated Approach for Reporting Indicators of Food Security.

This indicator is simply constructed by dividing total food expenditure by total household expenditure. However, the denominator and numerator must include the estimated value of food consumed but also not purchased. Thus, on the one hand, all (monetary) expenditures made by the household on food consumption goods over a period of 30 days are collected, and on the other hand, the (estimated) amounts of food consumed by the household but not purchased (consumption received in the form of gifts, aid, transfer, etc.) are also collected; moreover, all current (30-day horizon) and durable (over 6 months) household expenditures on non-food consumption goods are also collected. This indicator is based on the premise that the greater the share of the budget spent on food in a household's budget (relative to other goods and services consumed), the more economically vulnerable the household is (WFP 2016).

Following the World Food Program (WFP 2016) methodology to convert the Share of Food Expenditure for CARI, households with a share greater than 75% are converted to '*Severe Food Insecure*' and have a score of 1. Households with a share between 65% and 75% are converted to '*Moderate Food Insecure*' and have a score of 2. Households with a share between 50% and 65% are converted to '*Borderline Food Secure*' and have a score of 3. Households with a share of less than 50% are converted to '*Food Secure*' and have a score of 4.

### 2.3. Econometric specification

In order to empirically evaluate the local effect of violent conflict on household food security, the use of the ordered logit is particularly interesting since the values taken by the dependent variable correspond to intervals. Indeed, equation (2) shows that food security can take four forms. The empirical model is specified by equation (1) below:

$$y_{ij} = \beta_0 + \beta_1 \cdot Conflict_j + \theta \cdot X_{ij} + \varepsilon_{ij} \quad (1)$$

$$y_{ij} = \begin{cases} 1 = & \text{if household } i \text{ is severe food insecure} \\ 2 = & \text{if household } i \text{ is moderate food insecure} \\ 3 = & \text{if household } i \text{ is boderline food secure} \\ 4 = & \text{if household } i \text{ is food secure} \end{cases} \quad (2)$$

Where  $y_{ij}$  is the dependant variable that represents the food security status of individual  $i$  in district  $j$ ,  $X_{ij}$  is a set of socio-demographic characteristics related to household  $i$  in district  $j$  and other control variables as defined in table I.  $Conflict_j$  indicates the violent conflict variable in district  $j$ , either presence or fatalities (the number of deaths in the district).  $\beta_0$ ,  $\beta_1$  and  $\theta$  represent the coefficients.  $\varepsilon_{ij}$  stands for the error term.

**Table I: Definition of variables**

Variables	Definition
Presence of conflict	1 = if at least one violent conflict attack occurred in the locality; 0 = if not
Fatalities conflict	Number of deaths in the locality due to violent conflicts
Food Security	1 = Severe; 2 = Moderately; 3 = Borderline; 4 = Food secure
Employment	1 = Household head is employer; 0 = if not
Age	Age (number of years) of the household head
Sex	1 = Household head is male; 0 = if female
Milieu of residence	1 = Household live in urban area; 0 = if rural area
Religion	1 = Household head is Christian; 2 = Muslim; 3 = Other religion
Education	1 = Household head has never been to school; 2 = Primary; 3 = Secondary; 4 = Higher
Standard of Living	1 = Household is very poor; 2 = poor; 3 = Average; 4 = Wealthy; 5 = Very wealthy
Water	1 = There is a stream near the household's accommodation; 0 = If not
Farms	1 = there is a field/uncleared land near the household's dwelling; 0 = If not
Agricultural land	Total area of agricultural land exploited by the household in hectares
Land owned	Total area of land owned by the household in hectares

## 3. Results

### 3.1 Descriptive statistics

Descriptive statistics are provided in table A1. It shows that between 2008 and 2014 there was an average of 10.7 fatalities throughout Cameroon due to conflict events such as battles, riots, protests, explosions and violence against civilians. In terms of food security over the same period, the table shows that 1% of the population is severely food insecure and 2.3% is moderately food insecure, while 36.5% have a primary level of education. 42.18% of poor households are the most exposed to violent conflicts, which indicates that the main victims of violent conflicts are poor and less educated households. In terms of gender, 71.07% of household heads are men against 28.9% of women. 46.66% of Muslim households belong to the sample size. They were the most religion group exposed to violent conflict. This can be explained by the fact that the main victims of the violent conflicts against Boko Haram in the northern regions are Muslim households because of their proximity to the Nigerian border regions.

### 3.2. Preliminary tests

#### 3.2.1 Test for comparison of mean

**Table II: Test for comparison of means**

Variables	Conflict (Exposed)	Non conflict (Non-exposed)	Difference of mean	Observations
Severe food insecurity	0.028	0.010	- 0.018***	10,303
Moderately food insecurity	0.076	0.047	- 0.028***	10,303
Borderline food security	0.254	0.227	- 0.027***	10,303
Food security	0.640	0.715	0.074	10,303
Employment	0.880	0.861	- 0.018	10,303
Age	42.30	43.749	1.445	10,303
Female	0.259	0.296	0.036	10,303
Male	0.740	0.703	- 0.036***	10,303
Place of residence	0.586	0.517	- 0.069***	10,303
Christian	0.367	0.475	0.107	10,303
Muslim	0.552	0.447	- 0.105***	10,303
Other Religion	0.080	0.077	- 0.002***	10,303
No education	0.252	0.193	- 0.059***	10,303
Primary	0.326	0.324	- 0.002***	10,303
Secondary	0.336	0.372	0.035	10,303
Higher education	0.083	0.110	0.026	10,303
Very poor	0.162	0.141	- 0.021***	10,303
Poor	0.402	0.407	0.004	10,303
Average	0.404	0.425	0.021	10,303
Wealthy	0.024	0.020	- 0.001***	10,303
Very Wealthy	0.008	0.005	- 0.003***	10,303
Water	1.625	1.641	- 0.015***	10,303
Farms	1.404	1.504	- 0.100***	10,303
Agricultural land	367.6	321.5	46.103	10,303
Land owned	211.5	228.5	16.949	10,303

**Source:** Authors from the ECAM 4 and ACLED.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Results in Table II shows that the Conflict and Non-conflict column represents the mean values of the household variables according to the regions that were affected by the presence of conflict and those that were not over the period 2008-2014. The food security variables are globally



significant at the 1% level and have a negative sign. The explanation that emerges is that the presence of violent conflict negatively affects household food security. This supports the idea that conflict is an obstacle to adequate food. Specifically, conflict does not affect all populations in a homogeneous way. The detailed observation in Table II shows that those who are permanently affected are the Muslims who have no real education and whose economic situation is poor for some and rich for others. This has been the case for the populations in the border areas with Nigeria who have suffered from the conflicts with Boko Haram.

### 3.2.2 Independence test

Table III shows that the proportion of households living in districts in conflict is more exposed to food security issue. The main explanation is that the intensity of the conflict through the number of deaths further weakens the food security of households in affected areas. This significantly increases the rate of household food insecurity.

**Table III: test of independence between food security status and presence of violent conflict**

Food security status	Presence of violent conflict		Total
	Yes	No	
Severe food insecurity	86	55	141
Moderately food insecurity	397	146	543
Borderline food security	1 904	488	2 392
Food security	5 998	1229	7 227
<b>Total</b>	<b>8 385</b>	<b>1 918</b>	<b>10 303</b>
<b>Pearson chi2 (3) = 80,6214***</b>		<b>Pr = 0.000</b>	

Source: Authors from ECAM 4 and ACLED.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

### 3.3 Impact of violent conflict on food security

Analysing the impact of violent conflicts amounts to highlighting the presence, number of fatalities per district on food security and the marginal effects. The first column of Table IV shows that the sign of the coefficient associated with the presence of violent conflict by district is negative and significant at a 1% level. Indeed, the increase in the presence of violent conflict in localities translates into a decrease in purchasing power and can lead to situations of food insecurity. In Cameroon, areas where there has been violent conflict are areas where household food security is most affected. Households are forced to develop strategies or change their consumption patterns to survive. This can be observed in the far north, the north or households living in the border areas with Nigeria that have been affected by the Boko Haram conflict are the most food insecure. Authors such as Brück *et al.* (2019) have found this result for Gaza conflict.

The second column of Table IV shows that the sign of the coefficient associated with the number of deaths (fatalities) is negative and its probability value is significant at the 1% level. This implies that the intensity of deaths negatively affects household food security. These results confirm those of Justin *et al.* (2019) who suggest that a household's exposure to an additional 100 Boko Haram-related deaths per year would lead to an additional 0.4 days of food insecurity per week in Nigeria.

**Table IV: Effects of violent conflict on household food security**

Variables	Food security		Food security	
<b>Variables du conflit violent</b>				
Presence	- 0.314***	(0.055)		
Fatalities			- 0.001***	(0.000)
<b>Sex</b>	0.005	(0.049)	0.012	(0.049)
<b>Age</b>	0.004***	(0.001)	0.005***	(0.001)
<b>Water</b>	- 0.090*	(0.047)	- 0.090*	(0.047)
<b>Farm</b>	- 0.089*	(0.047)	- 0.096**	(0.047)
<b>Agricultural land</b>	- 0.000***	(0.000)	0.000***	(0.000)
<b>Land owned</b>	0.000***	(0.000)	0.000***	(0.000)
<b>Religion of household head</b>				
Muslim	- 0.180***	(0.047)	- 0.192***	(0.047)
other religions	- 0.102	(0.086)	- 0.110	(0.085)
<b>Place of residence</b>	0.471***	(0.046)	0.445***	(0.046)
<b>Employment</b>	- 0.323***	(0.071)	- 0.336***	(0.071)
<b>Education (ref: No education)</b>				
Primary	0.620***	(0.058)	0.629***	(0.058)
Secondary	1.132***	(0.063)	1.147***	(0.063)
Higher	2.444***	(0.130)	2.456***	(0.130)
<b>Standard of living (ref: very poor)</b>				
Poor	0.027	(0.065)	0.034	(0.065)
Average	0.086	(0.067)	0.096	(0.067)
Wealthy	0.063	(0.165)	0.080	(0.166)
Very Wealthy	- 0.942	(0.281)	- 0.087	(0.280)
<b>/cut1</b>	- 3.892***	(0.215)	- 3.831***	(0.214)
<b>/cut2</b>	- 2.229***	(0.201)	- 2.169***	(0.201)
<b>/cut3</b>	- 0.329*	(0.199)	- 0.272	(0.198)
<b>Observations</b>	10,303		10,303	
<b>R<sup>2</sup></b>	0.0630		0.0612	

**Source:** Authors from the ECAM 4 and ACLED. Standard deviation in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

The analysis of the marginal effects (table A2) shows that the variables associated with presence of conflict are globally significant at the 1% threshold on the variation of the estimated probability. While estimating the effects of presence of conflicts, we note that the probability of being food secure is 0.4% higher for a household headed by a woman. Then regardless of the level of education, namely primary, secondary and higher, food security decreases respectively by 2.3%, 4.1% and 4.9%. Finally, the richer we are, the more the probability of being food secure which in the findings increases by 1 percentage point. Regarding the effects of fatalities, being female increases the probability of being food insecure by 0.7%. Whatever the level of education, food security is negatively affected by 6.1% for primary level, 1.1% for secondary level and 1.2% for higher level. When households are poor, medium and rich, they are more likely to be food insecure by 0.3%, 0.9% and 0.3% respectively. On the other hand, when they are very rich, the probability of being food secure increases by 1.1%.

#### **4. Discussion on the transmission channels of violent conflicts on food security**

The ECAM 4 database is not a specific food security database, which does not allow a detailed analysis of transmission channels. However, the results show that the main channel through which violent conflicts affect food security is mainly the physical accessibility dimension. Indeed, the presence of violent conflicts in Cameroon over the period 2008 to 2014 led to the destruction of several physical infrastructures, namely farms, individual fields, water points, roads, markets, schools, which prevents a centralization of supplies and demands, above all for

foodstuffs, thus food insecurity is rapidly spreading. The results in Table IV show that violent conflict has a negative effect on the physical accessibility variables (farm, land, water) and are all significant at the 1% level.

Likewise, the intensity of violent conflicts measured here by the number of deaths encourages the exodus of households to safer areas and increases the vulnerability of households to eat better and consume healthy food. Our hypotheses are supported respectively by the work of Verwimp and Munoz-Mora (2013) for Burundi. Also, Justin *et al.* (2019) have shown that the main channel through which the presence of the conflict against Boko Haram in northern Nigeria affects food security is that of accessibility, particularly through total production, the destruction of infrastructure such as markets, cultivation, and has a negative impact on the accessibility of staple crops such as maize, wheat, sorghum, soybeans, yams, cassava, rice. Therefore, the results of this study strengthen theoretical and empirical knowledge on the effects of violent conflict in fragile countries of sub-Saharan Africa, especially first evidences in Cameroon.

## 5. Conclusion

The 2030 Agenda for Sustainable Development explicitly identifies conflict as one of the main obstacles to food security and aims to significantly reduce all forms of violence, including terrorism and armed conflict (FAO *et al.* 2017). This goal is based on the recognition that conflict undermines food security. This paper presents the link between violent conflict and food insecurity by examining the impact of violent conflict on household food security in Cameroon. To determine the severity of the effects of conflict on food security, we construct four food security variables that range from severely insecure to secure. We also find that an increase in conflict intensity has led to a reduction in affordability.

Our estimates do not capture the impacts on households living in camps for internally displaced persons (IDPs) and outside their country. Given that there is a high degree of malnutrition in IDP camps, an accurate estimate of the total damage caused by conflict would require better data collection efforts in IDP camps and host communities. Violent conflict is often synonymous with food shortages, which then trigger other forms of violence within affected communities or countries. Conflicts generate forced displacement, destruction of the environment, the diversion of agricultural labour force for the benefit of armed groups and the destabilization of the food value chain.

As an economic policy implication, the Cameroonian government, with the support of international humanitarian institutions, should further step up the care of people who are victims of violent conflicts. An effort to maintain peace in conflict zones should be encouraged through endogenous solutions that encourage education, awareness and involvement of local populations. Put in place mechanisms to encourage households living in agricultural localities to increase the cultivated areas in order to guarantee the availability of foodstuffs over time.

## References

- Akresh, R., L. Lucchetti and H. Thirumurthy (2012a) “Wars and Child Health: Evidence from the Eritrean-Ethiopian Conflict” *Journal of Development Economics* **99**, 330–340.
- Akresh, R., S. Bhalotra, M. Leone and U. Osili (2012b) “War and Stature: Growing up During the Nigerian Civil War” *American Economic Review* **102**, 273–277.
- Akresh, R., P. Verwimp and T. Bundervoet (2011) “Civil War, Crop Failure, and Child Stunting in Rwanda” *Economic Development and Cultural Change* **59**, 777–810.

- Arcand, J. L., A. S. Rodella and M. Rieger (2015) “The Impact of Land Mines on Child Health: Evidence from Angola” *Economic Development and Cultural Change* **63**, 249–279.
- Baliki G., T. Brück and W. Stojetz (2018) *Drivers of Resilience and Food Security in North-East Nigeria: Learning from micro data in an Emergency Setting*, ISDC: Berlin.
- Brück, T., M. d’Errico and R. Pietrelli (2019) “The Effects of Violent Conflict on Household Resilience and Food Security: Evidence from the 2014 Gaza Conflict” *World Development* **119**, 203-223.
- Brück, T., P. Justino, P. Verwimp and A. Tedesco (2013) “Measuring Conflict Exposure in micro level Surveys” LSMS-ISA Working paper, World Bank.
- Brück, T. and K. Schindler (2009) “The Impact of Violent Conflicts on Households: What do we Know and what Should we know About War Widows?” *Oxford Development Studies* **37**, 289–309.
- Dabalen, A. L. and S. Paul (2014) “Effect of Conflict on Dietary Diversity: Evidence from Côte d’Ivoire” *World Development* **58**, 143–158.
- D’Souza, A. and D. Jolliffe (2013) “Conflict, Food Price Shocks, and Food Insecurity: The Experience of Afghan Households” *Food Policy* **42**, 32–47.
- FAO, IFAD, UNICEF, WFP and WHO (2017) *The State of Food Security and Nutrition in the World 2017. Building resilience for peace and food security*, FAO: Rome.
- GICAM (2018) *Insecurity in the North-West and South-West Regions: Economic Consequences and Impacts on Business Activity*, Groupement Interprotonal du Cameroun: Douala.
- ICG (2017) *Cameroon’s anglophone crisis: How to get to talks? Africa Report*, International Crisis Group.
- Issa S. (2014) “Les Effets Socioéconomiques de Boko Haram à l’Extrême-Nord du Cameroun” *Revue Kaliao, Numéro Spécial*.
- Issa S. (2010) “Les Coupeurs de Route. Histoire du Banditisme Rural et Transfrontalier dans le Bassin du Lac Tchad”, Karthala : Paris.
- Justin, G., O. Adesoji and D. Dave (2019) “Armed Conflicts and Food Insecurity: Evidence from Boko Haram’s Attacks” *American Journal of Agricultural Economics* **102**, 114-131.
- Kah K. H. (2017) “Boko Haram is Losing, but so is Food Production: Conflict and Food Insecurity in Nigeria and Cameroon” *Africa Development*, **XLII**, 177-196.
- Martin-Shields, C. and W. Stojetz (2018) “Food Security and Conflict: Empirical Challenges and Future Opportunities for Research and Policy Making on Food Security and Conflict” *World Development* **119**, 150-164.
- OCHA (2016), “[www.ocha-cameroon.org](http://www.ocha-cameroon.org)”
- OCHA (2019), “[www.ocha-cameroon.org](http://www.ocha-cameroon.org)”
- WFP (2018) *Food Security, International Conflicts and Migration*, Report World Food Program.
- WFP (2016) *Food Security and Nutrition Strategic Review: “Zero Hunger” by 2030*, Report World Food Program.
- WFP (2019) *Mid-Term Evaluation of the Country Program of the World Food Program for Cameroon*, Report World Food Program.
- Serneels, P. and M. Verpoorten (2015) “The Impact of Armed Conflict on Economic Performance: Evidence from Rwanda” *Journal of Conflict Resolution* **59**, 555–592.
- Verwimp, P. and J. C. Munoz-Mora (2013) “Returning Home after Civil War: Food Security and Nutrition Among Burundian Households” *The Journal of Development Studies* **54**, 1019-1040.
- Tranchant, J. P., P. Justino and C. Müller (2014) “Political Violence, Drought and Child Malnutrition: Empirical Evidence from Andhra Pradesh” HiCN Working Paper 173, Households in Conflict Network.

Tranchant, J. P., A. Gelli, L. Bliznashka, S. Amadou, S. Moussa, A. Amidou, H. Emily, E. H. Siegel, E. Aurino and E. Masset (2019) “The Impact of Food Assistance on Food Insecure Populations During Conflict: Evidence from a quasi-experiment in Mali” *World Development* **119**, 185–202.

## Appendix

**Table A1: descriptive Statistics of the data used for Cameroon**

<b>Variables</b>	<b>Observations</b>	<b>Mean</b>	<b>S.D.</b>	<b>Min</b>	<b>Max</b>
<b>Variables of Conflict</b>					
Presence	10303	0.186	0.389	0	1
Fatalities	10303	10.702	49.908	0	472
<b>Food security status</b>					
Severe food insecurity	10303	0.013	0.116	0	1
Moderately food insecurity	10303	0.052	0.223	0	1
Borderline food security	10303	0.232	0.422	0	1
Food security	10303	0.701	0.457	0	1
<b>Water</b>	10303	1.628	0.483	0	1
<b>Farms</b>	10303	1.422	0.494	1	2
<b>Agricultural land</b>	10303	359.0	1315.2	0	11239
<b>Land owned</b>	10303	225.3	932.58	0	9000
<b>Employment</b>	10303	0.865	0.341	0	1
<b>Age</b>	10303	43.48	15.79	12	95
<b>Sex</b>					
Female	10303	0.289	0.453	0	1
Male	10303	0.710	0.453	0	1
<b>Place of residence</b>	10303	0.053	0.499	0	1
<b>Religion</b>					
Christian	10303	0.455	0.498	0	1
Muslim	10303	0.466	0.498	0	1
Other Religion	10303	0.078	0.268	0	1
<b>Education</b>					
No education	10303	0.204	0.403	0	1
Primary	10303	0.324	0.468	0	1
Secondary	10303	0.365	0.493	0	1
Higher	10303	0.105	0.306	0	1
<b>Standard of Living</b>					
Very poor	10303	0.145	0.306	0	1
Poor	10303	0.406	0.491	0	1
Average	10303	0.421	0.493	0	1
Wealthy	10303	0.021	0.143	0	1
Very Wealthy	10303	0.005	0.075	0	1

**Source:** Authors from ECAM 4 and ACLED.

**Table A2: Marginal effects of the estimation**

Variables	Food security (dy/dx)		Food security (dy/dx)	
<b>Variables of violent conflicts</b>				
Presence by sub-division	- 0.314***	(0.055)		
Fatalities by sub-division			- 0.001***	(0.000)
<b>Water</b>	- 0.090***	(0.047)	- 0.090***	(0.005)
<b>Farms</b>	- 0.088***	(0.047)	- 0.096***	(0.047)
<b>Agricultural land</b>	- 0.000***	(0.000)	- 0.000***	(0.000)
<b>Land owned</b>	- 0.000***	(0.000)	0.000***	(0.000)
<b>Employment</b>	0.011***	(0.002)	0.003***	(0.006)
<b>Sex</b>	- 0.006***	(0.049)	0.122***	(0.049)
<b>Age</b>	- 0.004***	(0.001)	- 0.005***	(0.001)
<b>Religion (ref: christian)</b>				
Muslim	0.180***	(0.047)	- 0.192***	(0.047)
Other religion	- 0.102***	(0.086)	- 0.110***	(0.085)
<b>Place of residence</b>	0.472***	(0.047)	0.455	(0.047)
<b>Education (ref: No education)</b>				
Primary	0.620	(0.058)	0.629***	(0.058)
Secondary	1.132	(0.063)	1.147***	(0.063)
Higher	2.444	(0.013)	2.466	(0.103)
<b>Standard of living (ref: very poor)</b>				
poor	0.027**	(0.065)	0.034***	(0.065)
average	0.086***	(0.067)	0.096***	(0.067)
wealthy	0.062*	(0.166)	0.079***	(0.016)
Very wealthy	- 0.093***	(0.281)	- 0.087***	(0.280)
<b>Observations</b>	10,303		10,303	
<b>R<sup>2</sup></b>	0.0630		0.0612	

**Source:** Authors from the ECAM 4 and ACLED. Standard deviation in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1