Food Insecurity in Conflict Affected Regions in Nigeria

Results from the North East, North Central, and South South zones

2018

The World Bank

National Bureau of Statistics, Nigeria

Food Insecurity in Conflict Affected Regions in Nigeria:

Results from the North East, North Central, and South South zones

ABUL AZAD & HEIDI KAILA

POVERTY AND EQUITY GLOBAL PRACTICE, THE WORLD BANK

Acknowledgements

This is a collaborative effort of the National Bureau of Statistics (NBS), Poverty and FCV teams of the World Bank. We greatly appreciate the cooperation and support of both NBS and FCV teams.

At the World Bank, we especially would like to acknowledge the technical contributions and support of Vasco Molini, Alvin Ndip, Sarosh Sattar, Kevin McGee, Michael Wild, Nadia Fernanda Piffaretti and Utz Johann Pape.

We also appreciate the support and input of Yemi Kale, Nemi Okujagu, Esiri Ojo, Florence Oke, and Victoria Irenonse of the National Bureau of Statistics. We are thankful for their great assistance throughout this project.

Finally, we appreciate the contributions of Delight Gutip, Gabriel Woji, Abba Success, Aese Agaigbe and Maryjoy Barrah throughout the process of data collection.

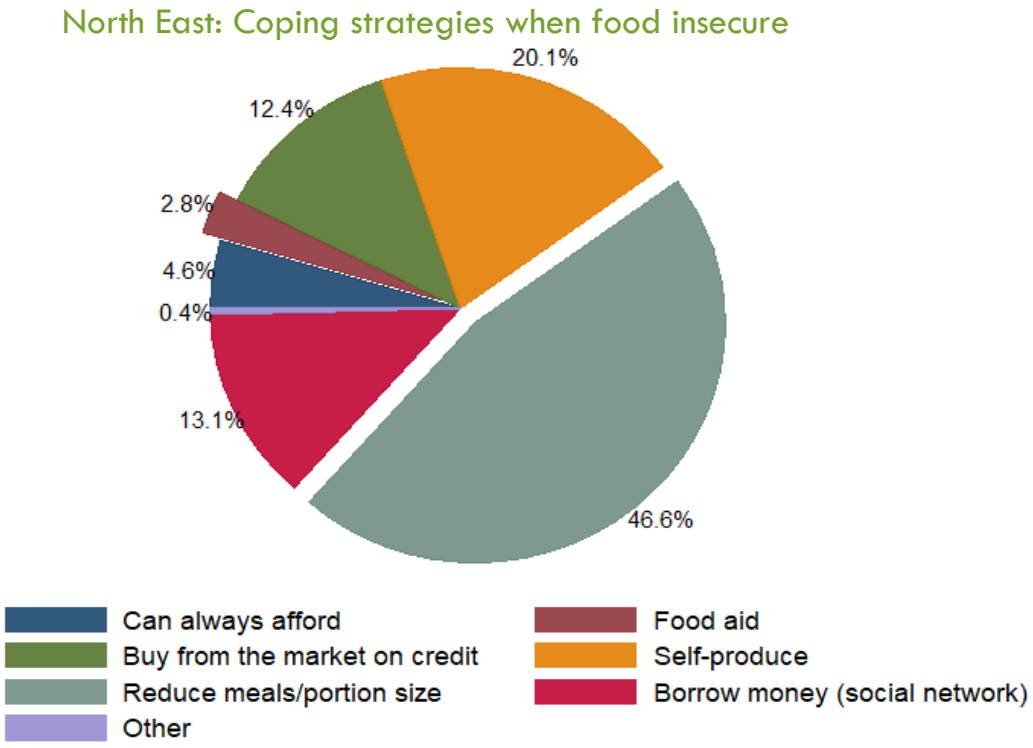
Executive Summary

In this report, we present data from the emergency response survey conducted via telephone among **households in three conflict affected regions of Nigeria, North East, North Central and South South** between August-September 2017. This round is the second round of telephone data collected from a subsample of households in the Nigeria General Household Survey (GHS). The first round collected data on conflict exposure.

The purpose of this second round of data collection was to understand food insecurity in conflict affected regions. **Armed conflict can have a detrimental effect on food security.** This might be due to for example reduced agricultural production, or price increases due to malfunctioning markets. Food insecurity might be permanent, such that a household living below the poverty line has a constant struggle to acquire food from the market or produce food for their own use. In situations such as armed conflict, also better endowed households might be temporarily food insecure.

In this report, we find that food insecurity is a major concern in all the three regions studied:

- **The mean household in all the three regions is "highly food insecure"**
- **North East of Nigeria is the most food insecure of the three regions**
- **Reducing meals or portion size is the most important coping strategy** in all three regions. This might have severe detrimental effects to the nutritional status of households.
- **Food prices are the most important source of food insecurity in all three regions**
- **A large majority of households rely on the market as the main source of food** in all regions. Price concerns should therefore be taken very seriously by policy makers.
- Households in all three regions do not report there being an inadequate supply of food in the market.



We find that both food secure and food insecure households have been affected by conflict events in all zones. In the North East and South South, food insecure households have been slightly more affected by conflict since 2010. In the North Central, the relationship is reverse, food secure households reported more conflict events. None of the differences observed are statistically significant however. Therefore, we can conclude that in conflict affected areas exposure to conflict has been widely felt by the households in our survey. More research is needed to understand the relationship between conflict and food insecurity in Nigeria.

Household characteristics related to food insecurity are partly similar and partly different across regions. In all the regions, poverty is positively but weakly related to food insecurity, which implies that our food insecurity measure could be capturing both chronic and transitory food insecurity. Larger households generally have a higher risk of food insecurity. In the North East and North Central, the education level of the household head has a negative statistically significant relationship with food insecurity. In the South South wage income is more strongly related to food security than in the other regions. Remittances are significant only in the North East, other factors held constant. Living in a rural area is strongly related to food insecurity only in the South South. These findings underlie the importance of understanding that **in different contexts different type of household might be in the highest risk of becoming food insecure**, even when the nature of food insecurity is similar.

Contents

Country Context and Background

Nigeria is divided into six geopolitical zones, each of which encompasses a unique composition of languages, ethnicities, economies, and other characteristics. This report focuses on conflict North East, North Central, and South South Nigeria. Each of these three geopolitical zones has a unique history and context of conflict.

The North East remains fragile due the ongoing Boko Haram insurgency

In the North East, the conflict has been the insurgency of the Boko Haram. The violence peaked in 2014 (*See details from round 1 report*), which was also the year Boko Haram occupied a territory as large as Belgium. The clashes between the insurgents and the police and military forces of Nigeria have resulted in large disruptions to the economy. The effects have been widely felt at the household level, as households have lost family members due to the violence, and the conflict has resulted in high levels of internal displacement.

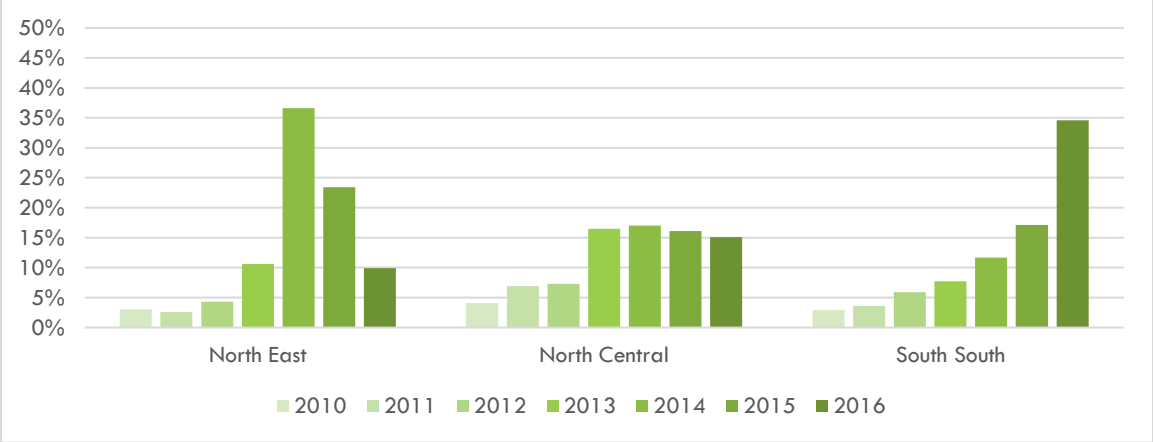
Herdsmen and farmers clash in the North Central zone

In the North Central region, the root of the conflict is in the longstanding disputes between herdsmen and farmers. Due to the reduction in available pastureland, herders and farmers have been fighting over land and water sources, and these clashes have resulted in increased violence. Newspaper reports also highlight the destruction of houses, killing cattle and destroying farmland (Mercy Corps, 2015). Given that the conflict is related to access to arable land, we are concerned of the food insecurity situation in the North Central region.

Several militia groups attack oil production in the South South

Various militia groups operate in the oil producing Niger delta region attacking the oil pipelines and oil infrastructure. These groups are also responsible of numerous kidnappings of oil industry workers. These militia have operated in the area and clashed with the Nigerian security forces since the start of the conflict in the 1990's, leaving the region fragile and causing disruptions to the national economy due to the reduction in oil revenue. We expect that such a prolonged conflict has also had a detrimental effect on the local economy and livelihoods at the household level, and therefore investigate the food insecurity situation in this region as well. The conflict has also resulted in environmental concerns due to repeated oil leaks.

Figure 1: Conflict events over time by zone, Nigeria 2010-2016



Source: Conflict and violence in Nigeria report, data from telephone survey round 1.

Figure 1 illustrates the development in conflict levels in the three regions over 2010-16. The vertical axis shows the share of all events per region that took place in the specific year. In all three zones, conflict events increased between 2010 and 2016. In the North East, the number of conflict events increased until 2014, but was reported at lower levels in 2015 and 2016. In contrast, the number of conflict events more than doubled between 2012 and 2013 in the North Central zone. Since 2013, the number of events has remained stable. Meanwhile, South South has shown consistently increasing levels of conflict, with a particularly sharp and alarming increase between 2015-16.

Data

Sampling and survey instruments

The food security survey was a telephone based survey conducted between August 15th and September 8th 2017. The interview was the second round of a telephone survey using a sub-set of the sample of GHS (General Household Survey) households. The first round of the telephone interview was administered during spring 2017 with 717 completed interviews with the following geographical distribution: 175 interviews in the North East, 276 in North Central and 266 in South South. The first round was focused on conflict exposure, while the second round discussed in this report focused on food insecurity in conflict affected regions.

In the three conflict affected geographical zones comprising of 16 states of Nigeria, households from LGA's that had high conflict exposure were oversampled chosen for a pilot sample, conducted before the telephone surveys. These LGA's were chosen based on the following criteria: The oversampled LGA's needed to have over 10 conflict events during 2012-14 recorded in the Armed Conflict Location & Event Data Project (ACLED) database[1]. However, given that during the third round of the GHS some of the LGAs in the North East were unsafe to visit due to the conflict, our sample might still be biased towards less conflict affected areas, as the households included in round 3 of the GHS were used in drawing the sample.

The first round of the telephone survey (which took place after the pilot) first attempted to reach 742 households from the GHS panel, of which 529 could be reached and interviewed. The rest did not have phone numbers or functioning phone numbers (only 2.7 percent refused to answer). In order to increase the sample size to a level that was considered adequate for the survey, an additional 288 replacement households were included in the sample also from the GHS panel. Out of these replacement households 188 could be interviewed. Therefore altogether 1030 households were attempted to be reached, with a final sample size of 717 completed interviews.

Conflict affected areas were oversampled in order to have a large enough sample of households that in fact experienced conflict events in order to shed light on the type of events that have happened. A random sample of the zones might have given too small sample of conflict affected households and therefore restricted the analysis of the various types of conflict events. Due to the oversampling however, the sample drawn was not representative at the level of the geographical zone, as is the case in the GHS. Therefore in the analysis we use sampling weights that adjust for the propensity of being in a conflict affected LGA in order to ensure that the sample is representative at the level of the geographical zone. As mentioned earlier, due to the challenges of collecting data in the North East during GHS round 3, our

[1] For details, see https://www.acleddata.com/

data might still suffer from some bias such that the conflict exposure in our data is a lower bound of the true conflict exposure in the North East.

During the second round of the survey 582 of the 717 households were re-interviewed on food security related issues (only the 717 were attempted to be reached). Of the 582 households 147 in the North East, 219 in North Central, and 216 in South South were interviewed. The attrition rates in our sample from round one to round two are hence 16 percent, 21 percent, and 19 percent for North East, North Central and South South, respectively. The attrition from the conflict survey round was mostly due to not being able to reach the respondents possibly due to non-functioning phone numbers. Only 3 percent of respondents refused to answer.

Similar telephone-based surveys are being conducted in six countries in Sub-Saharan Africa under the World Bank project "Listening to Africa". As a comparison, a mobile phone survey in Tanzania (see Croke et al. 2012 for details), had a high drop-out rate between the very first rounds from 550 to 458 respondents, but very low attrition for the subsequent rounds for the 458 respondents, who could reliably be reached by a mobile phone. In light of this reference point and also considering the fact that the households interviewed live in conflict affected regions, our attrition rates seem to be within reasonable limits.

The questionnaire is divided into 9 sections including a household roster. Information on food insecurity (the coping strategy index, CSI), food and market access, water quality, employment, income, employment and assets was collected.

Data Collection

NBS in collaboration with the World Bank carried out the survey using mobile phones and captured data in tablet, which was later uploaded to the server after verification. Both teams worked together to design and program the instrument in Survey Solutions.

Two supervisors and five enumerators carried out the data collection. The supervisors were previously trained on how to carry out electronic data collection via telephone, and also on how to provide training to enumerators by the Poverty and Equity and the LSMS teams. In addition to the training that took place before the baseline data collection, the supervisors were oriented to the second-round survey on food security. Thereafter, the supervisors trained the enumerators for the round 2 questionnaire. Before the data collection started, the questionnaires were piloted in-house and the enumerators also called someone in their home area.

During the data collection, the supervisors were constantly present to monitor the data collection process. The supervisors also verified responses after the interviews before downloading the data to the server.

During the interview, the participants were told that they could drop out at any time or choose not to answer a given question. All the participants were given 300 Naira, that is roughly 0.85 USD, of call time to take part in the survey. The call credit was transferred the very next day. We expect this to have contributed to the very low rate of non-response.

During the course of the data collection process, three consistency checks were run to check that the length of the interviews were in accordance with the target time frame and to flag questionable entries during the data collection process.

The Coping Strategy Index (CSI) -An Emergency Measure of Food Insecurity

According to FAO (2003), **"*food security* exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life. Household food security is the application of this concept to the family level, with individuals within households as the focus of concern. ***Food insecurity*** exists when people do not have adequate physical, social or economic access to food as defined above."

It is important to highlight the distinction between chronic food insecurity and transitory food insecurity, introduced in the World Bank report "Poverty and Hunger" in 1986. The former is associated with problems of continuing or structural poverty and low incomes, whereas the latter refers to periods of intensified pressure caused by shocks such as natural disasters, economic collapse or conflict.

The coping strategies index has been developed as a simple tool to assess food insecurity particularly in emergency conditions, as an early warning or food insecurity monitoring tool. Rather than being based on food consumption, which is a complicated measure both in terms of data collection as well as analysis, the CSI measure is simple and quick to both collect and analyze. This is an important distinction to bear in mind. The CSI index measures behavior. The Basic Logic of the CSI index is to provide an answer to the questions "*What do you do when you don't have enough food, and don't have enough money to buy food?*" Coping refers to strategies used, when a household does not have enough to eat. The CSI index measures how often during the last 7 days the households had to resort to any of the strategies listed in the questionnaire, based on the idea that the more people have to cope, the more food insecure they are. The underlying idea is also that households organize resources at their disposal when food is scarce, and do not wait for food to run out. Therefore, the CSI measure is regarded as being able to capture this scarcity.

The CSI index is a suitable tool to track and monitor trends in food insecurity within the same population over time, and therefore can be used to for example, assess the effectiveness of food aid. It is important to point out that the CSI index could measure both chronic and transitory food insecurity.

The CSI measure has been used in several context in at least Africa and the Middle East. In our questionnaire we use the second revised version of the CSI index (2008). For details, see *Maxwell & Caldwell: Coping Strategies Index: A Field Manual, 2008*.

In addition to the CSI index, we also use a simple measure of food insecurity This simple measure is a dummy variable capturing whether or not "there were times during the last 7 days, when the household did not have enough food or money to buy food". This measure is used in section "Relationship between food insecurity and conflict".

Limitations

There are a few limitations to the data that need to be kept in mind when interpreting the results.

Telephone based survey

First, a limitation set by the nature of the survey is the fact that telephone surveys need to be kept fairly short in order to keep the respondents engaged throughout the survey. The survey was designed to take on average 20 minutes. This time limitation naturally limits the scope of the number of questions that can be asked in one survey round.

In a telephone based survey, only households that can be reached by a phone number can be interviewed. Even though phone access rates from the GHS 2015-16 were as high as 84 percent in North East, 90 percent in North Central and 83 percent in South South, the households without a

phone access might be different from households with an access to a telephone, and therefore induce bias in our estimates. Assuming that households with a telephone are better-off than households without a telephone, we expect there to be a downward rather than an upward bias in our measure of food insecurity. That is, we expect that some of the highly food insecure households could be under-represented in our data and therefore the food insecurity situation could be worse than the data lets us to believe.

Gender dynamics

The survey interviewed only one respondent per household. The household head was asked to participate to the survey, and if the head was not available, another member of the household (most often spouse) was interviewed. Given that food consumption might be a responsibility of the women in the household, we are wary of the measurement error there might be due to the respondents being predominantly male. Given that among many of the targeted communities women are not allowed to speak to outsiders or have access to mobile phones, the strategy used for the interviews was considered the best possible alternative for a telephone based emergency response survey.

Demographic characteristics

This section discusses the demographic characteristics as well as the income sources and asset ownership of households region by region. The key variables in this dataset are listed in Table 1, using weights to adjust for the representativeness of the sample at the level of the region. All statistics reported are thus weighted, whenever possible.

Households in the North East larger in size than in other regions

Of the three regions analyzed in this report, the North East region stands out in various dimensions. The household size is the largest in the North East averaging 11 members (households are slightly larger than in the GHS 2016 in North East, 7.7 members). The education levels are the lowest. Only 57 percent of household heads ever attended school. The household heads have on average 5.8 years of education, and the differences across the gender of the household heads is striking, female household heads having only 1.3 years of schooling compared to 6.3 among male household heads. In fact only 10 percent of households have a female household head, which corresponds closely to the fraction of female respondents in the survey, which is 11 percent.

Regarding employment and income sources, the households in the North East rely heavily on agriculture as a main source of livelihood: 50 percent of households report their main income source to be their own farm, which is in accordance with 56 percent of households reporting the main employment of the household being farm labor at their own account. 38 percent of households own farming assets. Herding, even though not reported as the most important income source, is very common as 54 percent of households own livestock. Livestock loss (death or stealing) have occurred to 5.9 percent of households during the last 12 months.

Looking outside the farming households, 23 percent of the households list wages to be their main income source which is in line with wage labor (both in agriculture and non-agricultural sector combined) being the

main employment among 28 percent of households. The North East zone has the highest fraction of households that have changed their main employment during the last 12 months, being 13 percent.

The share of households receiving remittances is lower than in the other regions, 8.2 percent. Asset ownership of vehicles, property or non-farm assets is not strikingly different from the two other regions studied.

North Central relies on agriculture, but not as heavily as North East

In North Central Nigeria the household characteristics differ clearly from the North East. 17 percent of the households in our sample have a female household head, and the response rate from female household members is even higher, 26 percent. Households have on average 7.2 members (slightly larger households compared to GHS full sample average 5.9). Regarding education, 67 percent of household heads had at least some education, the rate being lower for female (49 percent) than to male household heads (71 percent), but with less striking gender gap than in the North East. Household heads have on average 7.3 years of education, male household heads having 7.8 years and female household heads 5.2 years of education.

In terms of income and employment, farming on one's own account is most often reported to be the most important source of income (43 percent), and also the most important mode of employment (48 percent). A little bit less than a half of the households report the main income and the main employment being in the non-farm sector. North Central receives the most remittances of all of the three zones, 21 percent of households report receiving remittances, of which almost all are from within Nigeria. The main means through which remittances are received is the bank.

Regarding asset ownership, livestock and farm-assets are the most common assets in the North Central zone, with ownership rates of 35 percent and 36 percent, respectively. As many as 18 percent of livestock owning households report that their livestock had been killed or stolen during the last 12 months, which might be reflective of the conflict situation between herdsmen and farmers.

South South most educated of the three regions

In the South South the population is the most educated among the three zones studied. Of all household heads, 89 percent have attended school: almost all male household heads (96 percent) and the majority of female household heads (65 percent). The mean household head has 8.6 years of education. However, a large gender gap exists behind this figure: the mean years of education acquired by male household heads is as high as 9.7 years, and only 4.7 for women. South South also has the highest fraction of female headed households, 24 percent, which is close to the rate of female respondents, 23 percent. The household size in the South South is 6.7 members (also higher than in the full GHS sample for the region in 2016, which was 5.0). In all the regions, the households that were reached were on average larger than the GHS sample households in 2016. This bias could be introduced by the nature of the survey, it is possible that larger households have better access to mobile phones, and perhaps alternate numbers where the head could be reached, compared to small households.

In terms of main sources of income and employment, households in the South South are least dependent on agriculture of the three regions. The non-farm economy is a more important employer for our sample, a total of 52 percent of households report it as the main employment source for the household. The farm economy is nevertheless important in this region: 37 percent of households name self-employment on farm as their main form of employment, and 33 percent as the main income source. 26 percent of households

own farm assets and 19 percent of households own livestock. Livestock loss can also be considered a problem in the South South as 22 percent of livestock owners report their livestock having been killed or stolen.

Food insecurity high in all three regions

Food security is a major concern in all the three regions. In the North East 79 percent of households reported that there were times during the last 7 days, when they did not have enough food or money to buy food. Similar figures for the North Central and South South are 71 percent and 74 percent, respectively.[2]

The CSI index captures how often coping strategies were used during the last 7 days in order to deal with the scarcity of food. The higher the index, the more coping strategies are employed more often. The mean of the CSI index in the North East is 15, which is higher than in the North Central and in the South South where the average of the CSI index was 13 in both areas. In all three regions, food insecurity is well above the threshold level of 10 denoting "highly food insecure". This shows that food insecurity is definitely a major concern in the area.

The distribution is uneven across the regions: A large number of households are not food insecure or only somewhat food insecure. There are however a small fraction of households that face extremely high food insecurity, which is particularly the case in in the North East. The most food insecure quantile of the sample have a food insecurity index ranging from 30 to 42 (with the maximum value being 56). Households with this kind of food insecurity issues are likely to be very vulnerable.

Demographic characteristics related to food insecurity vary regionally

Table 2 provides analysis on the relationship between household characteristics, poverty status, and food insecurity using an OLS regression. The dependent variable is the CSI index, that is, a measure of food insecurity. Standard errors are heteroscedasticity-robust and all the regressions use probability weights to adjust for the sampling framework discussed in the Data-section. Columns 1-32 show results for North East, columns 4-6 for North Central and columns 7-9 for South South. Columns 1, 4 and 7 show a regression model with only poverty as an independent variable. Columns 2, 5 and 8 show a model with basic household characteristics and income sources, as well as indicators of asset ownership as well as a dummy denoting whether the household is located in a rural area. Finally, in columns 3, 6 and 9 a large model with all the household characteristics as well as poverty is shown.

Albeit the similar situation with food insecurity in the three regions, we can see that the determinants of food insecurity vary somewhat across the three regions studied.

First, looking at the relationship between poverty and food security (columns 1, 4 and 7), we find consistently across the regions that there is a positive relationship between poverty and food insecurity, as one would expect. In none of the regions this relationship is however statistically significant, implying that

[2] This indicator can be used as a simple measure of dividing households between food insecure and food secure. We have used it in the analysis in section "Relationship between food insecurity and conflict".

food insecurity and poverty do not go hand in hand. This speaks to the possibility that indeed the food insecurity captured by our survey could to a large degree be transitory.

Looking at the relationship between demographic characteristics and food insecurity (columns 2, 5 and 8) we can see that the relationship between household size and food insecurity is statistically significant in the North Central: larger households are more food insecure other factors held constant. Age of the household head is negatively associated with food insecurity in all three regions (to a lesser extent in the South South), but only statistically significant in the North Central, implying that having an older household head is associated with being food secure.

Number of years of education is negatively associated with food insecurity and statistically significant only in the North East and North Central. One more year of education is associated with 0.475 and 0.299 unit decrease of the CSI index in the North East and North Central, respectively. In South South wage income is negatively associated with food insecurity, whereas in the North Central being self-employed stands out as an important determinant.

Rural status is associated negatively with food insecurity in the North East. Remittances are statistically significant only in the North East. None of the asset ownership dummies are statistically significant once other factors are controlled for in any of the regions. This might be suggestive of the measure capturing transitory food security rather than chronic food security related to persistent poverty. However, it is also possible that chronic food insecurity is a concern given that among poor households in Nigeria the share of food expenditures is as high as 73% of total household expenditures.[3]

Finally, in columns 3, 6, and 9, we find that the coefficient of poverty changes little when including other household characteristics. Similarly, the above reported statistically significant relationships between different household characteristics and food insecurity change little once poverty is added to the model. This implies little multicollinearity between the variables.

[3] Calculations based on the full GHS dataset.

Table 1: Means of key variables by region

	North East	North Central	South South
Female respondent	.11	.26	.23
Female household head	.1	.17	.24
Household size	11	7.2	6.7
Ever attended school household head*	.57	.67	.89
Ever attended school household head female*	.21	.49	.65
Ever attended school household head male*	.61	.71	.96
Education level completed household head**	1	1.3	1.4
Education level completed household head female**	.18	.91	.76
Education level completed household head male**	1.1	1.4	1.7
Number of years of education for household head*	5.8	7.3	8.6
Number of years of education household head female*	1.3	5.2	4.9
Number of years of education household head male*	6.3	7.8	9.7
Income source: wages	.23	.2	.24
Income source: self-employed (farm)	.5	.43	.33
Income source: self-employed (non-farm)	.19	.24	.3
Income source: pension	.032	.046	.025
Household receives remittances	.082	.21	.13
Main employment: farm (wages)	.069	.028	.026
Main employment: farm (self-employed)	.56	.48	.37
Main employment: non-farm (wage)	.21	.22	.26
Main employment: non-farm (self-employed)	.13	.22	.26
Main employment: livestock herding	.011	.0062	0
Employment changed (last 12 months)	.13	.079	.12
Household has any type of asset	.68	.6	.56
Household owns livestock	.54	.35	.19
Household owns vehicles	.2	.14	.13
Household owns property	.41	.35	.31
Household owns farm assets	.38	.36	.26
Household owns non-farm assets	.08	.076	.071
Livestock killed or stolen	.059	.18	.22
Market is the main source of food	.88	.85	.92
Distance to nearest market (minutes)	20	18	18
Distance to water (minutes in walking)	11	14	7.1
Coping Strategy Index (CSI Score)	15	13	13
Observations	147	219	216

*All education variables are from the GHS.
**Education level completed household head 0=not completed, 1=primary 2=secondary 3=tertiary.

Table 2: Determinants of food insecurity by region

VARIABLES	(1) NE	(2) NE	(3) NE	(4) NC	(5) NC	(6) NC	(7) SS	(8) SS	(9) SS
Poor	3.923		3.586	3.784		0.704	10.913		7.017
	(2.427)		(2.209)	(3.073)		(2.571)	(7.108)		(7.030)
Household size		0.201	0.102		0.592*	0.566**		0.434	0.369
		(0.210)	(0.222)		(0.302)	(0.280)		(0.394)	(0.394)
Hh head age		-0.122	-0.101		-0.156**	-0.153**		-0.021	-0.000
		(0.083)	(0.078)		(0.067)	(0.068)		(0.064)	(0.059)
Female hh head		-0.893	-0.107		-2.013	-1.933		2.249	2.160
		(3.460)	(3.489)		(2.273)	(2.306)		(2.859)	(2.891)
Number of years of education hh head		-0.475**	-0.416**		-0.299*	-0.288*		-0.114	-0.069
		(0.194)	(0.193)		(0.152)	(0.162)		(0.244)	(0.217)
Income source: wages		0.596	1.061		-3.888	-3.834		-4.164*	-3.888
		(2.776)	(2.754)		(3.189)	(3.165)		(2.368)	(2.355)
Income source: self-employed (farm)		0.270	-0.511		-5.328**	-5.395**		-2.119	-1.996
		(2.839)	(3.052)		(2.611)	(2.659)		(2.632)	(2.651)
Income source: pension		1.237	2.422		11.118**	10.945**		-10.937***	-11.062***
		(4.689)	(4.623)		(5.228)	(5.220)		(3.157)	(3.009)
Remittances (dummy)		-5.624**	-6.496**		1.693	1.765		-0.753	-0.791
		(2.462)	(2.732)		(3.422)	(3.488)		(2.816)	(2.822)
Hh owns livestock		-0.571	-0.717		-1.586	-1.500		4.525	4.743
		(2.924)	(2.916)		(2.358)	(2.281)		(3.156)	(3.180)
Hh owns vehicles		-4.105	-3.541		-1.794	-1.673		-2.478	-1.949
		(2.913)	(3.045)		(2.517)	(2.572)		(2.932)	(2.869)
Hh owns property		1.609	1.093		-2.436	-2.518		1.110	1.236
		(3.528)	(3.405)		(2.258)	(2.248)		(2.690)	(2.554)
Hh owns farm assets		-4.749	-4.320		1.167	1.176		4.573	3.557
		(3.096)	(3.022)		(2.557)	(2.569)		(3.127)	(2.715)
Hh owns non-farm assets		4.618	4.897		0.200	0.251		-5.866	-5.350
		(4.175)	(4.259)		(3.552)	(3.512)		(3.788)	(3.654)
Rural (dummy)		-4.301*	-4.596*		0.756	0.664		3.345	2.772
		(2.330)	(2.325)		(2.307)	(2.401)		(2.282)	(2.258)
Observations	147	147	147	219	217	217	216	216	216
R-squared	0.029	0.199	0.216	0.017	0.132	0.132	0.042	0.147	0.161

Notes: OLS model, dependent variable is the CSI index. Constant not reported. Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Food insecurity and market access

Most households depend on the market as the main source of food

In the North East 88 percent report that they bought most of their food from the market during the last 30 days. For North Central and South South regions the same figures are 85 percent and 92 percent, respectively. Considering the high share households that engage in agriculture in the North East and North Central, the dependence on the market seems very high.

Even among the households that did not buy most of their food at the market, who mostly reside in the North East and North Central, large fractions of households still report that during the last 12 months there was a time when the market was the main source of food (30 percent in the North East, 46 percent in the North Central). Households in the North East therefore seem to be more or less equally dependent on the market as in the other regions, despite being more engaged in agriculture as a source of income and employment.

High food prices the largest concern at the market

The most important reason given for not buying food from the market is the sharp increases in food prices. Among households that do get their food from the market, price increases are reported to be the largest challenge while getting food from the market. In the North East this concern is reported by 63 percent of households, in the North Central and South South the figures are similar, 66 percent and 52 percent.

In contrast, the availability of food at the market is not considered a concern in any of the regions. In the North East 97 percent of households report that there is plenty of food at the nearest market, and in the North Central and South South both the figure is 89 percent. Market access is not considered to be a major obstacle in any of the regions. The distance to the market is reported to be on average 20 minutes in the North East, and 18 minutes in both North Central and South South[4]. The trip to the market is generally considered to be safe.

The concerns voiced about price hikes should be taken very seriously. It is noteworthy to point out that this concerns is in line with the high food inflation rates as high as 20 percent (year-on-year) in the summer of 2017 (Nigeria Biannual Economic Update, Oct 2017), while non-food inflation during the same time period has been lower, around 12 percent. Between 2015 and 2016[5] labor productivity (a rough indicator of wages) has decreased both in Naira and USD terms (NBS, 2017), so we do not have a reason to believe that purchasing power has increased at the same pace as food inflation. Given that food inflation hits the poor hardest, as they typically spend a large share of their income in food, this development is very concerning particularly for the most vulnerable households.

Households cope by reducing meals or portion sizes

Households cope with food insecurity issues predominantly by reducing meals or portion sizes. The fraction of households reporting this as a coping strategy is 46.6 percent in the North East, 37.3 percent in North Central and 49.7 percent in the South South. This is worrisome, as reducing meals and portion sizes might

[4] The mode of transportation was not specified in the questionnaire.
[5] The most recent data available is for Q4 2016 for labor productivity.

have a detrimental effect to the nutritional status of households. Poor nutrition could have far reaching consequences to child health in particular.

Self-production is the second most important coping strategy in all the regions. We can see that households in all regions also report quite often to either borrow money from their social network (relatives and friends), or to buy food from the market on credit. Very few households report food aid to be an important coping strategy, less than 5 percent of households in each region.

The distribution of coping strategies is presented in Figures 2a, 2b and 2c for North East, North Central and South South, respectively.

Figure 2a: Coping strategies used when cannot afford food in the North East

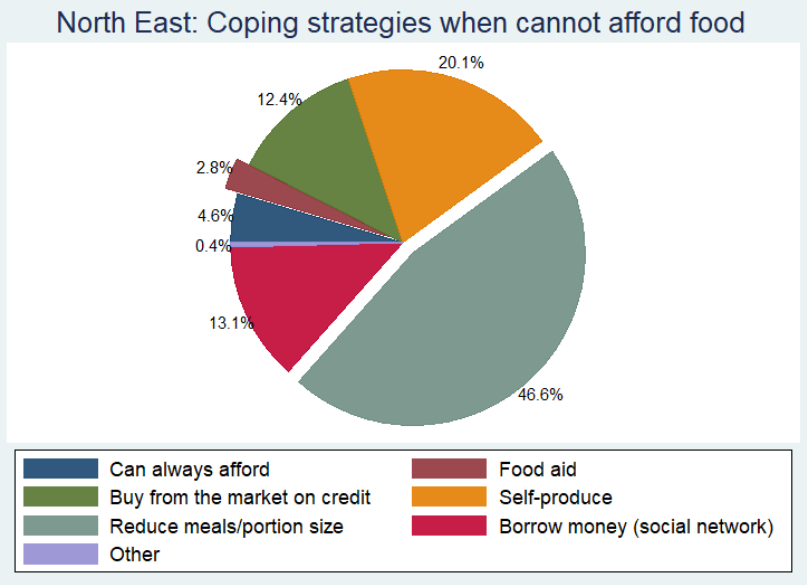


Figure 2b: Coping strategies used when cannot afford food in the North Central

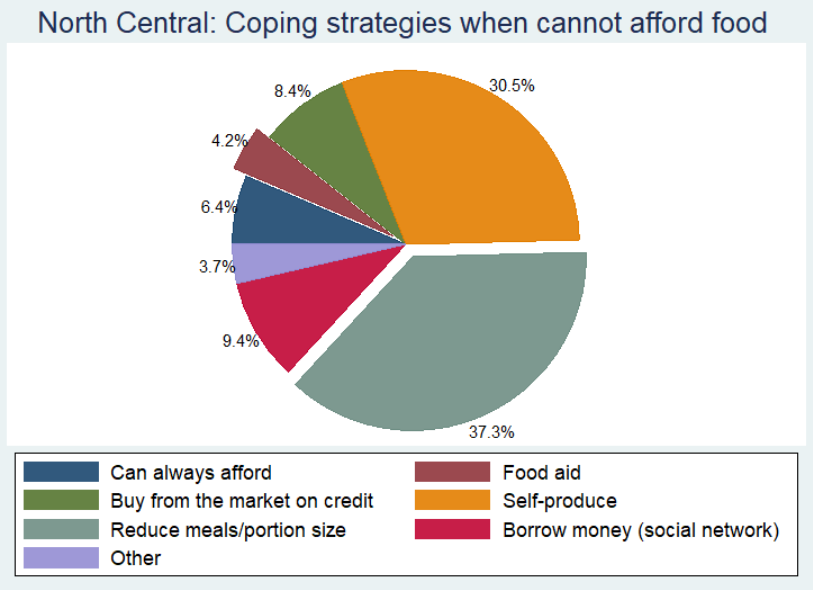
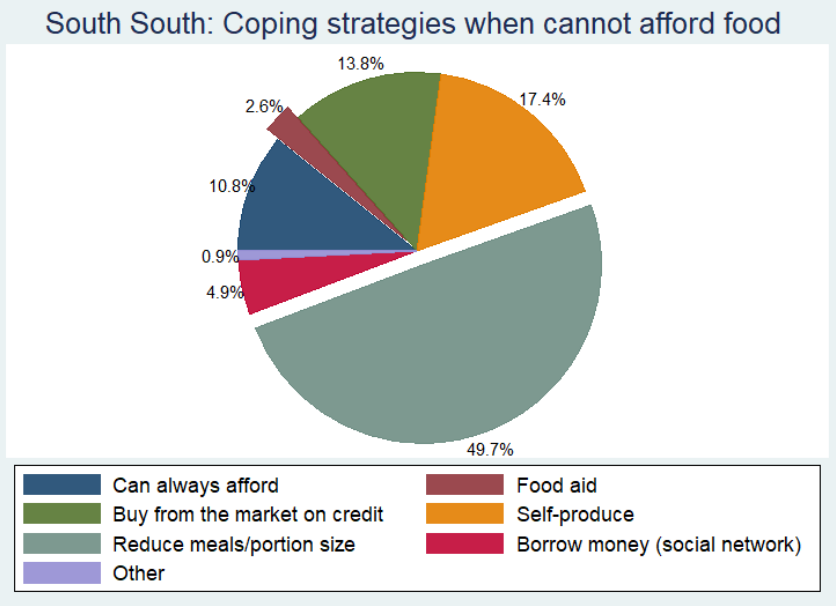


Figure 2c: Coping strategies used when cannot afford food in the North Central



The main storing method of food is baskets or bags in all three regions. In the North East this method is used by 53 percent if households and in the North Central and South South by 48 and 34 percent, respectively.

In the North East and North Central in particular, households report problems of pests (38 percent in both regions) and spoilage (9 percent in North East and 13 percent in North Central). Even though food is scarce, there is also room for improvement in food storage in the North. In contrast, in the South South food storing in general is less common.

Some households also report concerns with a lower agricultural production than average during the last agricultural season. In the North East, the fraction is 22 percent, and in the North Central and South South 19 and 20 percent, respectively. In the North East and North Central input prices are reported as the main reason for the decline.

It is plausible, that the rise in input prices are a component of the increase in agricultural output prices (that is, food prices), which in turn were reported to be a main obstacle in acquiring food from the market. Input price hikes might affect food price increase by first, factoring in directly to the food prices. Second, input price increase might induce farmers not to buy inputs, in which case their productivity would decrease, and demand held constant, this would increase prices due to decreased supply.

It is important to point out, that the increase in input prices is just one potential factor affecting food prices. Other both supply as well as demand-side factors can affect food prices as well. Drought might be another potential concern for farming households, as the main source of water in the farm is reported to be rain (98 percent of respondents in the North East, and 98 percent in North Central and 87 in the South South). This is another potential source of vulnerability in all the three regions. Also, as noted earlier in this report, the concerns about food price increases in our dataset are in line with the high national food

inflation rates -therefore also macroeconomic management can be considered a potential tool to address this problem. Finally, high food prices might also be a signal of malfunctioning markets, for example, due to low local competition.

All in all, more research into inflation is needed in order to understand the root causes of the price concerns reported by the households in our survey. Furthermore, understanding better the agricultural markets could open pathways to better understand to what degree price increases contribute to the bad food security situation. After understanding the causes of the high food prices at local markets, policies can be designed accordingly.

Most households do not treat drinking water

Drinking water concerns are also present in all the regions. The most common type of water access is a tubewell or borehole (38 percent in North East, 37 percent in North Central and 55 percent in the South South). It is also somewhat common that drinking water is bought from moving venders in the Northern regions (13 percent in North East and 15 percent in North Central). In the South South, the second most common water source is surface water.

Most households report that they do not do anything to the water to make it safe: 78 percent in North East, 80 percent in North Central and 83 percent in the South South. Distance to the nearest water source by foot is reported being 11 minutes in North East, 14 in North Central and only 7 minutes in South South.

Relationship between food insecurity and conflict

Food insecurity and conflict have different types of relationship across the different regions. In this section, we use the first round of the telephone survey that collected information on conflict exposure together with the second food security round. For the following analysis, we use the households that participated in both rounds, as previously.

In the conflict interview, households were asked about various conflict related events going back to 2010. The households were asked whether any household member had experienced any of the listed events, and also, whether anyone in their community had experienced any of the events listed. More details on the conflict data can be found in an adjacent report (report for round 1), which provides more descriptive evidence on conflict exposure.

In Figures 3, we look at the relationship between conflict and food insecurity across the three regions. Figure 3a illustrates this relationship for the North East zone. Food insecure households are those that responded yes to the question "*In the past 7 days, were there times when you did not have enough food or money to buy food*", and food secure households are those that responded no. Therefore the indicator used is a simple dummy-variable measure of food insecurity, and not the CSI index, in order to provide a more simple illustration of the results.

The bars denote different measures of conflict. The blue bar denotes the share of households in the region that reported at least one conflict event having occurred in their community during the recall period from 2010 to spring 2017. The red bar denotes the share of household that report that at least one violent event (killing, injury or physical violence) occurred in their community during that period. We consider

violent events separately, as they are perhaps the clearest indicator of conflict. Finally, the green and orange bars show these shares for the household level conflict exposure.

The majority of both food secure and food insecure households have had conflict events in their community. We can see that in the North East, food insecure households (79 percent of all the households), were more likely to report community level conflict events. Out of food insecure households 74 percent reported conflict events having taken place at the community compared to 72 percent of food secure households. Violent events in the community were reported by 48 percent of respondents among both food secure and food insecure households. Food insecure households also report slightly higher conflict exposure at the household (53 percent of food insecure households compared to 40 percent of food secure households). However, violent events are more common among food secure households (19 percent among food secure households compared to 14 percent to food insecure households).

The differences point towards perhaps higher conflict rates among food insecure households in the North East. However, these differences are not statistically significant. In Table 3a, we have run a t-test to test the equality of means of these groups, and none of the differences are statistically significant, and therefore we cannot draw conclusions on the differences we observe.

Figure 3a: Food insecurity and conflict in the North East

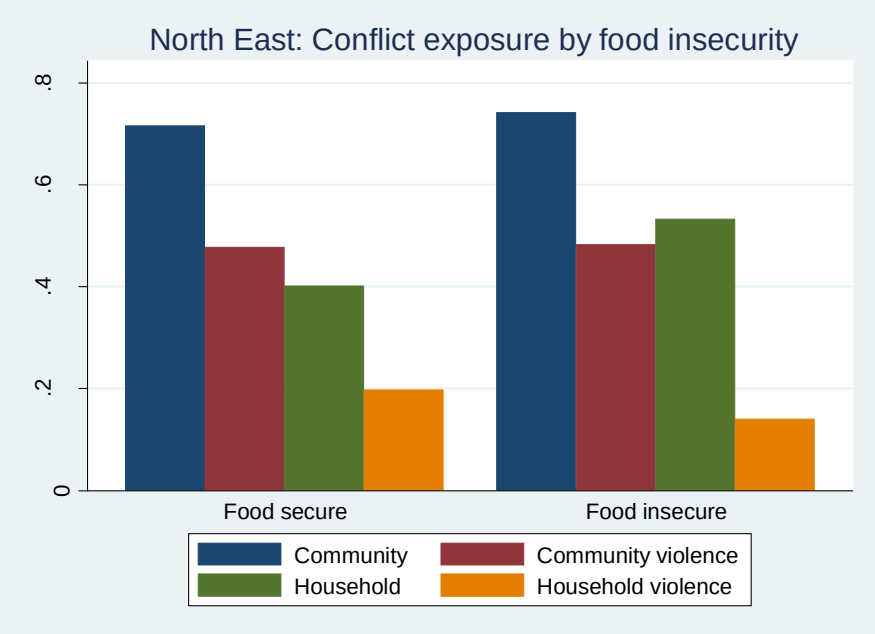


Table 3a: Mean comparison of conflict exposure across food insecurity status North East

	Food secure	Food insecure	Difference
Community	0.72	0.74	-0.03
Community violence	0.48	0.48	-0.00
Household	0.40	0.53	-0.13
Household violence	0.19	0.14	0.06

Significance levels: *** p<0.01, ** p<0.05, * p<0.1

In the North Central, food insecurity and conflict have a different relationship than in the North East. In the North central, food secure households have experienced more conflict events, both inside the household and within their communities. This difference also holds if we look at violent conflict. To illustrate, 58 percent of food secure households report there have been at least one conflict event in their community since 2010, compared to only 42 percent of food insecure households. Differences are large in all categories except violence at the household level.

It could be that the nature of the conflict in the North Central is different from the North East, and wealthier households, such as landowners, have experienced more events than landless and perhaps poorer households. More analysis is needed to investigate whether this indeed is the case. Table 3b shows however, that none of these differences are statistically significant, even at the 10 percent level.

Figure 3b: Food insecurity and conflict in the North Central

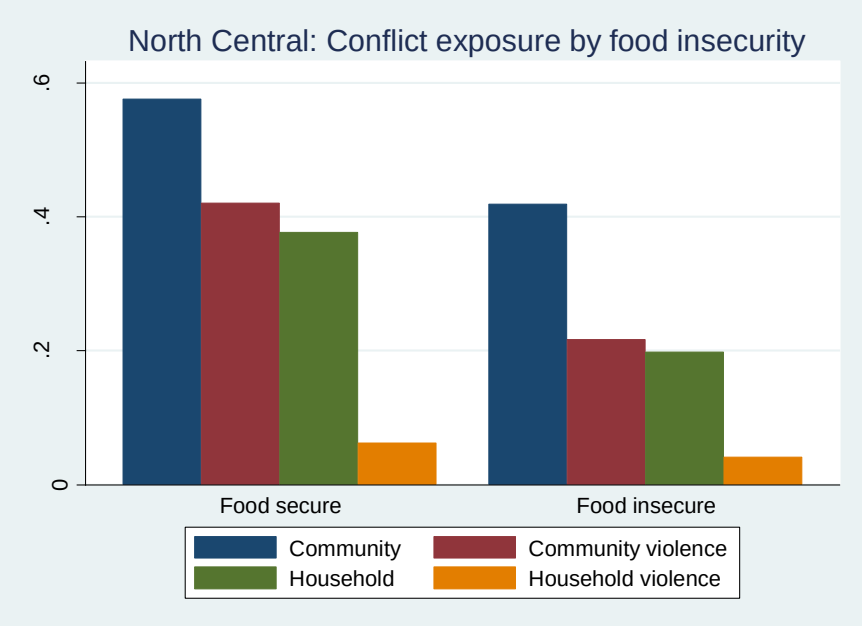


Table 3b: Mean comparison of conflict exposure across food insecurity status North Central

	Food secure	Food insecure	Difference
Community	0.58	0.42	0.16
Community violence	0.42	0.22	0.20
Household	0.38	0.20	0.18
Household violence	0.06	0.04	0.02

Significance levels: *** p<0.01, ** p<0.05, * p<0.1

In the South South, the relationship between food insecurity and conflict is more similar to that in the North East: food insecure households are slightly more likely to have been exposed to conflict, and report conflict events in their community. In the South South, 53 percent of food insecure households have experienced at least one conflict event compared to 40 percent of food secure households. Among the rest of the

categories the differences are not as large, but point towards the direction of food insecure households having experienced more events. However, none of the differences in the South South are statistically significant. Therefore, also in the case of South South is hard to draw any conclusions about the relationship between food security and conflict.

Figure 3c: Food insecurity and conflict in the South South

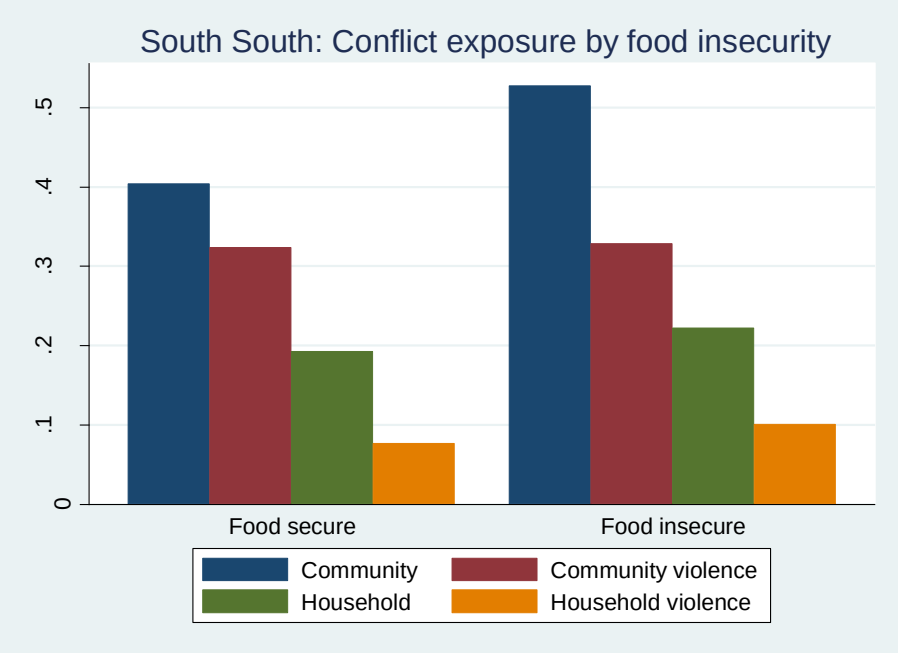


Table 3c: Mean comparison of conflict exposure across food insecurity status South South

	Food secure	Food insecure	Difference
Community	0.40	0.53	-0.12
Community violence	0.32	0.33	-0.00
Household	0.19	0.22	-0.03
Household violence	0.08	0.10	-0.02

Significance levels: *** p<0.01, ** p<0.05, * p<0.1

Limitations to the analysis

Across all the three regions, we have not found statistically significant differences in conflict between food secure and food insecure households. This does not imply that conflict could not affect food security, and therefore some limitations to the above analysis merit to be mentioned.

Recall periods different for food security and conflict

The food security question was administered during August -September 2017 based on 7 days recall on food access. The conflict indicators are based on a 7-year recall period from 2010 to Spring 2017. Therefore, a household having experienced one conflict event in 2010 and a household having experienced one event in 2017 are treated similarly in the above analysis. A panel data analysis would be required to look at the immediate effects of conflict events on food security over time.

Different type of conflict events might have a different relationship with food security

It could be that wealthy households report more internal displacement, as they might have the funds to relocate. Wealthier households could also report more property related conflict events. Due to the different nature of conflict events, we have looked at violence separately, but more disaggregation is needed to understand the relationship between income and conflict, and food security and conflict.

Conflict affected households might have received assistance

It is possible, that some conflict affected households have received assistance after the events took place, but before the food security module was collected. This would perhaps make them more food secure. However, given that less than 5 percent of households report food aid as one of their main coping strategies, we are not too worried about food aid being a major confounding factor in our analysis.

Key lessons and policy recommendations

Food insecurity is a large concern in all the three geopolitical zones, that have experienced conflict during the recent years. **Most households are food insecure** in these areas. Furthermore, **the most common coping strategy when food is scarce is to reduce meals or portion sizes**. This might have a detrimental effect of the nutritional status of households. Poor nutrition could have far reaching consequences to child health, such as stunting, and lead to long-term adverse consequences. More information is needed to understand the consequences of food insecurity in Nigeria.

We find that food secure and food insecure households have been equally affected by conflict events. It is important to keep in mind that food insecurity as measured by the survey could be transitory, and therefore related to many other factors than the history of conflict events as experienced by the household.

The relationship between household characteristics and food security vary across the three regions. Some clear patterns emerge however: In all the regions, poverty is positively but weakly related to food insecurity, which implies that our food insecurity measure is not only capturing the chronically food insecure. Education is related to better food security, while larger households are more likely to be food insecure. The magnitude and significance of most of the relationships observed vary across regions.

Source of food insecurity as reported by the households is similar across regions. **High food prices are the largest concern in all three regions**, which is in line with high (national) food inflation rates. This is despite the fact that in all three regions, most respondents consider there to be plenty of food available at the market. More research is needed to understand the root causes of high food prices, in order to identify policies that can be used to address the concern of affordability of food and ultimately, food insecurity. Given that the market is the main source of food for the majority of households, humanitarian organizations should focus on understanding the markets as well, when addressing food security issues.

Given the high food insecurity rates in all the regions, more information is needed for in-depth analysis. **State-level data collection is required to better identify households at risk**. This information can be used for targeted interventions to tackle food insecurity in states where food insecurity is most severe.

Our data captures one snapshot of the food insecurity situation, **more data is needed to understand whether the high food insecurity rates persist over time -whether food insecurity is transitory or chronic.** There are various reasons to be concerned of food availability in the conflict affected regions. First, the North East is seeing a recent influx of internally displaced people moving back to their home regions from refugee camps, which will increase demand for food.

Moreover, we are concerned of the agricultural productivity, particularly in the North East and North Central, that rely heavily on agriculture as their main source of livelihood. In the North Central, access to land has been a source of the conflict. In the North East, large share of arable land has been abandoned since the start of the conflict. Therefore, **targeted interventions not just tackling the demand side of food, but also the local supply in terms of supporting farmers will be crucial for preventing chronic long-term food insecurity**.

References

FAO (2003) Trade Reform and Food Security, Conceptualizing the Linkages Chapter 2 http://www.fao.org/tempref/docrep/fao/005/y4671e/y4671e00.pdf

Kevin Croke, Andrew Dabalen, Gabriel Demombynes, Marcelo Giugale and Johannes Hoogeveen Croke (2012): Collecting High Frequency Panel Data in Africa Using Mobile Phone Interviews, World Bank Policy Research Working Paper 6097

Maxwell & Caldwell (2008): Coping Strategies Index: A Field Manual, 2008.

Mercy Corps (2015): The Economic Costs of Conflict Evidence on violence, livelihoods, and resilience in Nigeria's Middle Belt https://www.mercycorps.org/sites/default/files/Mercy%20Corps%20Nigeria%20Policy%20Memo%20Economic%20Costs%20of%20Middle%20Belt%20Conflict.pdf

National Bureau of Statistics, NBS (2017): Labour Productivity Report Q4 2016, June 2017. http://nigerianstat.gov.ng/elibrary

World Bank (1986) *Poverty and Hunger: Issues and Options for Food Security in Developing Countries*. Washington DC.