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HARMFUL TEMPERATURES AND CONSUMPTION EXPENDITURE: EVIDENCE FROM NIGERIAN HOUSEHOLDS

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Abstract

This paper examines the effect of changes in temperature on households' food expenditure in Nigeria. Using micro-data on consumption expenditure from Nigerian households, we find that extreme heat increases per capita consumption expenditure during dry seasons but not in wet seasons. Prior works show that small-scale farmers attenuate the effects of extreme heat on agricultural productivity through the short-term use of non-traded productive inputs, such as land. This evidence supports the view that the scope of climate change mitigating practices could keep food prices steady despite increases in extreme weather events. However, when investment in tradable inputs like drought-resistant technologies is greater, attenuating weather shocks could lower the welfare of net-food buyers if it increases food prices. To further support our interpretation, we find that relative to households in urban cities, rural households pay more for food during the dry season. We interpret this as a reflection of the higher costs of production associated with extreme heat during the dry season. Our results support policies that offer compensated income to vulnerable households to mitigate the impact of weather shocks in agrarian communities in developing countries.

Keywords: *climate change, extreme heat, food expenditure, welfare, Nigeria.*

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Introduction

How susceptible are households' food and consumption expenditures in developing countries to extreme weather events? This is an important question given that, on a global scale, the predicted financial cost of adaptation to climate change could likely result in an additional price increase of food staples, a total of 32 to 37 percent for rice, 52 to 55 percent 48 for maize, 94 to 111 percent for wheat, and 11 to 14 percent for soybeans (Nelson et al. 2009). More specifically, answers to this question are important for designing adaptive social safety net programs that can mitigate additional welfare costs associated with extreme weather shocks to agricultural production.

Evidence suggests that small-scale farmers attenuate the adverse effects of extreme temperatures through short-run adjustments in non-traded productive inputs (Aragón et al. 2021, Jessoe et al. 2018). This evidence supports the view that the scope of climate change mitigating practices could keep food prices steady despite increases in extreme weather events. However, a broader view sees tradable inputs, such as irrigation and drought-resistant technologies, as important constituents of the agricultural production function during adverse weather shocks (Hertel & de Lima 2020). Across the agricultural value-addition chain in the Sub-Saharan Africa (SSA) region, access to irrigation water and drought-resistant technologies could dramatically impact agricultural output during heat stress. If adapting agriculture to weather shocks intensifies the use of purchased inputs, prevailing input market distortions could affect yield and increase prices of agricultural goods in ways not captured in previous studies.

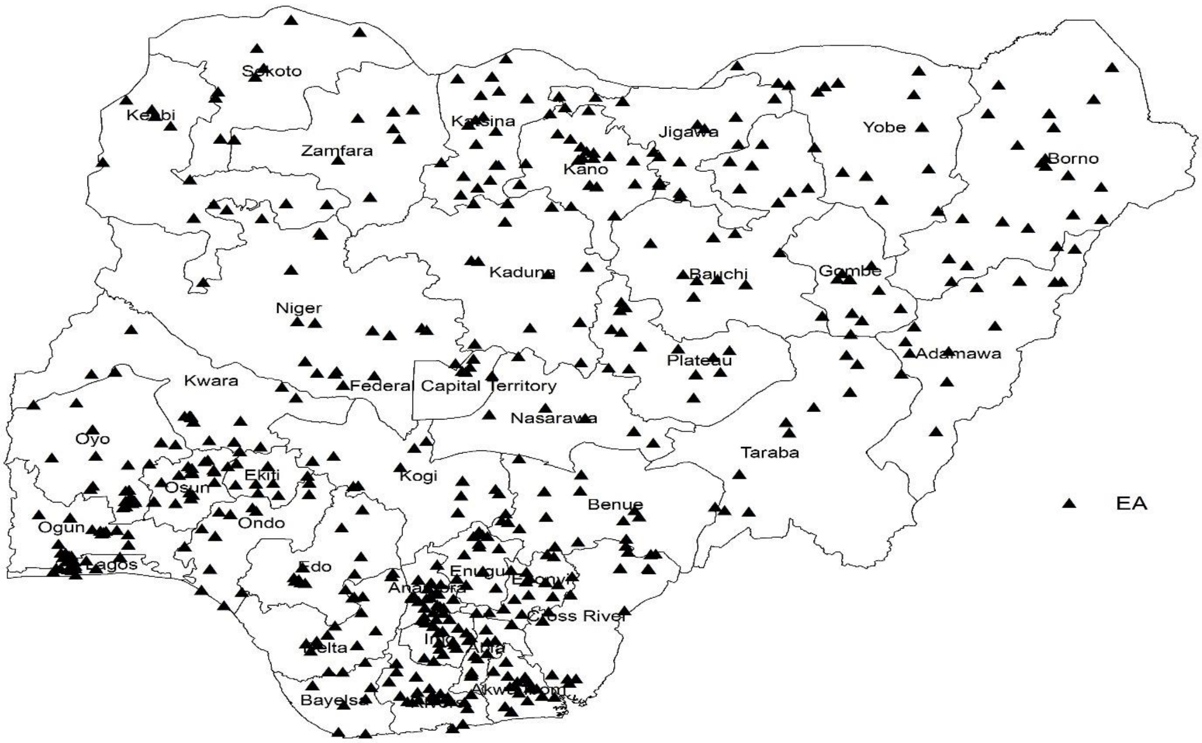
We investigate the impact of extreme temperatures on consumption expenditure outcomes like per capita consumption, respective spending on cereal, tuber, and animal and fruit separately during the wet and dry seasons. The intuition is that extreme weather shocks will stimulate greater use of purchased intermediate inputs for abating the impact of climate shock during dry seasons than during the wet season. Similarly, we categorize households based on whether they live in rural or urban areas. Intuitively, compared to rural dwellers, urban dwellers are less dependent on agriculture for livelihood strategy and may be less likely to experience price shocks that arise from output changes. We identify these impacts from weakly exogenous and random local weather fluctuations, thereby reducing the problem of omitted variable bias. After controlling for seasonality in agricultural supply and other time and zone-specific trends, we find that a marginal increase in our measure of extreme heat days is associated with a 46.8% fall in consumption expenditure during the wet season.

Contrastingly, an increase in HDD by 1^{o}C during dry seasons is associated with a 24.9% increase in food expenditure per household. These findings are consistent with the variation in the cost of mitigation practices due to weather shocks exhibiting a distinct seasonal pattern; therefore, food prices are higher during harsh weather conditions (Brown et al. 2009). Weather variation does not significantly affect expenditure in urban areas compared to rural-based households. This result is consistent with the studies showing that climate shock will make rural households in developing countries more vulnerable than urban-based households. Given that consumption spending responses to weather shocks likely reflect substitution that prioritizes the consumption of important staples, we find that cereals and fruits are more affected by extreme temperatures.

Similar studies (e.g, Aragón et al. 2021) find that extreme heat increases tuber quantity harvested (in absolute and relative terms), which reflects why expenditure on this food category is not responsive to weather shocks.

Our paper aligns with recent literature exploring the margins of adjustment and the scope for mitigating the impact of climate change on agriculture and the food system (Emediegwu et al. 2022, Aragón et al. 2021, Jessoe et al. 2018, Colmer 2018). We improve existing literature by exploring the effect of harmful temperatures and estimating the differential impact of weather shocks based on households' vulnerabilities. The extant literature sees the scope mitigation from short-term productive and behavioral adjustments as important cornerstones for lowering the effects of climate change. For instance, Aragón et al. (2021) find a more intensive use of non-traded productive inputs, like increasing area planted, increasing family labor, and changing crop mix to attenuate the effect of extreme heat on productivity loss. These findings are typical of agricultural household models under incomplete markets (Taylor & Adelman 2003, De Janvry et al. 1991).

Figure 1: Enumeration areas across Nigeria



Notes*: *Each black shape represents an enumeration area (EA).

We divide the paper as follows. We describe the data and empirical strategy in Section 2, while the various results are discussed in Section 3. We conclude the paper with some policy implications in Section 4.

Data and Model Specification

Data Description and Sources

We combine household survey data with satellite imagery to construct a comprehensive dataset containing socio-economic and meteorological variables. Our unit of observation is the enumeration area (EA)-by year. Our final dataset is panel data consisting of more than 2000 observations spanning from 2010 to 2016. Nigeria is a prime example to study the effect of extreme heat on micro-level socioeconomic livelihoods in a tropical region. Nigeria houses more poor people than any country globally, ranks 103rd out of 119 qualifying countries on the hunger scale (UNDP 2016), and positions 152nd out of 188 countries on the 2015 UNDP Human Development Index (von Grebmer et al. 2018). Pressures from weather-related shocks are some of the identified concerns driving vegetation loss and poverty in the country (Bertoni et al. 2016, Barbier & Hochard 2016).

Socio-economic Dataset

We source our main data from the three waves of the Nigeria General Household Survey (NGHS), a multi-topic panel survey carried out annually over 12 months on a nationally representative survey of approximately 5,000 households from more than 500 EAs representing all the states in Nigeria as shown in Figure 1.[1] The three waves used in this study are chronicled as follows: wave 1 (2010-2011), wave 2 (2012-2013), and wave 3 (2015-2016).[2] The National Bureau of Statistics (NBS) implemented the surveys with the support of the World Bank Living Standards Measurement Study Integrated Surveys on Agriculture (LSMS-ISA) project. The survey asks household members to report the amount spent on different food and non-food items in the last seven days and other health and education expenditures. We use this information to construct measures of household consumption expenditures. One major limitation of the dataset is that we do not observe expenditure over the spending period: rather, only the aggregate amount in the week preceding the week of interview, reflecting cost of living in an average week, is recorded. However, we believe these measurement errors are exogenous to our explanatory variables; consequently, such imprecision might only lead to imprecise rather than biased estimates. The survey also provides information on other socio-demographic features such as access to the market, gender of household heads, amount spent on electricity, *etc*. Given that our unit of measurement is at the EA, we average observations at household level to the EA level.

Weather Data

Our weather data comes from the National Centers for Environmental Prediction (NCEP)/Climate Prediction Center (CPC).[3] This gridded dataset contains daily maximum and minimum temperature, as well as total daily precipitation at 0.5×0.5 degree resolution (approximately 56km × 56km at the equator) from 1979 till date. Mean daily temperature is derived by averaging each day's maximum and minimum temperature for each grid cell. To link the weather and household data, we overlay a polygon of Nigerian EA on the average temperature and total precipitation for each grid cell and take the simple average across all grid cells per EA using geospatial software. While, we leave average temperature at daily level to allow us construct our measure of extreme heat, we aggregate the daily precipitation observations to obtain monthly aggregate rainfall at a location.

[1] There are 36 states in Nigeria, including the Federal Capital Territory.
[2] Year 2014 is missing in the survey.
[3] CPC data is provided by the NOAA/OAR/ESRL PSL, Boulder, Colorado, USA, from their website at: https://psl.noaa.gov/

As our baseline specification, we divide a typical year into dry and wet seasons to understand how seasonality drives consumption spending among Nigerian households. A typical dry season in Nigeria spans November to March, while the rest of the year is classed as wet season period.

Model Specification

We use a reduced-form log-linear model specification to estimate the relation between heat exposure and consumption expenditure in Nigeria.[1] Our dependent variable is y_{iet}, where $i \in \{c/n, ce, tu, an, fr\}$, with *c/n* for consumption per capita, *ce* for cereal expenditure, *tu* for *Table 1*: Derivatives of Consumption Purchases tubers and roots expenditure, animal products expenditure, and *fr* for fruits and vegetables expenditure in enumeration area (EA) *e* and in year *t*. All outcomes aside from consumption per capita are derived as shown in *Table 1*.

Table 1. Dependent variables of model

Outcome Variable	Combination
Cereals	Sorghum + Maize + Millet + Rice + Other cereals
Tubers & Roots	Yam + Cassava + Banana & Other tubers
Animal Products	Poultry + Meat + Fish + Diary
Fruits & Vegetables	Fruits + Vegetables + Beans

The model is specified as

$$yiet = \alpha e + \gamma rt + \beta 1DDet + \beta 2HDDet + \lambda 1Pet + \lambda 2Pet2 + \lambda Het + \varepsilon et \qquad (2.1)$$

where α_e are EA fixed effects to control for EA-specific time-invariant factors of food consumption spending such as average distance to the nearest market, γ_r are zone-specific trends which accounts for time-changing determinants of food consumption spending that are common within a geo-political zone (such as the agreement to ban open grazing in the South-West Zone of Nigeria).[2] H_{et} contains EA-specific time-varying characteristics that may influence spending on food products. These characteristics include average house rent, average education spending, average spending on mobile phone recharge and average amount on petrol. ε_{et} are idiosyncratic errors clustered at EA-level to account for possible correlation of the standard error terms within EA groups.

Following earlier studies like Aragón et al. (2021), Roberts et al. (2012), we model the impact of weather exposure as cumulative heat exposure and rainfall. Specifically, we construct two indices to reflect cumulative heat exposure - degree days (DD) and harmful degree days (HDD). HDD accounts for non-linear impact of extreme heat. It is significant to state that for ease of interpretation, we calculate *average* degree days as done in Aragón et al. (2021), rather than *aggregate* degree days. Our interest parameter is β_2, which estimates the impact of extreme heat on food expenditure in Nigeria.

[1] This is a popular approach in measuring the impact of weather shocks on economic outcomes as evidenced in Emediegwu (2021), Hsiang & Meng (2015), Deschenes & Greenstone (2007)

[2] The states are grouped into six geopolitical zones: the North Central (NC), North East (NE), North West (NW), South West (SW), South East (SE) and South (SS)

Concerning the choice of thresholds, there is no unanimity in the literature on the most appropriate or a "one-fits-all" thresholds since the choice is dependent on the outcome measured. Consequently, we follow Aragón et al. (2021), Deschenes & Greenstone (2007) in selecting threshold floor = $8^{o}C$ and the threshold ceiling = $32^{0}C$. Rainfall is proxied by total precipitation (in mm) represented by PP and its quadratic term in equation (2.1). Moreover, the climatic variables consist of weather observations during wet and dry seasons.

With a full set of EA and zone-by-year fixed effects, we ensure that the derived estimates are plausibly free from fluctuations in weather. This is a fair assumption because weather fluctuations are fairly exogenous to other unobserved consumption expenditure factors (Aragón et al. 2021, Blanc & Schlenker 2017). Also, to account for heteroskedasticity associated with EA sizes, a weighted version of equation (2.1) is estimated where weight is the EA population derived as the sum of household population within an EA. In addition to controlling for heteroskedasticity, population-weighted models allow us to estimate impacts on an average person rather than average EA.

Results and Discussion

Main Results

Table 2. presents the results of the effect of extreme temperature on food consumption expenditure. The result shows that HDD has a negative and statistically significant effect on consumption per capita during wet seasons (column 1). In particular, an extra day of average HDD during wet seasons is associated with a 47% decrease in consumption per capita. Conversely, we find that the same marginal increase in average HDD in dry seasons has a positive and statistically significant effect on consumption per capita. This mixed result reveals that the effect of changes in HDD on consumption per capita varies depending on the season, which explains the role of seasonality. A plausible explanation for this result is that since most plantings are done in the wet season, food prices are usually higher. This finding is similar to the findings in Aragón et al. (2021), where they conclude that extreme heat shocks can reduce aggregate supply and increase agricultural prices. Therefore, households tend to reduce their consumption expenditure as a coping strategy (Hisali et al. 2011). In the same vein, food prices are generally lower during the harvesting season (dry season), and as a consequence, households tend to consume more food. As a way out for farmers faced with climatic shocks, the farmers increase their input use to attenuate the impact of extreme weather shock, thereby increasing output in the dry season which leads to reduced prices thereby increasing household consumption expenditure.

The effects of extreme heat on the purchases of cereal, tuber, animal products, and fruits are presented in columns 2, 3, 4, and 5, respectively of Table 2. From the results, average HDD has a negative and significant effect on cereal and fruits expenditure during wet seasons. An extra day of average HDD is associated with 112% and 128% decreases in cereal and fruits purchases, respectively. On the other hand, we find that the effect of a change in average HDD on tuber purchases in wet seasons is positive, although not significant. The results further show a positive effect of extreme heat on cereal, tuber, animal products, and fruits expenditure in dry seasons. However, while the effects on tuber and fruits purchases are statistically significant, those of cereal and animal products are not. Specifically, we find that an extra day of average HDD leads to 87% and 78% increases in tuber and fruits purchases, respectively.

Table 2. Effect of Temperature on Food Consumption Expenditure

	Purchases				
	ln(c/n) (1)	ln(cereal) (2)	ln(tuber) (3)	ln(animal) (4)	ln(fruits) (5)
Average DD (wet season)	0.037 (0.036)	0.202** (0.084)	0.305** (0.146)	0.091 (0.068)	0.090 (0.060)
Average HDD (wet season)	-0.468*** (0.179)	-1.119** (0.561)	0.516 (0.696)	-0.148 (0.433)	-1.277*** (0.452)
Average DD (dry season)	-0.011 (0.033)	-0.086 (0.100)	-0.200 (0.142)	-0.061 (0.072)	0.149 (0.091)
Average HDD (dry season)	0.249* (0.145)	0.356 (0.381)	0.872* (0.515)	0.260 (0.299)	0.775*** (0.244)
PRECIPITATION Controls	YES	YES	YES	YES	YES
EA controls	YES	YES	YES	YES	YES
Observations	2279	2249	2204	2279	2279
Adjusted R^2	0.61	0.68	0.66	0.64	0.55

Standard errors (in parentheses) are clustered at EA level. Temperature is measured in °C and precipitation in mm. ***p<0.01, **p<0.05, *p<0.1.

These results are in line with empirical evidence in the extant literature, which suggests that while the quantity of tubers harvested decreases with extreme heat (Aragón et al. 2021), households tend to persist in their spending on staple food items like tubers while cutting down drastically or even giving up on the consumption of other food items (Brown et al. 2009, Jensen & Miller 2008). Besides, the results suggest that households adjust their purchases in relation to the availability and, consequently, the market prices of food items. For instance, since the dry season is generally the harvesting period in Nigeria, food items tend to be a lot cheaper, stimulating household purchases. To sum up this subsection, the positive and statistically insignificant effect of extreme heat on animal product purchases indicate that the expenditure on these products are not effectively determined by the weather or season. This, in part, is because the rearing of livestock necessary for the production of the products is not seasonal and less affected by weather shocks, unlike other farm products (Gerber et al. 2013).

Robustness Results

Table 3. presents the results of the robustness checks of the main results to alternative specifications. Each row of the table represents a different specification of the model. However, only estimates of the measure of extreme heat (HDD) are reported.

No Controls: Row 1 in Table 3. re-estimates equation (2.1) with *DD* and *HDD* as the only independent variables. The results show that extreme heat has a negative and significant effect on the purchase of cereals and fruits in wet seasons. Whereas, in dry seasons, a change in average HDD has a positive and significant impact on the purchase of fruits. Generally, we find that the estimates are qualitatively similar to the baseline estimates, although some effects disappear.

No Controls (Except Precipitation): In Row 2, we replicate Row 1 specification with the inclusion of the precipitation control to check if the addition of further weather controls would affect the stability of our results. The results from this specification are similar to those in Row 1 of Table 3. Ergo, our results are not sensitive to the inclusion or exclusion of certain controls.

Aggregate Heat Units: Further, we show that our results are robust to changes in the measure of extreme heat used. We re-analysed the baseline model using aggregate DD/HDD in place of average DD/HDD as the measure of extreme heat. The result in Row 3 of Table 3. shows estimates with similar significant signs as our baseline, however, with larger estimates. The large coefficients are not surprising given the use of aggregate measure rather than an average in this scenario.

Cluster by State: We re-estimated equation (2.1) with errors clustered at state level rather than at EA level. The results presented in Row 4 of Table 3. show that our estimates are broadly consistent with the main specification, though slightly higher in a few cases.

Outliers Influence: Finally, we checked if our results are driven by outlier households. These are households with an average of 200,000 Nigerian naira (NGN) worth of annual food expenditure. Purging our data of these households does not undermine the stability of our estimates, as shown in Row 5. The effects across the different seasons are broadly similar to those of the original specification, howbeit with slightly higher magnitudes.

Overall, the results from several sensitivity checks show that our baseline estimates that measures the impact of extreme heat on Nigerian household food consumption expenditure are largely robust. Therefore, we do not expect large deviations from the baseline estimates.

Table 3. Robustness Results

	ln(c/n)		ln(cereals)		ln(tubers)		ln(animals)		ln(fruits)	
	Average HDD (wet season)	Average HDD (dry season)	Average HDD (wet season)	Average HDD (dry season)	Average HDD (wet season)	Average HDD (dry season)	Average HDD (wet season)	Average HDD (dry season)	Average HDD (wet season)	Average HDD (dry season)
1. Excluding all controls	-0.274*	0.362***	-0.934**	0.365	-0.044	0.393	-0.174	0.150	-0.916**	0.638***
	(0.166)	(0.113)	(0.471)	(0.319)	(0.626)	(0.455)	(0.359)	(0.261)	(0.056)	(0.213)
2. Excluding all controls (except prep)	-0.278*	0.381***	-0.912**	0.421	-0.051	0.432	-0.155	0.191	-0.939***	0.664***
	(0.167)	(0.112)	(0.473)	(0.320)	(0.628)	(0.457)	(0.359)	(0.263)	(0.371)	(0.21)
3. Aggregate HDD	-0.0023***	0.0021**	-0.005**	0.002	0.002	0.006*	-0.001	0.002	-0.006***	0.005***
	(0.001)	(0.001)	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
4. Cluster by state	-0.494**	0.330***	-1.118	0.335	0.516	0.871**	-0.148	0.259	-1.276*	0.774***
	(0.234)	(0.119)	(1.004)	(0.464)	(0.728)	(0.357)	(0.277)	(0.266)	(0.667)	(0.252)
5. Remove outliers	-0.514***	0.357***	-1.153**	0.377	0.492	0.980*	-0.109	0.257	-1.284***	0.808***
	(0.180)	(0.135)	(0.5666)	(0.391)	(0.707)	(0.511)	(0.433)	(0.314)	(0.454)	(0.252)

Except otherwise stated, standard errors (in parentheses) are clustered at EA level. Temperature is measured in ^{0}C and precipitation in mm. We count households with an average of NGN200,000 worth of annual food expenditure as outliers.

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

Conclusion

Our study sheds light on an important linkage between variation in extreme temperature and welfare through the effect on consumption expenditure. Existing studies show that small-scale farmers respond to extreme weather shocks through productive adjustments in non-tradable inputs to attenuate the impact of extreme weather shocks. This interpretation is consistent with predictions of producer-consumer models in the presence of incomplete markets (Aragón et al. 2021, Taylor & Adelman 2003, De Janvry et al. 1991).

Although important, non-tradable inputs such as land and family labor account for a less share of productive inputs used by small-scale farmers for abating the effect of weather shocks. Accounting for purchased intermediates such as fertilizers, irrigation water, and drought and heat-resistant varieties would give a broader effect of weather shocks on production and the plausible effect on welfare. One way is to raise the cost of production, which is transmitted through higher food prices and observed by rising expenditure during the dry seasons. Already, local food production in many parts of Sub-Saharan Africa is vulnerable to interannual weather variation, creating a sharp seasonal variation in food prices. The additional cost due to mitigating practices of extreme weather events could limit the ability of poor farmers to grow enough food, aggravate price variability, and worsen the purchasing power of net food buyers. On the other hand, since production responds sharply to food demand, the price rise could provide an opportunity for increased food production and improve the welfare of net food suppliers.

We examine how consumption expenditure responds to interannual variation on hot days using the Nigerian General Household Survey data. After conditional on the seasonality in agricultural production and other zone-time specific trends, we find that an additional average harmful degree day (HDD) is associated with a fall in consumption expenditure during the wet season but increased during dry seasons. These findings are consistent with the fact that the mitigating practices during the dry season for extreme temperatures could aggravate the prices of food staples. However, extreme heat does not significantly affect expenditure in urban areas compared to rural households. This finding is in tandem with the studies showing that climate shock will make rural households in developing countries more vulnerable and more affected than urban-based households.

Similarly, we find evidence of consumption substitution that prioritizes the expenditure on important staples. These results have important policy implications. The most obvious is that the pattern of impact carries different weights depending on seasonality, location of households, and types of food commodity. More poor people generally appear to be net food consumers and live in rural areas. Without food subsidy or compensated income, this category of people may be harder hit by extreme weather events due to a fall in their purchasing power. The afore statement contrasts studies that show that many rural households gain from higher food prices, suggesting that the overall impact on poverty remains negative (Ivanic & Martin 2008). For instance, Aragón et al. (2021) show that Peruvian farmers use productive adjustments, such as changes in input use, as strategies to attenuate drops in output and consumption.

However, because farming in Sub-Saharan Africa is majorly rain-fed, weather variability will continue to impact the ability of local producers to meet up with demand, particularly during the inventoryscarce dry months (Brown et al. 2009). Due to data limitations, we cannot exhaust other key aspects to understanding questions raised in this study. First, we cannot observe the prices of food commodities; only the total amount spent on food and non-food expenditure is used. Second, common to other recent studies of the climate economics literature (e.g., Deschenes & Greenstone (2007)), we can only observe the impact of short-term weather shocks, not climatic changes. Lastly, since consumption expenditure can be a function of price or income, our model could not disentangle these mechanisms due to data inavailabilty.

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Zərərli temperatur və istehlak xərcləri:
Nigeriya ev təsərrüfatlarından alınan məlumatlar

Xülasə

Bu məqalədə temperatur dəyişikliklərinin Nigeriyada ev təsərrüfatlarının qida məhsullarına çəkdikləri xərclərə təsiri araşdırılır. Nigeriya ev təsərrüfatlarının istehlak xərcləri ilə bağlı mikroməlumatlardan istifadə edərək həddindən artıq istilərin quru mövsümlərdə adambaşına istehlak xərclərini artırdığını, yağıntılı mövsümlərdə isə belə olmadığını aşkar etdik. Əvvəlki tədqiqatlar göstərir ki, kiçik fermerlərin torpaq kimi qeyri-ticari istehsal vasitələrindən qısamüddətli istifadə etməsi həddindən artıq istiliyin kənd təsərrüfatı məhsuldarlığına təsirini azaldır. Bu məlumatlar, iqlim dəyişikliyinin azaldılması tədbirlərinin miqyasının ekstremal hava hadisələrinin artmasına baxmayaraq qida qiymətlərini sabit saxlaya biləcəyi fikrini dəstəkləyir. Bununla yanaşı, iqlim təlatümlərini azaltmaq üçün quraqlığadavamlı texnologiyalar kimi ticarət ediləbilən resurslara qoyulan investisiyaların artması qida qiymətlərinin artmasına səbəb olarsa, xalis alıcıların rifahı pisləşə bilər. Tədqiqatlarımız şəhərdəki ev təsərrüfatları ilə müqayisədə kənd yerlərindəki ev təsərrüfatlarının quraq mövsümdə qida üçün daha çox pul xərclədiyini göstərdi ki, bu da yuxarıdakı fikrimizin bir daha təsdiqidir. Bunu quru mövsümdə həddindən artıq isti ilə əlaqədar olaraq istehsal xərclərinin daha da artması ilə izah edə bilərik. Gəldiyimiz nəticə isə budur ki, inkişaf etməkdə olan ölkələrin aqrar icmalarında hava təlatümlərinin təsirlərinə daha həssas olan ailə təsərrüfatlarına kompensasiya təklif edən siyasət dəstəklənməlidir.

Açar sözlər: *iqlim dəyişikliyi, həddindən artıq istilik, ərzaq xərcləri, sosial təminat, Nigeriya.*

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Вредные температуры и потребительские расходы:
данные, полученные от Нигерийских домохозяйств

Резюме

В этой статье рассматривается влияние изменений температуры на расходы домохозяйств на продукты питания в Нигерии. Используя микроданные о потребительских расходах нигерийских домохозяйств, мы обнаружили, что экстремальная жара увеличивает потребительские расходы на душу населения в сухие сезоны, но не в дождливжый. Предыдущие работы показывают, что мелкие фермеры смягчают воздействие экстремальной жары на производительность сельского хозяйства за счет краткосрочного использования неторгуемых производственных ресурсов, таких как земля. Эти данные подтверждают точку зрения о том, что масштабы мер по смягчению последствий изменения климата могут поддерживать стабильные цены на продукты питания, несмотря на рост экстремальных погодных явлений. Однако, когда инвестиции в торгуемые ресурсы, такие как засухоустойчивые технологии, больше, смягчение погодных потрясений может снизить благосостояние нетто-покупателей продуктов питания, если это приведет к повышению цен на продукты питания. Для дальнейшего подтверждения нашей интерпретации мы обнаружили, что по сравнению с городскими домохозяйствами сельские домохозяйства платят больше за продукты питания в сухой сезон. Мы интерпретируем это как отражение более высоких производственных затрат, связанных с экстремальной жарой в сухой сезон. Наши результаты подтверждают политику, которая предлагает компенсационный доход уязвимым домохозяйствам для смягчения последствий погодных потрясений в аграрных общинах развивающихся стран.

Ключевые слова: *изменение климата, экстремальная жара, расходы на продукты питания, благосостояние, Нигерия.*