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Poverty dynamics amidst multiple crises in Nigeria

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Our mission is to build evidence, insights, and solutions that help end extreme poverty globally.

We aim to contribute to new global and national data and evidence that governments, decision-makers, citizens and researchers can use to improve people's lives and support the world's poorest people in their efforts to escape extreme poverty.

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Executive Summary

Two in five Nigerians lived in poverty in 2018/19, representing around 83 million of the country's population (National Bureau of Statistics, 2019). During the pandemic, 10 million additional people were estimated to be living in poverty by 2022 (World Bank, 2020). Underlying these figures is the mobility of households into and out of poverty, with considerable downward mobility in a context of varied risks and multiple crises including climate-related disasters, conflict, and the Covid-19 pandemic both in terms of health and economic crises.

This paper examines three crises, namely Covid-19, conflict (focused on the Boko Haram and Fulani militia violence), climate-related disasters (droughts and floods) and their relationship with household poverty dynamics in Nigeria. To do so, it newly brings together five large datasets comprising:

- four waves of the Nigeria General Household Survey Panel from 2010/11-18/19;
- seventeen rounds of the Covid-19 National Longitudinal Phone Survey 2020-22;
- the Armed Conflict Location & Event Data Project (ACLED) yearly data from 2010-22;
- the Global Flood Observatory yearly data from 2010-18; and
- the Climate Research Unit gridded Time Series yearly data on drought from 2010-20.

Contextualising movements into and out of poverty within a backdrop of increasingly complex crises requires bringing together poverty correlates of 'people', focused on demographics and livelihoods, and 'place', related to the broader contexts that might inhibit poverty escapes, including crises. This approach is critical to ensure that pro-poor initiatives are sufficiently risk-informed to help prevent impoverishment and propel escapes from poverty that can be sustained over time.

Key findings

The results of the analysis pointed to high rates of chronic and transient poverty, particularly in Nigeria's Northern states where conflict and climate-related disasters were also prevalent. This could reflect the fact that Northern Nigeria's historical poverty rates were already high pre-conflict, with drought and discrimination against the North in Southern labour markets being key factors. We find that there is a multi-pronged relationship between exposure to violence and negative poverty trajectories, i.e., falling into poverty, remaining in poverty, or churning around the poverty line. Households residing in areas of Boko Haram violence against civilians resulting in fatalities experienced a higher probability of chronic poverty and a lower probability of resilience. There are differences depending on the time period considered - relative to the peak of violence in 2015. We find that after 2015, residing in areas of reported Boko Haram fatalities is additionally associated with a higher probability of transient poverty. Households who were directly victimised, many located in areas of

Boko Haram violence, also experienced a higher probability of transient poverty. Fulani militia fatalities were also associated with negative poverty trajectories. Moreover, in areas of drought, a higher number of Fulani militia fatalities in a community is associated with a marginally higher probability of poverty transience and a lower probability of resilience, compared to areas with no drought.

Livelihood profiles vary depending on the poverty trajectory. Conflict and drought mediate the relationship between livelihoods and poverty dynamics. Residing in areas of Fulani violence and being a victimised household would appear to make non-farm enterprises (NFEs) particularly risky.

Durable asset development is important in guarding against chronic and transient poverty amongst self-reported 'victimised' households at the bottom of the welfare distribution, though may be inadequate in helping guard against poverty transience when households are confronted directly with insecurity. Finally, possessing cultivable land itself is inadequate in helping households improve their welfare at the bottom of the distribution in areas where self-reported victimisation and/or the presence of Fulani militia violence are common. This could be on account of prevalent insecurity, with the majority of direct victimisation, whether from Boko Haram, Fulani militias, or other sources, occurring in family homes and farms.

The pandemic then further contributed to deteriorating welfare. There was a large share of households experiencing decreasing NFE income over time in 2020 and into early 2020, at a rate higher amongst the bottom two (compared to the top three) quintiles, and amongst households residing in areas with Boko Haram violent fatalities. Perhaps as a result of a challenging and risky NFE environment, many households moved away from engaging in NFEs to working on the family farm between the start of 2021 and the start of 2022. At the same time, agriculture also proved risky, with many households expecting droughts and floods to negatively affect them. More widely, alongside conflict and climate-related disasters, there is a concerning economic crisis marked partly by soaring fuel prices, where many households, particularly those in the poorest segment of the population, report paying high prices for petrol and increasingly perceive a deteriorating economic situation compared to 2021.

In this context, common micro-level coping responses to negative shocks pre-pandemic included relying on credit (especially as a response to the effects of drought or insecurity), changing work patterns, and engaging in asset sales (especially when faced with insecurity). During the pandemic, households residing in areas where Fulani militia violence was common saw their receipt of assistance, which includes food/in-kind and cash, decrease over time, whereas those in areas of Boko Haram violence saw a rise in assistance between July 2020 and March 2021. With limited support available to them, poorer households were more likely to borrow money during the pandemic mainly to purchase food, compared to richer households who borrowed for their NFEs or education. This might drive poor households to a vicious cycle of poverty and debt as they attempt to meet subsistence needs.

Policy implications

So, what can be done to respond to poverty aggravated in contexts of multiple crises? Our empirical analysis of multiple crises, namely conflict, climate, and Covid-19, shows that these can reinforce each other and influence poverty dynamics and well-being in an interactive way. Policy instruments should therefore be well-coordinated and consider these crises together. Key implications of the study for anti-poverty policy and programming are outlined in Table 1 below, for consideration by federal and state governments as well as other actors working on poverty eradication in Nigeria.

Table 1: Challenges and policy and programming interventions

Challenge	Examples of interventions
Asset drawdowns amidst sequenced crises	• Graduation-type approach, especially cash-plus interventions which are proven to increase income and food security by more than asset transfers alone. Such interventions could also prevent negative coping strategies in face of shocks – for instance, distress asset sales. • Given the study's findings around asset theft – there is a need for interventions that guard against insecurity and risk related to asset loss, e.g., evidence-based insurance products against loss of assets.
Inadequacy of agriculture amidst climate and conflict shocks	• Further development of climate-smart agricultural (CSA) practices, drawing on examples in place, e.g., Borno implementing conservation agriculture, crop diversification, improved seeds, soil fertility management. • Adoption of technology in agriculture, such as drought-resilient crop varieties or appropriate mechanisation. • CSA as well as technological adoption in agriculture should pay particular attention to the impacts of flooding and drought, insecurities due to violent conflict, and pre-existing vulnerabilities related to poverty and gender.
Volatility of non-farm enterprises amidst conflict and Covid-19	• Reforms of the business environment that take into account the economic, market and political context – as well as potential impact on vulnerable groups. • Use reforms to promote local conflict-resolution and peacebuilding with the aim to foster legitimacy and inclusivity—which can help contribute to a more stable context for business environment reforms to be successful.
Unsustainable debt levels among poorer households following Covid-19	• Debt management interventions to help people struggling with debt. • Social protection instruments, for instance Covid-19 cash transfers aimed at reduction of household debt accumulated during the pandemic and promoting financial recovery from crisis. • Expansion of financial inclusion initiatives, for instance widening the coverage of mobile money and micro-finance institutions.
Inadequacy of risk-informed development	• Recognize interdependences across sectors. • Focus on all facets of risk reduction "including preventing hazards, reducing exposure and vulnerability and building adaptive capacity" (UNDRR, 2021). • Redoubling of public assistance and expansion of coverage in pastoral-farmer conflict areas, given that areas of Fulani militia violence received significantly lower assistance during the pandemic compared to areas affected by BH conflict. • Support recovery programs to go on for longer than they do. • Develop flexibility of underlying political and economic governance structures and a commitment to multilateralism and partnerships

Introduction

Two in five Nigerians lived in poverty in 2018/19, representing around 83 million of the country's population (National Bureau of Statistics, 2019). During the pandemic, 10 million additional people were estimated to be living in poverty by 2022 (World Bank, 2020). Underlying these figures is the considerable mobility of households into and out of poverty. Many households in the country rely on assets, such as land and education, together with income-generating activities on and off the farm to generate pathways out of poverty. At the same time, households experience a range of shocks and stressors to their asset base and livelihoods that can propel poverty descents (Diwakar and Adedeji, 2021). Some of these risks are embedded in a range of complex crises in the country. Macro constraints to poverty reduction in Nigeria have been identified as lack of inclusive growth, high volatility due to oil exports, a weak policy framework, high youth unemployment, high population growth coupled with weak human development, low productivity in agriculture, and spatial inequality between rural compared to highly urbanised areas as well as Northern compared to Southern areas (Anyawu, 2012; Odozi et al., 2018; World Bank, 2014; IFC, 2020; The World Bank, 2022; OPHI and UNDP, 2020).

Crises such as climate-related disasters, conflict, forced displacement and the Covid-19 pandemic have also affected people's welfare (ACLED, 2021; Onwujekwe et al., 2012; NBS, 2020; Andam et al., 2020;Amare et al. 2021). Recent trends show that these crises became amplified in terms of intensity, frequency, and the impact on people living in poverty. The number of fatalities and the number of people facing forced displacement due to armed conflict has increased in the last two decades (World Bank, 2022; World Bank and UNCHR, 2016). For example, as much as 3.65 million people were internally displaced by conflict and violence in 2022 in five regions (the North East, Central, North West and North Central regions and Niger state), while another 2.44 million people were internally displaced due to flooding and heavy rains between June and November 2022 alone (IDMC, 2023). Already among the 10 most climate vulnerable countries in the world (USAID, 2019), Nigeria is projected to face an increased frequency and intensity of droughts and floods (Shiru et al. 2020; World Bank, 2021). Finally, projections show that Covid-19 caused a 14-percentage point increase in the poverty headcount rate during lockdowns (Andam et al. 2020). On average, Nigerians driven into poverty by Covid-19 are more southern, more urban, and more likely to work in the service sector (The World Bank 2020a). The individual effects of these shocks on household welfare are well-documented. However, to date, limited studies investigate poverty dynamics amidst multiple crises.

This paper examines three complex crises, namely Covid-19, conflict, and climate-induced shocks and stressors, and its relationship with household poverty dynamics in Nigeria. To do so, it newly brings together five large datasets comprising:

- four waves of the Nigeria General Household Survey Panel from 2010/11-18/19,
- 17 rounds of the Covid-19 National Longitudinal Phone Survey 2020-22,

- the Armed Conflict Location & Event Data Project (ACLED) yearly data from 2010-22,
- the Global Flood Observatory yearly data from 2010-18, and
- the Climate Research Unit gridded Time Series yearly data on drought from 2010-20.

The paper argues that it is important to consider poverty amongst both 'people' and 'place' (Ravallion, 1999) in responding to poverty dynamics amidst polycrisis. Profiles and correlates of poverty trajectories in the empirical literature on Nigeria typically centre on people's livelihood strategies and demographics (Diwakar and Adedeji, 2021). Equally important, however, are factors of 'place'—contexts including that of layered crises that can affect people's ability to develop pathways out of poverty. Contextualising movements into and out of poverty within a backdrop of increasingly complex crises in particular geographies is critical to ensure that pro-poor initiatives are sufficiently risk-informed to help prevent impoverishment, stabilise wellbeing and even propel escapes from poverty that can be sustained over time – though the achievement of poverty escapes is likely to be particularly challenging in areas affected by conflict and climate change.

The empirical analysis provides strong evidence of a complex relationship between poverty trajectories and the different crises. Most notably, Boko Haram fatal violence against civilians is associated with a higher probability of chronic poverty and a lower probability of resilience, particularly where conflict is measured over a longer term prior to its peak in 2014. This highlights the particularly damaging effect of protracted conflicts for prospects of escaping poverty. Fulani militia fatalities were also associated with negative poverty trajectories.

In terms of the relationship between climate and poverty, we find evidence that the presence of severe or extreme drought is associated with a higher probability of transient poverty. Moreover, in areas of drought, a higher number of Fulani fatalities is associated with a higher probability of poverty transience and a lower probability of resilience. Asset development[1] is important in guarding against chronic and transient poverty as well as promoting household welfare and resilience. Interestingly, the positive effect of assets on poverty trajectories loses significance when households are directly victimised, possibly because assets get stolen, destroyed, or become unusable. The Covid-19 pandemic provided a further shock to household welfare, with a large share of households experiencing decreasing NFE income and moving into activities on a family farm. The agricultural sector was also perceived as being risky, with many households expecting droughts and floods to negatively affect farm income. These factors taken together point to a combined crises of climate-related disasters, conflict, and a deterioration in economic conditions which have very significant effects on poverty dynamics.

The next section summarizes literature on multiple crises and their relationship with poverty. Section 3 then presents the datasets and methods used for the analysis. Section 4 presents

[1] Asset development refers to durable items, such as furniture, stoves or radios, or other household items.

descriptive statistics on poverty dynamics and multiple crises, correlates of regression-based analysis of poverty dynamics including the role of conflict and climate-related disasters in moderating correlates of poverty dynamics. It also presents an analysis of how Covid-19 and subsequent layered crises has affected people's income and wellbeing across the welfare distribution, before assessing household coping strategies in these crises before and during the pandemic. Section 5 concludes with consideration of the policy implications of the study.

Context: Poverty amidst conflict, climate change and Covid-19 in Nigeria

Conflict and poverty

There have been several armed conflicts in Nigeria, with strong variations at the subnational level. For example, over the last two decades these have included terrorist movements like Boko Haram[2] in the northeast, violence resulting from Fulani militia violence[3], especially along Nigeria's Middle Belt region, and other forms of violence, such as violence related to oil disputes in the Niger Delta region. Fatalities due to armed conflict have increased over the last two decades, especially in the north of Nigeria (World Bank, 2022). This has also contributed to rising forced displacement of as much as 2.5 million people due to the Boko Haram insurgency by 2016 (World Bank and UNCHR, 2016). There is a seasonal dimension to certain types of conflict, where Fulani militia violence related fatalities spikes in the lean season during the summer months (World Bank, 2022), which in turn limits farmers' access to inputs, fields and water sources, thus creating additional pressures that provide fertile grounds for conflict (Adelaja and George, 2019).

The empirical literature on violence in Nigeria finds it is typically associated with a host of negative outcomes in terms of monetary and multidimensional poverty. For example, examining general bouts of violent conflict in the country, Odozi and Oyelere (2019) find that recent and long-term exposure to conflict is associated with higher poverty incidence, poverty gap and poverty severity. Some of these channels may be attributed to disrupted agricultural markets amidst conflict (Awodola and Oboshi, 2015; Blankespoor, 2021). The influx of IDPs resulting from conflict and climate-related disasters is also found to negatively impact household level food security in host communities (George and Adelaja, 2022).

A few sources further investigate multidimensional outcomes specifically attributed to Boko Haram-related violence. These find that individuals exposed to terrorist fatalities have a higher probability of giving birth to children with low birth weight, or that children's weight and stunting status is worsened (Nwokolo, 2015; Ekhator and Asfaw, 2019). Education also suffers, with Boko Haram violence found to be associated with a lower number of years of schooling amongst children exposed to conflict during primary school years (Bertoni et al., 2017; Diwakar, 2021). Despite this body of evidence, we were unable to find any studies to

[2] Boko Haram is an Islamist militant organisation operating in the Northern provinces of Nigeria, tracing its beginnings to the 2009 insurgency, where the group started an armed rebellion against the government of Nigeria.

[3] According to ACLED's definition, Fulani militia violence falls under the category of violence caused by "identity militias", which are understood to be armed and violent groups organized around a collective, common feature including community, ethnicity, region, religion or, in exceptional cases, livelihood. Much of the violence involving Fulani militias centres around disagreements between pastoralists and farming communities. Note that while Fulani militias operate as part of the broader Fulani community, they are not representative of the community as a whole.

date that have empirically assessed the impact of multiple crises, i.e. the interaction of violent conflict, climate, and Covid-19, on poverty dynamics.

Climate change and poverty

Nigeria is among the 10 most climate vulnerable countries in the world (USAID 2019), facing diverse climatic hazards, including floods, storms, ocean surges, droughts and wildfires. Over 41 million people - 24 percent of the population - live in high climate exposure areas (USAID 2019). Among key hazards are floods and droughts. Over 10 million people are estimated to have been affected by floods between 1900-2020 (The World Bank 2021). Droughts are particularly pronounced in Nigeria's eastern and central regions, which experience rainfall anomalies and aridity. Climate projections show that increasing temperatures are likely to make droughts more frequent in most of the country (Shiru et al. 2020). Given that poor people are disproportionately exposed to floods and droughts in Nigeria (Winsemius et al. 2018) due to being located near large rivers and delta areas, the projected increase in frequency and intensity of those natural shocks will likely hit people living in poverty the hardest.

Most poor households in Nigeria work in agriculture, making them particularly exposed to the negative effects of climatic shocks. For example, analyses of the impact of the 2012 flood in Nigeria found that per capita expenditure of households that were dependent on agriculture was reduced and many experienced heightened food insecurity, through damages to crop yields as well as destruction of infrastructure including homes (Urama, Eboh, and Onyekuru 2019; Mmom and Aifesehi 2013; Ezemonye 2015). Drought has also affected welfare. An analysis of drought in Yobe state found that it negatively affect crop yields and reduced agricultural revenues and food availability (Eze 2018).

Drought is also observed to negatively affect labour market outcomes. (Efobi 2022) analyses a nationally representative sample of Nigerian households and finds that women who were exposed to droughts in early stages of their life have a lower probability of working and face a lower quality of jobs, potentially through lower education levels as a key transmission channel. Finally, beyond consumption and income, rainfall shocks of the magnitude of a 10 percent positive deviation of rainfall from long-term trends have also been found to negatively affect child health in Nigeria, for example by reducing weight-for-height Z scores by 17 percent of the median value (Rabassa, Skoufias, and Jacoby 2012).

Covid-19 and poverty

In Nigeria, projections show that Covid-19 caused a 14-percentage point increase in the poverty headcount rate, pushing an estimated additional 27 million people below the poverty line during lockdown (Andam et al. 2020). On average, Nigerians forced into poverty by Covid-19 are more southern, more urban, and more likely to work in the service sector (The World Bank 2020a). According to the report from a first round of a nationally representative Nigeria Covid-19 National Longitudinal Phone Survey, conducted between April and May

2020 (at the time of the national lockdown), 79% of respondents reported that their households' total income has decreased since mid-March (The World Bank 2020b) . A key channel was a reduction in employment, with the most affected sectors being commerce, service, and agriculture. Additionally, 35-59% households struggled to purchase food due to higher prices and 26% of respondents couldn't access medical treatment when they needed it (The World Bank 2020b). Our findings in this paper from an analysis of later survey rounds also point to a continued deteriorating economic situation into 2022. Moreover, the fuel subsidy removal in 2023 has also heightened economic pressures on households (Eyo, 2023).

Empirical studies confirm the negative effect of the Covid-19 pandemic on poverty-related outcomes in Nigeria. Diwakar and Adedeji (2021) find that there is a vicious cycle where households already in poverty face volatility in income from non-farm enterprises, increased hunger, and are forced to draw down on their assets to cope, thus limiting pathways out of poverty that were common pre-pandemic. Amare et al. (2021) exploit spatial variation in Nigerian households' exposure to Covid-19 in a difference-in-difference framework[4] and find that lockdown measures are associated with 6–15 percentage points increase in food insecurity. The authors also find significant effects on labour market participation - there is a 12-percentage point reduction in the probability of participation in non-farm business activities for households exposed to lockdown measures. Of particular relevance for this paper is the finding that households living in conflicted-affected zones see an additional statistically significant deterioration in food security of 2-13 percentage points, highlighting the complex interplay of different crises (Amare et al. 2021).

The 'triple C' crisis (Covid-19, conflict, and climate-induced shocks and stressors) is thus particularly prevalent in Nigeria. However, to date, limited studies investigate poverty dynamics amidst multiple crises. The study by (Amare et al. 2021) does recognize the impacts of conflict during the pandemic, but this is not explicitly linked to poverty or its dynamics. Consideration of movements of households into and out of poverty is important in developing better tailored policy and programmes to get to zero poverty (Shepherd et al., 2014), including in crises contexts (Diwakar, 2021). Conceptually, this paper draws together a focus on livelihoods of people in poverty with a focus on crises, thus drawing attention to poverty amongst 'people' and 'places' (Ravallion, 1999) in its investigation of correlates of poverty dynamics.

[4] A difference-in-differences framework is a quasi-experimental research design used in for causal inference in econometrics. It attempts to mimic an experimental research design using observational study data, by studying the differential effect of a treatment on a 'treatment group' versus a 'control group'. It calculates the effect of a treatment on an outcome by comparing the average change over time in the outcome variable for the treatment group to the average change over time for the control group.

Data and methods

Datasets

This study brings together five datasets on the following topics:

- **Poverty**: The Nigeria General Household Survey (GHS) Panel, with waves in 2010/11, 2012/13, 2015/16, and 2018/19, and that includes data on household consumption and various correlates of welfare. This survey, implemented by the National Bureau of Statistics and the World Bank, is representative at national and regional levels. We rely on a balanced panel of 1,326 households available across the four survey rounds.
- **Pandemic**: Covid-19 National Longitudinal Phone Surveys (NLPS) which was conducted to understand the socioeconomic impacts of the pandemic in its first phase, and the crises that followed in its second phase. Its sample derives from the GHS 2018/19 wave. We again rely on a balanced panel of 1472 households present across the 12 survey rounds in Phase 1, and 2181 households present across 5 survey rounds in Phase 2.
- **Armed conflict**: Data on conflict from the Armed Conflict Location & Event Data Project (ACLED) for geolocated conflict events and fatalities. We rely on conflict data in Nigeria from 2000 to 2022, focusing on conflict fatalities stemming from Boko Haram violence against civilians and from the Fulani militia. This represents the total number of fatalities that were reported across all sides of the event. Fatalities are not attributed to specific groups.
- **Floods**: We rely on data from the Global Flood Observatory, an open-source data repository created by Cloud to Street and The Flood Observatory. Estimates of floods are developed using nearly two decades of daily satellite imagery at 250 metre resolution from NASA's MODIS. New estimates of flood extent and population exposure analyse over 913 large flood events from 2000-2018, estimating 2.23 million km2 of flooded area and 290 million people directly affected (Tellman et al. 2021).
- **Droughts**: We use data on global precipitation and potential evapotranspiration from the Version 4 Climate Research Unit gridded Time Series (CRU TS) for years 2010-2020. Monthly values of precipitation are derived by the interpolation of monthly climate anomalies from extensive networks of weather station observations globally. Potential Evapotranspiration (PET) is calculated using the Penman-Monteith formula, taking into account mean temperature, vapour pressure, cloud cover and average wind field values (Harris et al. 2020). The difference between monthly precipitation and PET, expressed in mm/month gives the water balance that is the basis for SPEI calculations.

These datasets have advantages and limitations. A clear advantage is their geolocational data, which is merged together based on latitude and longitude of households and crises, with a slight offset, i.e., random displacement of the actual GPS location by 20 km, in the household survey data to protect anonymity. Another key advantage is the panel

construction of the dataset which allows for dynamics to be assessed. Even so, there are various limitations, including different degrees of precision across datasets, ranging from 250 meter resolution of flooding to 55km radii for the drought data. In addition, conflict data is notoriously difficult to accurately capture, with various forms of underreporting common (Eck, 2012). Known biases in the measure of fatalities are also discussed in (ACLED, 2023), including incentives of conflict actors to either over-state or under-state true fatalities to appear stronger or out of fear of international backlash, as well as the inability of the fatalities measure to accurately capture the experiences of women, who are more likely to be victims of sexual violence that might not necessarily result in death. In our household survey data, Borno, a highly conflict-affected state, had increasingly limited coverage over time as a result of insecurity, resulting in estimates that are likely to be biased downwards. We attempt to mitigate some of these issues, for example through investigating attrition and employing different measures of crises and sensitivity analysis, as noted below and in the annex.

Key variables pre-pandemic

As in Diwakar and Adedeji (2021), we focus on relative poverty dynamics, to mitigate limited comparability of consumption aggregates between GHS rounds. To construct relative poverty status, we identify households in poverty as those who have per capita expenditures in the bottom two quintiles per survey year, and thereafter create poverty trajectories (Box 1). This inevitably means that there are differences in identification with absolute poverty, whereby some households who are above the national poverty line might still be in relative poverty using our definition. Even so, this construction is particularly useful in strengthening links with the pandemic survey data, where we also consider pre-pandemic welfare quintiles in our analysis as noted below.

Box 1: Definition of relative poverty trajectories used in this study

Chronic poverty is long-term poverty that persists over many years or even a lifetime and is often transmitted intergenerationally. In the quantitative data, it refers to households consistently in the bottom two quintiles across waves, which roughly equates with the national poverty rate in the country pre-pandemic (40.1% in 2018/19) (NBS, 2020). **Transience** in this study refers to the process whereby a person or household that is non-poor (in the top three expenditure quintiles) at some point in the survey subsequently slips into poverty (the bottom two quintiles)- hence experiencing impoverishment, a transitory escape from poverty, or churning around the poverty line. **Resilience** refers to individuals or households that either escape and remain out of poverty over the long term (a sustained poverty escape or remain never poor across survey waves.

Source: adapted from Shepherd et al. (2014)

A key variable of interest is armed conflict. We define this in three different ways. First, we capture the number of conflict fatalities due to Boko Haram violence, and separately due to Fulani militia violence, in each case measured in terms of whether it occurred in a 20km radius of the household. Second, we consider the conflict debt, i.e., the build-up or 'stock' of conflict that takes into account the presence of conflict in previous years. We estimate

conflict debt as a function of a decay parameter which gives stronger weight to more recent years of conflict.[5] Third, we make use of a retrospective module on conflict in the 2015 GHS wave, whereby we identify 'victimised' households as those self-reporting where a family member was killed, suffered physical aggression, injured or disabled from a direct attack, suffered sexual violence, was forced to work for free, was internally displaced, or was captured/ kidnapped/ abducted or robbed between 2010 and 2015. Though this last measure only corresponds to the first three GHS panel waves, it provides useful detail in terms of actual experiences of violence.

To investigate drought, we adopt the Standardised Precipitation Evapotranspiration Index (SPEI) as a measure of drought intensity, which takes into account both temperature and precipitation data, accounting for the multi-scalar nature of drought and the impact of global warming (Vicente-Serrano, Beguería, and López-Moreno 2010). We define the SPEI for December each year during the period 2000-2018 using monthly data on precipitation and potential evapotranspiration from the previous 12 months, all relative to the reference period from 1981 to the year for which SPEI is defined. Given that the spatial resolution of the Version 4 CRU TS dataset is coarser than the geographical coordinates of households available in the GHS, we calculate SPEI for each 0.5 x 0.5 degrees grid cell (about 55km as measured at the Equator) and assign that value of the drought index to every household that falls within that grid cell. We consider drought episodes (SPEI <-1.5) over the period 2000-2018, given the persistent effect that climatic shocks can have on households. Negative values of SPEI indicate relatively dry periods and positive values relatively wet periods.

Finally, to identify households within the GHS panel in Nigeria that were affected by floods, we apply several different definitions of flood. The first approach defines a household as exposed to a flood if their geographical coordinates fall within the 250-metre spatial resolution grid cell that was classified as flooded in the data from the Global Flood Observatory. Each grid cell has a binary variable indicating whether the area was flooded as well as flood duration and population affected. Considering that flooding will likely also negatively impact households in the proximity of the most directly affected areas and that people can farm in locations other than their home, we extend the definition of households experiencing floods to any household whose geographical coordinates are within a 10km, 20km, and 30km radius of the directly flooded area. This broader definition aims to account for potential indirect effects of floods, such as disruption caused to local infrastructure, spikes in commodity prices, and a decrease in agricultural output.

Methods

We first examine key correlates of relative poverty dynamics in Nigeria relying on the GHS merged with conflict and climate-related disaster data. As we are interested in studying movements in and out of poverty, i.e. the dynamics of poverty over time, rather than a static

[5] We follow a process described in Mueller and Techasunthornwat (2020) to estimate conflict debt.

poverty status at one point in time - we disaggregate our outcome variable into possible trajectories: chronic poverty, poverty transience, and resilience. We rely on a multinomial logistic regression given the different poverty trajectories as our outcome. In the model:

$$Pr\left(Trajectory_{i,t} = 1 \,\middle|\, \beta,\, v_{i,t}\right) = F\left(\beta_0 + \beta_1 Crises + \beta_2 Activity_{i,t} + \beta_3 Assets + \beta_4 Head_{i,t} + \beta_5 Area_{i,t}\right)$$

Where:

- $Trajectory_i$ as the probability of household i being chronically poor, experiencing poverty transience, or exhibiting resilience;
- $Crises$ is a vector capturing the presence of conflict fatalities or self-reported victimisation, drought, and floods over the survey waves;
- $Activities$ includes the economic activities of the household head (whether they work in agriculture, a non-farm enterprise, or in wage or salaried employment);
- $Assets$ are defined as the log of consumer durables and the ownership of cultivable land;
- $Area$ is a vector covering whether the household resides in an urban or rural area, and the state-level unemployment rate; and
- H is a vector of household and demographic controls (religion, gender, age and age-squared, education, and household size).

In addition to our main model, we also examine interaction of crises with household livelihoods. This is to understand the extent to which conflict and climate-related disasters might mediate the relationship between livelihood profiles and poverty dynamics. We finally also separately include controls for self-reported shocks including ill-health, but results remain consistent to our main model.

In our multinomial logistic models, we cluster standard errors at the level of the enumeration area. To further assess sensitivity alongside our multiple measures of crises, we also use a linear panel model with fixed effects estimators to examine correlates of changing poverty status, where we rely on the same set of household and area regressors but take into consideration its time variance to exploit the panel structure of the data. This is also partly an attempt to mitigate limitations stemming from potential endogeneity given the complex relationships between conflict, climate-related disasters and poverty, as noted in Section 2 and as we discuss in more detail in the annex. In all cases, we calculate marginal effects of our variables.

Alongside the regression analysis of pre-pandemic welfare, we also descriptively examine changes over time during the pandemic. For this, we analyse both phases[6] of the National

[6] Phase 1 was implemented from April 2020 to April 2021 and included 12 rounds of monthly phone interviews with over 1,700 households that were selected from the General Household Survey-Panel (GHS-Panel) 2018/19. Phase 2 began after April 2021 with the aim to o monitor in real-time how the Nigerian households are coping with national and global crises and their effects on the welfare and livelihoods of the households.

Longitudinal Phone Survey (NLPS) comprising 17 rounds between 2020 and 2022. The purpose of this is to understand how Covid-19 may have affected some of the key activities that correlate with poverty, and thus acted as an additional crises hypothesized to affect wellbeing and poverty. Given that the NLPS derives its sample frame from the last wave of the GHS, we are also able to make use of pre-pandemic expenditure quintiles of households and further disaggregate the trend analysis of pandemic data to understand changes in wellbeing across the welfare distribution. We compare the top 60% of the welfare distribution to the bottom 40%, the latter comparable to the share of population under the national poverty line in 2018/19. This is similar to a process undertaken in Diwakar and Adedeji (2021), though we extend it here using an additional eight rounds of pandemic data that has more recently become available, and with newer modules capturing the impacts of emerging crises, including victimisation, climatic shocks, as well as food and energy price inflation.

Finally, we explore how households have been coping prior to and during the pandemic, and amidst different shocks including conflict and climate-related disasters, to assess implications for their future wellbeing. Across models and methods, it is worth stressing that our analysis is not causal but descriptive and/or indicative of correlations between key variables. Even so, they remain important in providing insights into the presence of poverty dynamics and wellbeing amidst multiple crises.

Crises and poverty dynamics

Presence of poverty dynamics and multiple crises

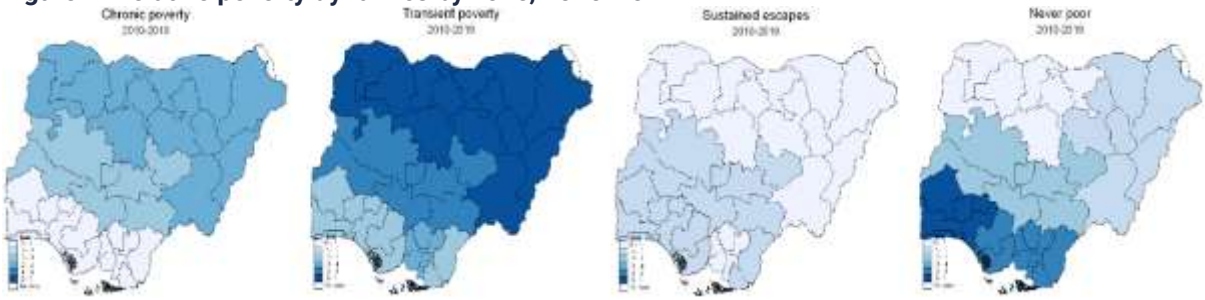
Key messages

- Relative chronic poverty between 2010 and 2019 was concentrated in the northern zones, as was poverty transience. These are also areas with high rates of Boko Haram and Fulani militia violence-related fatalities. Instead, sustained escapes from poverty and households that were never poor were predominantly located in the southern zones, below the Middle Belt.
- Flooding and extreme or severe drought have both been particularly pronounced in Nigeria's Middle Belt.

The international poverty headcount ratio in Nigeria has fallen but the numbers of people living in poverty has risen since 2003. **By 2018/19, two in five Nigerians lived in poverty, representing around 83 million of the country's population (National Bureau of Statistics, 2019). During the pandemic, 10 million additional people were estimated to be living in poverty by 2022** (World Bank, 2020).

These poverty trends are underpinned by movements into and out of poverty that vary across the country. Sub nationally, **relative chronic poverty between 2010 and 2019 was concentrated in the northern zones, as was poverty transience. Instead, sustained escapes from poverty and households that were never poor were predominantly located in the southern zones** of the country (*Figure 1*). This also largely reflects the prevalence of multidimensional poverty, clustered in the Northern zones over a similar timeframe (OPHI, 2020).

Figure 1: Relative poverty dynamics by zone, 2010-2019



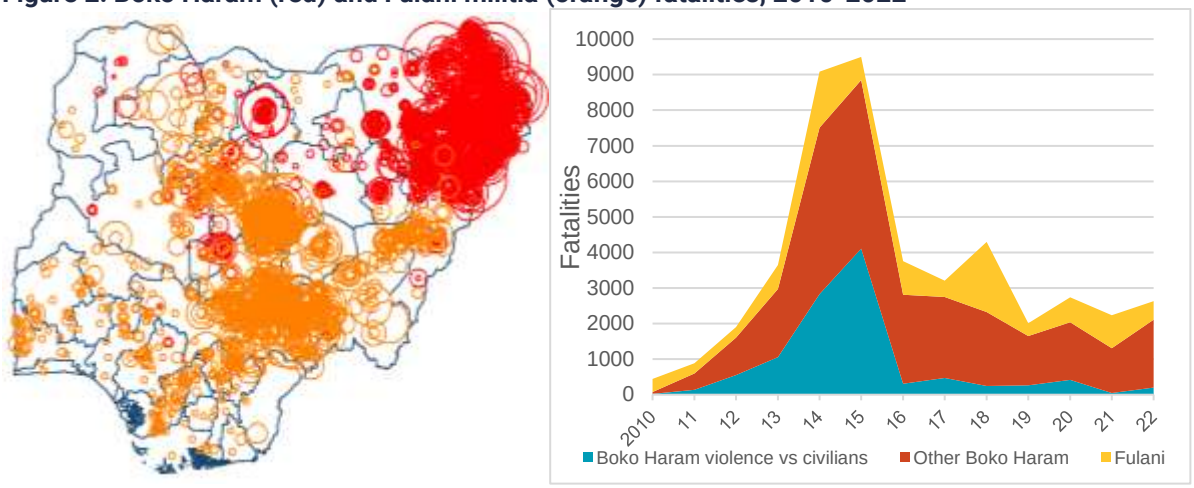
Note: Calculations of poverty dynamics are based on a balanced panel across four waves of The Nigeria General Household Survey (GHS) Panel, covering years 2010/11, 2012/13, 2015/16, and 2018/19.

States in the Northeast, particularly prone to poverty transience, also saw high rates of Boko Haram-related violence against civilians (Figure 2, left). Between 2010 and 2022, violence involving Boko Haram claimed the lives of 36,583 people according to data from ACLED. There was a peak in 2015, which saw 4735 fatalities due to the Boko Haram insurgency, though fatalities from the conflict continued well into 2022 (Figure 2, right).

Instead, Fulani militia-related fatalities were particularly pronounced in the Middle Belt of Nigeria within the North Central zone, an area which also saw moderate rates of relative

chronic and transient poverty, and lower nonpoor and sustained escape populations. Over the same period, there were 9,742 fatalities due to Fulani militia-related violence, with slight peaks in 2014 and 2018 (Figure 2, right). There are also seasonal spikes in Fulani militia violence typically corresponding to the lean season where limited resources exert increased pressures on pastoralism and agriculture (World Bank, 2022).

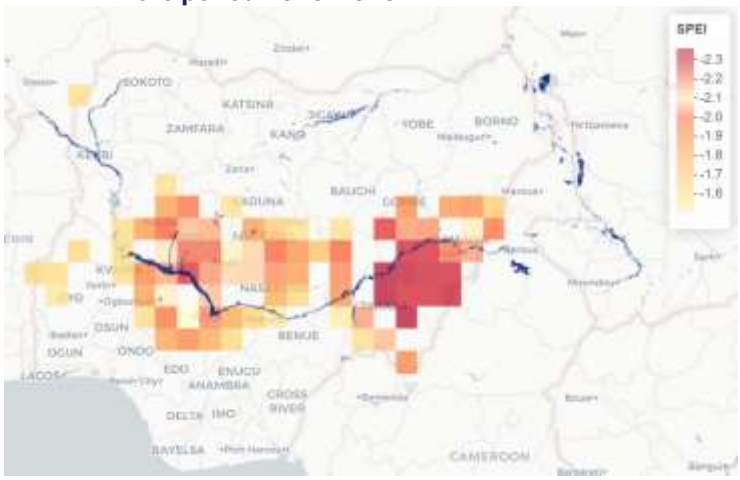
Figure 2: Boko Haram (red) and Fulani militia (orange) fatalities, 2010-2022



Note: 'Other' Boko Haram refers to Boko Haram fatalities not classified directly as 'violence against civilians'.
Source: analysis of Armed Conflict Location & Event Data Project (ACLED) 2010 to 2022 data.

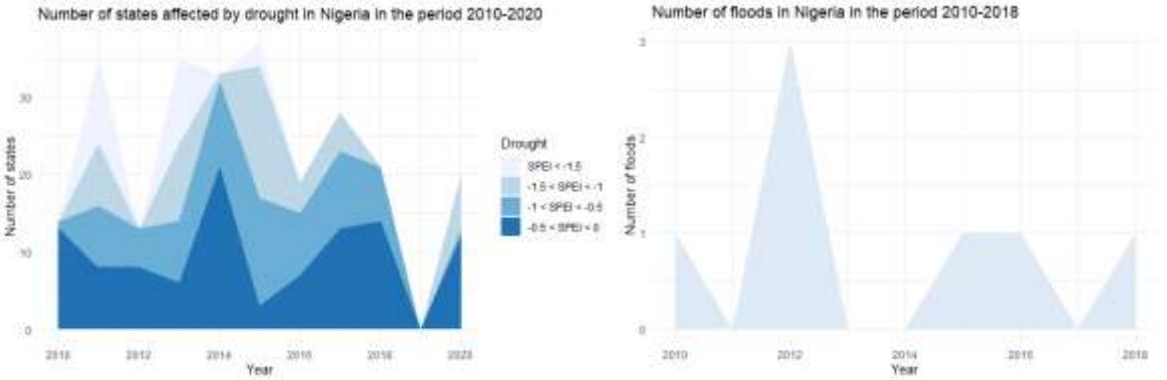
Climate-related disasters also exhibited subnational variations in Nigeria over the last twelve years, as seen in *Figure 3*. **Flooding and extreme or severe drought have both been particularly pronounced in Nigeria's Middle Belt**, though more moderate drought conditions also exist in southern states. Over time, central parts of the country experienced between one to three drought events in the period 2010-2020. Figure 4 shows the number of states affected by drought in Nigeria, for different intensities of drought as measured by SPEI. The most widespread droughts occurred in 2011, 2013, and 2015. In terms of the number of floods, there is a notable spike in 2012, when three independent flood events happened across the country, as shown in Figure 4.

Figure 3: The worst experienced drought (SPEI < - 1.5) in the period 2010-2020 and flooded areas in the period 2010-2018



Source: analysis of Version 4 Climate Research Unit gridded Time Series (CRU TS) 2010-2020 and Global Flood Database 2010-2018 data.

Figure 4: Drought (left) and flood (right) presence over time



Note: Graph on left refers to worst flood event within the state per year. Source: analysis of Version 4 Climate Research Unit gridded Time Series (CRU TS) 2010-2020 and Global Flood Database 2010-2018 data.

Poverty of place: Crises correlates of poverty dynamics

Key messages

- Boko Haram fatal violence against civilians occurring within 20km of households over the survey period is associated with a higher probability of chronic poverty and a lower probability of resilience, particularly where conflict is measured over a longer term during the early waves of the survey prior to its peak in 2014. The presence of self-reported exposure to violence, particularly prevalent in areas of Boko Haram violence, is associated with a higher probability of transient poverty and a lower probability of resilience.
- In terms of climate-related disasters, the presence of severe or extreme drought over the survey period is associated with a higher probability of transient poverty. Moreover, in areas of drought, a higher number of Fulani militia fatalities is associated with a slightly higher probability of poverty transience and a lower probability of resilience.

As noted in Section 2, there are a range of contextual factors correlated with poverty in Nigeria. We first examine the relationship between poverty trajectories and fatalities resulting from Boko Haram violence against civilians within a 20km radius from households. **There is a strong association between the long-term effects of Boko Haram violence in the period prior to its peak in 2014 and chronic poverty. These long-term effects are also associated with a lower probability of resilience** (*Table 2*). Moreover, these results persist when including household and area fixed effects (columns 2 and 5). There is also a relationship between short-term Boko Haram violence and chronic poverty, though this loses statistical significance when including household and area fixed effects, which control for household and area- specific factors that do not change over time. It is worth noting that the North of Nigeria, where the Boko Haram conflict is concentrated, was already much poorer relative to the rest of the country even prior to the insurgency, further highlighting the complexity of the relationship between conflict and poverty – we discuss the potential issue of reverse causality in Annex C. We finally also consider the cumulative conflict debt that may have accrued, where there is again the expected directionality across trajectories, but only significant in the case of chronic poverty. Together, these results point to a multi-pronged relationship between Boko Haram violence and negative poverty trajectories of households.

We are also interested in understanding pathways through which conflict might affect poverty trajectories. One such way this might occur is through harm to family members or households, which can be a direct form of victimisation from conflict. Descriptively, 18% of households living near Boko Haram violence reported victimisation, compared to 5% elsewhere, the former which could reflect victimisation due to the conflict itself. In the regression analysis, **the presence of self-reported exposure to violence is associated with a higher probability of transient poverty and a lower probability of resilience** (Table 2 column 7). This suggests that a key transmission mechanism in the relationship between conflict and poverty dynamics in Nigeria is through direct channels of impact. Sensitivity tests to these results are discussed and presented in Annex C, and broadly support this conclusion. We consider indirect impacts via livelihoods in Section 4.3.

In terms of violence related to the Fulani ethnic militia, it is the long-term effects of conflict that is consistently associated with a higher probability of chronic poverty. Instead, short-term effects are associated with a higher probability of transient poverty. Finally, including household and area fixed effects also contributes to a negative and statistically significant relationship between conflict and sustained escapes from poverty. These results suggest that **the legacy of Fulani militia violence prevalent in the Middle Belt of Nigeria may potentially contribute to the persistence of poverty, whereas shorter-run dynamics of violence instead may be prompting poverty mobility** by pushing households into poverty or preventing them from escaping or remaining out of poverty.

Besides conflict, **the presence of severe or extreme drought is also associated with a higher probability of transient poverty that is significant across most specifications**. It is moreover associated with a lower probability of resilience even when controlling for Boko Haram violence; however, it loses significance in the main Fulani specifications, likely on account of the inextricable links between Fulani militia violence and climatic conditions, thus with the relationship being partly captured through the Fulani variable. Flooding also loses significance when household and area fixed effects are considered, suggesting that these factors may play an important role in its relationship with poverty dynamics.

Table 2: Crises and poverty trajectories

Conflict		Boko Haram			Fulani			General
		Fatalities	Fatalities	Conflict	Fatalities	Fatalities	Conflict	Victimisation
Variables		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Short-run	CP	0.0013*	0.0003	N/A	-0.0000	-0.0003	N/A	-0.0073
conflict		(0.0007)	(0.0005)		(0.0015)	(0.0004)		(0.0348)
	TP	0.0008	0.0001	N/A	0.0025***	0.0019***	N/A	0.1575**
		(0.0007)	(0.0004)		(0.0009)	(0.0007)		(0.0668)
	R	-0.0020	-0.0004	N/A	-0.0025	-	N/A	-0.1502***
		(0.0014)	(0.0007)		(0.0020)	(0.0006)		(0.0581)
Long-run	CP	0.0018*	0.0008*	0.0334*	0.0035*	0.0025**	0.0209	N/A
conflict		(0.0009)	(0.0005)	(0.0196)	(0.0020)	(0.0010)	(0.0139)	
	TP	0.0023***	0.0005	0.0516	-0.0006	-0.0022	-0.0131	N/A
		(0.0009)	(0.0004)	(0.0456)	(0.0024)	(0.0018)	(0.0265)	
	R	-0.0040**	-0.0013**	-0.0850	-0.0029	-0.0004	-0.0077	N/A
		(0.0016)	(0.0006)	(0.0589)	(0.0031)	(0.0014)	(0.0197)	
Drought	CP	0.0487	-0.0185	-0.0189	0.0104	-0.0413	-0.0304	-0.0216
		(0.0477)	(0.0278)	(0.0276)	(0.0485)	(0.0273)	(0.0272)	(0.0278)
	TP	0.1135**	0.0808**	0.0808**	0.1105**	0.0814**	0.0877**	0.0878**

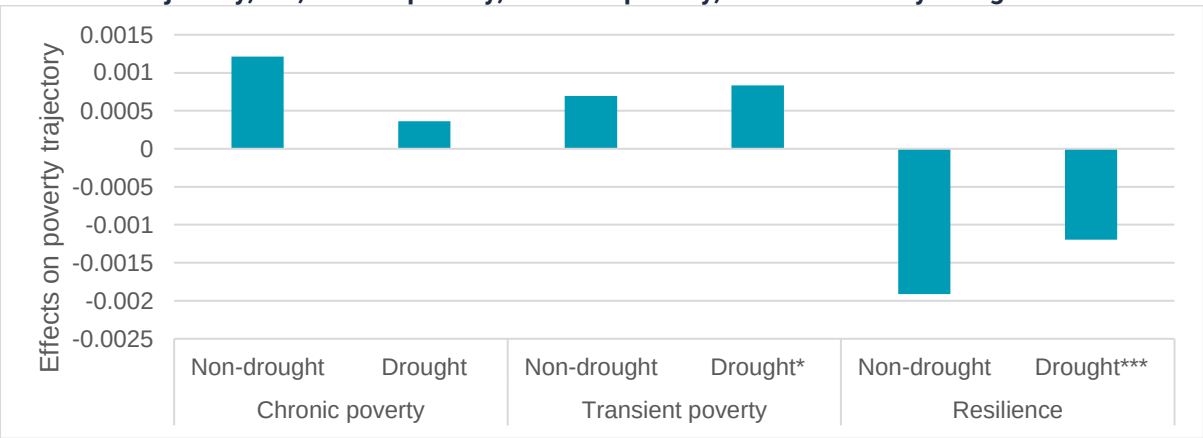
		(0.0521)	(0.0391)	(0.0390)	(0.0525)	(0.0387)	(0.0377)	(0.0389)
	R	-0.1622**	-0.0624*	-0.0618*	-0.1209*	-0.0401	-0.0573	-0.0662*
		(0.0631)	(0.0355)	(0.0356)	(0.0670)	(0.0353)	(0.0351)	(0.0353)
Flood	CP	0.1868**	0.0209	0.0195	0.1699**	0.0065	0.0133	0.0132
		(0.0739)	(0.0276)	(0.0274)	(0.0741)	(0.0263)	(0.0263)	(0.0300)
	TP	0.0556	0.0129	0.0151	0.0679	0.0173	0.0134	0.0251
		(0.0491)	(0.0602)	(0.0600)	(0.0479)	(0.0599)	(0.0596)	(0.0619)
	R	-0.2424***	-0.0339	-0.0346	-	-0.0238	-0.0266	-0.0383
		(0.0891)	(0.0564)	(0.0555)	(0.0916)	(0.0567)	(0.0562)	(0.0566)
Log(Asset Value)	CP	N/A	-	-0.0330***	N/A	-	-	-0.0330***
			(0.0074)	(0.0074)		(0.0073)	(0.0071)	(0.0072)
	TP	N/A	-0.0156	-0.0156	N/A	-0.0184*	-0.0155	-0.0165*
			(0.0099)	(0.0099)		(0.0100)	(0.0098)	(0.0098)
	R	N/A	0.0484***	0.0486***	N/A	0.0494***	0.0492***	0.0495***
			(0.0090)	(0.0091)		(0.0090)	(0.0090)	(0.0090)
NFE ownership	CP	N/A	-	-0.0871***	N/A	-	-	-0.0880***
			(0.0212)	(0.0209)		(0.0210)	(0.0205)	(0.0211)
	TP	N/A	0.1273***	0.1283***	N/A	0.1374***	0.1273***	0.1234***
			(0.0299)	(0.0300)		(0.0297)	(0.0303)	(0.0302)
	R	N/A	-0.0402	-0.0411*	N/A	-0.0444*	-0.0405	-0.0354
			(0.0248)	(0.0249)		(0.0247)	(0.0251)	(0.0256)
Paid	CP	N/A	-0.0517	-0.0554*	N/A	-0.0557*	-0.0580*	-0.0582*
			(0.0330)	(0.0319)		(0.0309)	(0.0309)	(0.0308)
	TP	N/A	0.0754	0.0782	N/A	0.0768	0.0796*	0.0761
			(0.0490)	(0.0484)		(0.0478)	(0.0476)	(0.0510)
	R	N/A	-0.0237	-0.0228	N/A	-0.0211	-0.0216	-0.0179
			(0.0356)	(0.0358)		(0.0359)	(0.0358)	(0.0367)
Engagement in	CP	N/A	0.0178	0.0159	N/A	0.0157	0.0170	0.0163
			(0.0330)	(0.0327)		(0.0319)	(0.0319)	(0.0327)
	TP	N/A	0.0707**	0.0730**	N/A	0.0695**	0.0719**	0.0658*
			(0.0352)	(0.0352)		(0.0349)	(0.0347)	(0.0389)
	R	N/A	-	-0.0889***	N/A	-0.0852**	-	-0.0822**
			(0.0332)	(0.0326)		(0.0338)	(0.0336)	(0.0346)
Own cultivable	CP	N/A	0.0670***	0.0597**	N/A	0.0619**	0.0607**	0.0605**
			(0.0237)	(0.0242)		(0.0260)	(0.0257)	(0.0253)
	TP	N/A	-0.0072	-0.0060	N/A	-0.0007	-0.0032	-0.0037
			(0.0420)	(0.0418)		(0.0414)	(0.0427)	(0.0422)
	R	N/A	-0.0599	-0.0537	N/A	-0.0612	-0.0575	-0.0567
			(0.0419)	(0.0398)		(0.0411)	(0.0413)	(0.0411)
Obs		1,326	1,298	1,298	1,326	1,298	1,298	1,298
Household FE		No	Yes	Yes	No	Yes	Yes	Yes
Area FE		No	Yes	Yes	No	Yes	Yes	Yes
Pseudo R-Sq		0.0250	0.2994	0.3000	0.0246	0.3041	0.2990	0.3000

*Average marginal effects reported; Standard errors clustered at EA; *** p<0.01, ** p<0.05, * p<0.1; CP= chronic poverty; TP= transient poverty; R= resilience; short-run conflict refers to 2010-13 (for victimisation, 2010-15 due to data availability), long-run conflict refers to 2014-18 since peak violence.*

To investigate the climate-conflict nexus, and in line with research indicating a spike in Fulani militia violence fatalities during lean seasons (World Bank, 2022), we also consider whether a similar relationship is observed amongst households experiencing drought more broadly over time. This would intuitively be the case as drought would also create pressures by limiting water sources and thus the viability of agriculture and pastoralist livelihoods. Descriptively, nearly half (48%) of households living in areas with extreme or severe drought between 2010 and 2018 also lived near Fulani militia violence. We then examine the extent to which Fulani militia violence mediates the relationship between drought and poverty trajectories. **In areas of drought, a higher number of Fulani militia fatalities is associated with an even higher probability of poverty transience and a lower probability of resilience**

(Figure *5*). However, effect sizes are small, likely reflecting a degree of over-controlling[7] given the overlap of these complex relationships more broadly. Nevertheless, these results together point to the compounding crises that limit poverty reduction.

Figure 5: Average marginal effects8 of Fulani militia-related fatalities (2010-18) on poverty trajectory, i.e., chronic poverty, transient poverty, or resilience - by drought



Source: analysis of Nigeria General Household Survey (GHS) 2010/11- 2018/19, ACLED (2010-2022) and CRU TS 2010-2020 data.

Poverty of people *and* place: Spotlight on livelihoods amidst conflict

Key messages

- Durable asset development is important amongst victimized households at the bottom of the welfare distribution, though may be inadequate in helping guard against poverty transience when households are confronted directly with insecurity.
- NFEs are associated with a higher probability of poverty transience and appear to be particularly risky amongst victimized households and those residing in areas of Fulani militia violence. The former is perhaps on account of conflict shocks contributing to death and injuries; indeed, a larger share of victimized households stops operating their NFEs over time compared to non-victimized households.
- Cultivable land does not help prevent impoverishment and also appears to be inadequate in helping households improve their welfare at the bottom of the distribution amidst victimization and Fulani militia violence. This is serious given that farms play a strong backup role with other resilience capacities or assets may fail.

This section investigates how conflict might mediate the relationship between livelihood profiles and poverty trajectories. We focus the discussion on agriculture, non-farm enterprises, and asset development given their associations with poverty trajectories discussed below.

[7] Given that the multiple crises we capture (droughts, floods, and conflict) are interrelated, one control variable might already capture part of the effect of another control variable on our outcome of interest. We hypothesise that this is the reason for detecting a small effect in some specifications.

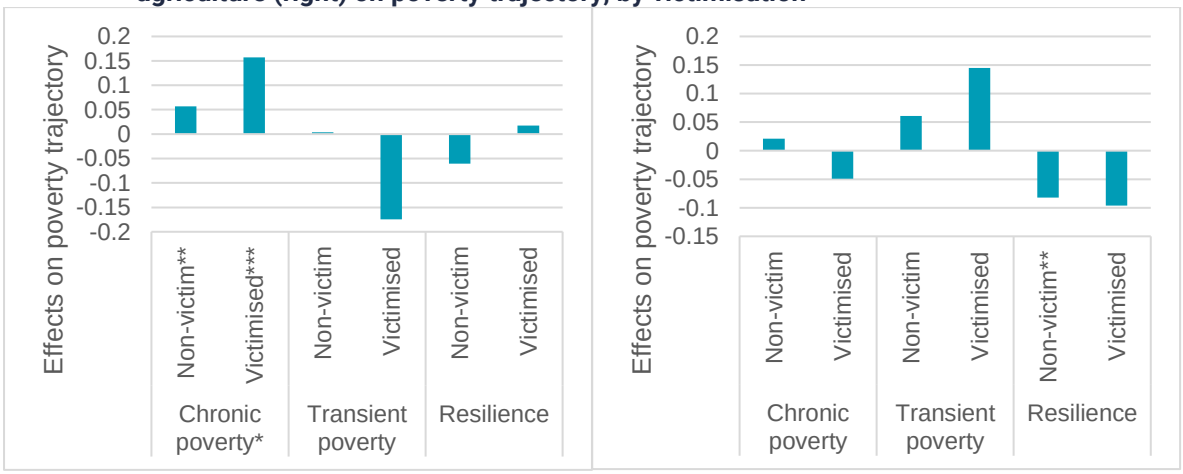
[8] Average marginal effects calculate the relationship between a higher independent variable and the probability of experiencing the outcome variable (e.g. a specific poverty trajectory). In this case, this estimate is capturing the marginal effect of the Fulani militia-related fatalities on poverty trajectories, and how this varies depending on whether the household resides in a drought-affected area.

Livelihoods amidst victimisation and Boko Haram violence

The economic activities and area of residence also correlates with poverty trajectories. **Descriptively, almost half (49%) of household heads were engaged in agriculture, and a similar share (52%) owned cultivable land in the first survey wave. A large share (63%) of households also owned non-farm enterprises** in 2010, especially amongst households that were always or sometimes non-poor. A much smaller share of households were instead engaged in wage or salaried work. In particular, just under one in five (18%) of household heads were involved in salaried or wage work, a share that was particularly low (5%) amongst the chronic poor compared to households sometimes or always non-poor.

A key pathway through which conflict might affect poverty is through the effects of victimisation on agriculture. Regression results suggest that households with their own cultivable land are more likely to be chronically poor compared to households that do not own cultivable land (Table 2 above), which may reflect profiles where a majority of people in poverty continue to live in rural areas where agriculture is the mainstay. These results persist amongst victimised and non-victimised households, with effect sizes larger amongst victimised households and the differences statistically significant compared to non-victimised households (Figure 6). This suggests that ownership of **cultivable land is more strongly associated with chronic poverty for victimised households. Investigating insecurity related to land, 50% of violence reported by households occurred in the victim's own house or on their own farm**. At the same time, there is no significant relationship between the head's engagement in agriculture and poverty trajectories amongst victimised households, suggesting that it is instead the asset (land) ownership itself which poses risks amidst contexts of violence.

Figure 6: Average marginal effects of cultivable land ownership (left) and head's engagement in agriculture (right) on poverty trajectory, by victimisation[9]

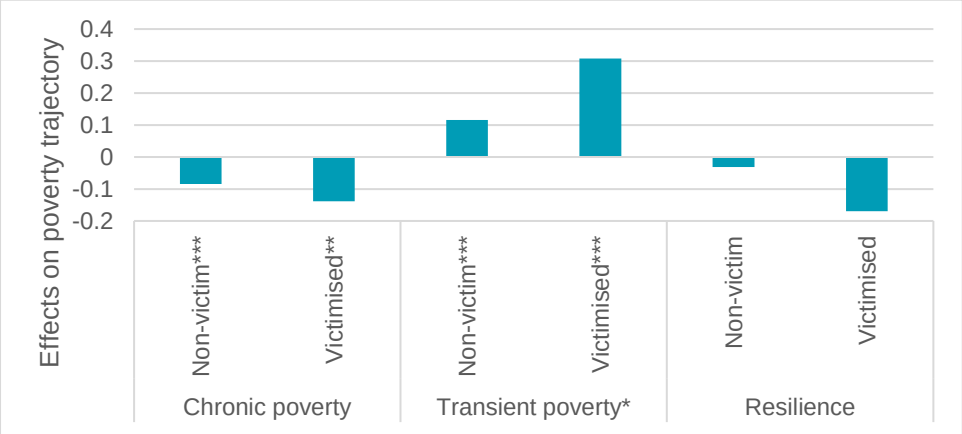


Source: analysis of Nigeria General Household Survey (GHS) 2010/11-2018 data.

[9] The asterisk next to chronic poverty refers to a statistically significant contrast of margins, reflecting a significant difference in the AMEs of non-victim vs victimised households.

Ownership of non-farm enterprises (NFEs) were instead associated with a lower probability of chronic poverty, though a higher probability of poverty transience (Table 2). This is observed for victimised and non-victimised households, though the effect size is larger amongst victimised households, implying that NFEs are even riskier for these households. Moreover, in the case of households experiencing transient poverty, this difference in average marginal effects of NFEs between victimised and non-victimised households is statistically significant (Figure *7*). **NFEs appear to be particularly risky amongst victimised households, perhaps on account of human manpower being affected as a result of conflict shocks**. It could also be due to victimisation taking place around the NFE, resulting in asset theft or attacks on the premises of the enterprise. Perhaps as a result, 34% of victimised households who had NFEs subsequently stopped their NFEs over the survey period, compared to 29% amongst non-victimised households. Moreover, death or ill health of the owner was one of the key reasons that NFEs stopped operating (Diwakar and Adedeji, 2021). Descriptively, service-related enterprises, mainly in retail trade, were most common amongst households.

Figure 7: Average marginal effects of NFE ownership on poverty trajectory, by victimisation

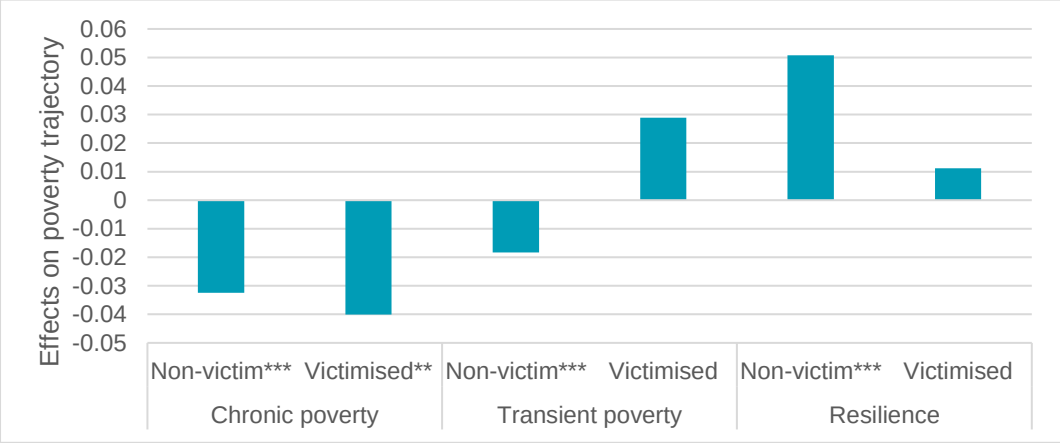


Source: analysis of Nigeria General Household Survey (GHS) 2010/11-2018 data.

Asset development (e.g., of consumer durables) more specifically is another important corelate of resilience in Nigeria (Diwakar and Adedeji, 2021), which likely acts as a consequence rather than driver of poverty escapes. In our regressions, the log of asset value instead is associated with a lower probability of chronic and transient poverty, and a higher probability of resilience (*Table 2*), pointing to the importance of asset development in promoting household welfare. The presence of assets is moreover associated with a statistically significant higher probability of resilience and lower probability of transient poverty amongst non-victimised households; however, the relationship loses significance amongst victimised households. It is also associated with a lower probability of chronic poverty across victimised and non-victimised households (*Figure 8*). These findings suggest that **durable asset development is important amongst victimised households at the bottom of the welfare distribution, though may be inadequate in helping guard against poverty transience when households are confronted directly with insecurity**. Descriptively, the types

of consumer assets that many households tended to possess included household items such as furniture, stoves or radios.

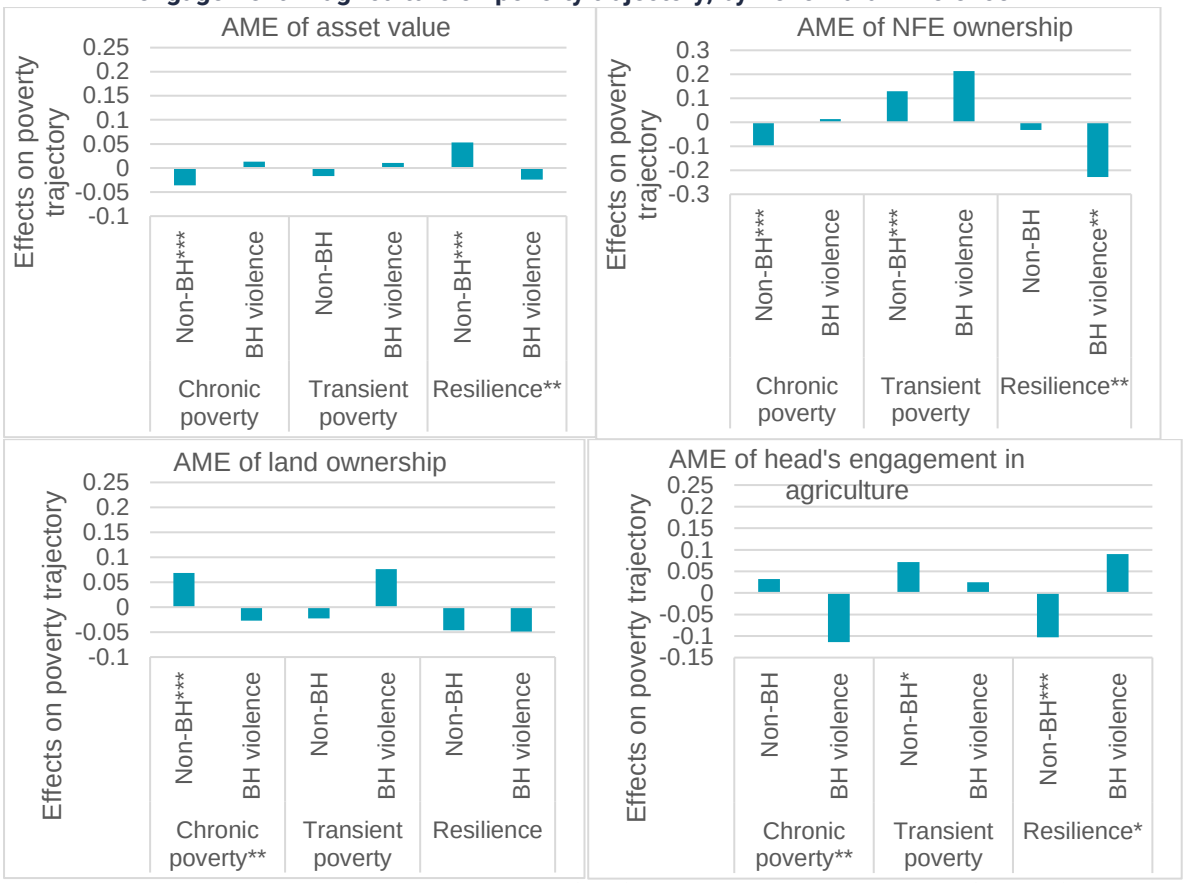
Figure 8: Average marginal effects of asset value on poverty trajectory, by victimisation



Source: analysis of Nigeria General Household Survey (GHS) 2010/11-2018 data.

Finally, we consider variations across households located in areas of Boko Haram violence and other, safer parts of the country. Findings are similar to the victimisation indicator in terms of directionality, though often loses statistical significance amongst households in conflict-affected areas (Figure 9). There are however strong differences between households in conflict-affected and safer areas of the country in terms of their probability of experiencing resilient poverty trajectories. In particular, the difference in average marginal effects of NFE ownership and of asset value between these households is statistically significant. Moreover, NFE ownership itself is associated with a lower probability of resilience amongst households residing in areas affected by Boko Haram violence. Finally, the difference in average marginal effects of land ownership on chronic poverty when comparing households in conflict-affected compared to safer areas of the country is also statistically significant. Together, our **results examining Boko Haram violence highlights points to role in exercising a downward pressure on wellbeing compared to safer areas of the country**.

Figure 9: Average marginal effects of asset value, NFE ownership, land ownership, and head's engagement in agriculture on poverty trajectory, by Boko Haram violence



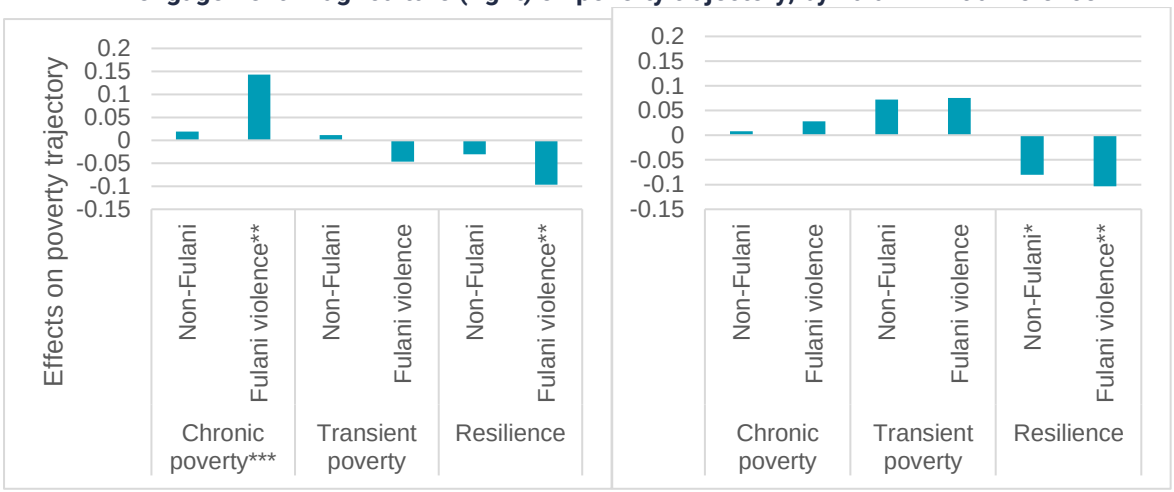
Source: analysis of Nigeria General Household Survey (GHS) 2010/11-2018 data and ACLED (2010-18) data.

Livelihoods amidst pastoral-farmer violence

We finally also examine people's livelihood strategies in areas affected by Fulani militia violence, and how this interaction is related to poverty dynamics.[10] **Agricultural livelihoods and conflict over resources are dominant in Nigeria's Middle Belt. Perhaps linked to this, in areas with Fulani militia violence, households that own cultivable land experience a higher probability of chronic poverty compared to those who do not** (Figure 10). Moreover, the difference in these average marginal effects between conflict-affected and safer areas of the country is also statistically significant. We also observe that in areas of Fulani militia violence, ownership of cultivable land is associated with a lower probability of resilience. The head's engagement in agriculture bears similar directionality, though with the result significant in both conflict-affected and safer areas of the country. The results are comparable to earlier findings on the interaction of conflict and drought (Figure 10), suggesting that livelihoods affected by drought may be particularly risky in areas of violence.

[10] This is different from the preceding sub-section, which is based on self-reported 'victimisation' and relates more strongly to Boko Haram-related violence. This section instead focuses on Fulani militia-related violence.

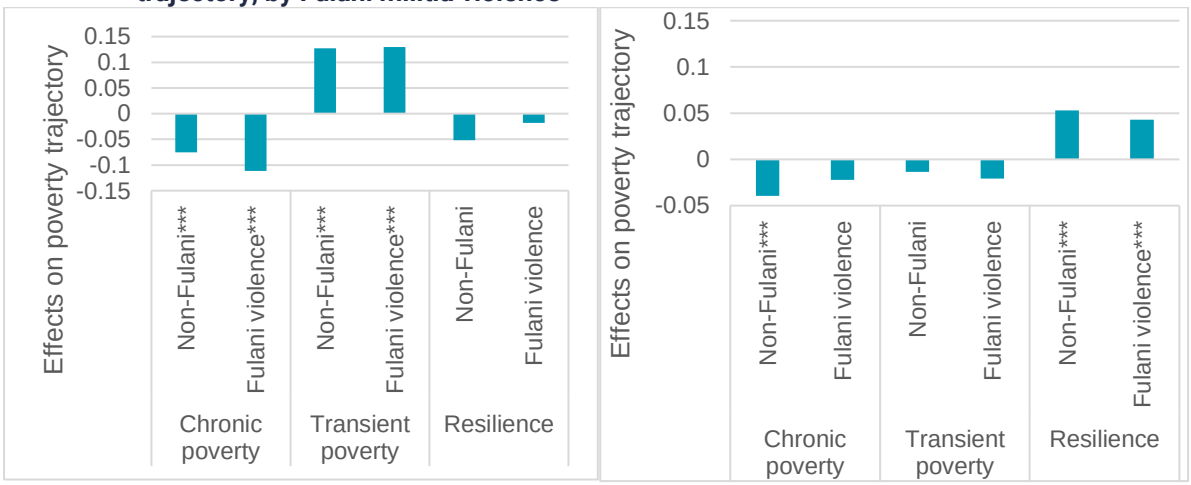
Figure 10: Average marginal effects of cultivable land ownership (left) and household head engagement in agriculture (right) on poverty trajectory, by Fulani militia violence



Source: analysis of Nigeria General Household Survey (GHS) 2010/11-2018 data and ACLED (2010-18) data.

When considering livelihoods and assets not specific to agriculture, results are comparable to the earlier specification examining Boko Haram violence. First, **NFE ownership in both Fulani militia violence-affected and safer areas of the country is again associated with a lower probability of chronic poverty but a higher probability of poverty transience** (Figure 11, left). However, the differences in marginal effects are not statistically significant this time between safer and insecure areas. Finally, asset value is also an important correlate associated with a higher probability of resilience, with similar and non-significant differences in effect sizes between insecure and safer areas of the country (Figure 11, right).

Figure 11: Average marginal effects of NFE ownership (left) and asset value (right) on poverty trajectory, by Fulani militia violence



Source: analysis of Nigeria General Household Survey (GHS) 2010/11-2018 data and ACLED (2010-18) data.

Covid-19 and layered crises

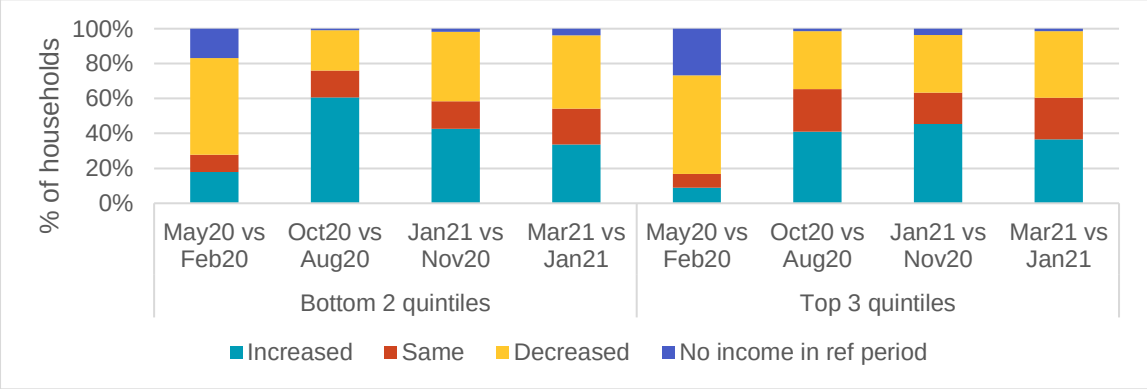
Key messages

- There was a large share of households experiencing decreasing NFE income over time in 2020 and into early 2020, at a rate higher amongst the bottom two (compared to top three) quintiles, and amongst households residing in areas with Boko Haram violent fatalities.

- Perhaps as a result of a challenging and risky NFE environment, many households moved away from engaging in NFEs to working on the family farm between the start of 2021 and 2022. At the same time, agriculture proved risky, with many households expecting droughts and floods to negatively affect them.
- Alongside conflict and climate-related disasters, there is a concerning economic crisis marked partly by soaring fuel prices, where many poor households report paying high prices for petrol in the summer of 2022 and increasingly perceive a deteriorating economic situation compared to 2021.

Covid-19 acted as another crisis affecting the welfare of Nigerians. The start of the pandemic saw nearly 80% of households experience a decrease in their total income compared to pre-pandemic levels, with some recovery over time. However, there were variations by livelihood sector and wealth status. For example, **there was a larger share of households experiencing decreasing NFE income over time in 2020 and into early 2020 amongst the bottom two quintiles compared to richer segments (Figure 12), and when focused on households residing in areas with Boko Haram violence** (40% reporting income decline at some point between May 2020 and March 2021) compared to other parts of the country (23% reporting income decline over the same time period). This declining NFE income moreover is a repeated consequence of all these shocks. Given that it is also an important pathway out of poverty amongst poor households, this is an important finding drawing attention to mechanisms through which conflict and Covid-19 have stopped upward mobility out of poverty.

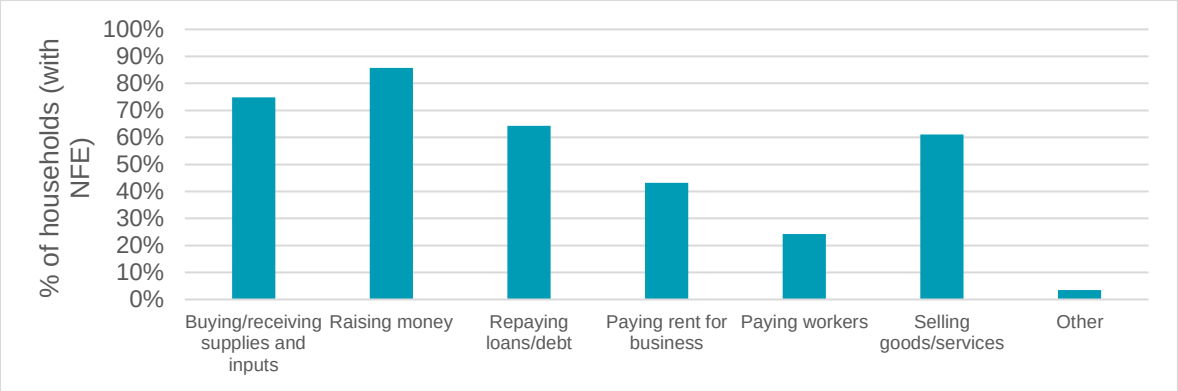
Figure 12: Changes in NFE revenue over time, by wealth status



Note: Y-axis refers to % households with an income source in the survey round. Source: analysis of Covid-19 National Longitudinal Phone Survey 2020-22.

Potential channels might include lockdowns and border closures. These **policy responses to Covid-19 raised various difficulties in NFE operations**, including raising money for the business, buying and receiving supplies and inputs, difficulty repaying loans or debt especially in rural areas (affecting 68% of rural households, compared to just 57% of urban households), and difficulty selling goods or services to customers (**Error! Not a valid bookmark self-reference.**).

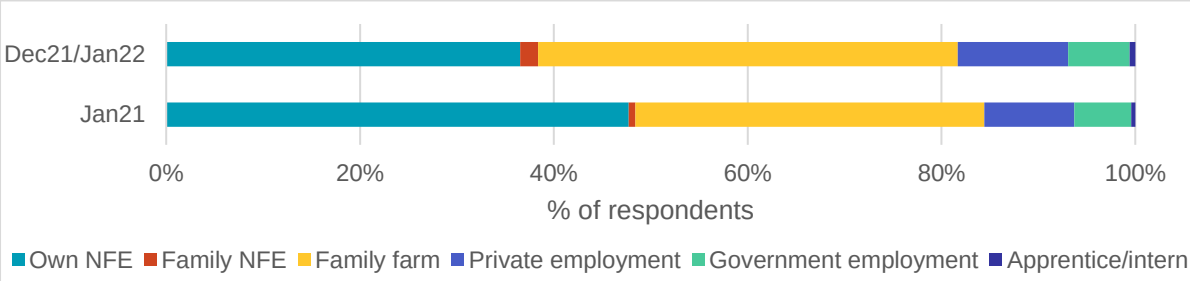
Figure 13: Challenges in NFE operations due to the pandemic, December 2021/January 2022



Source: analysis of Covid-19 National Longitudinal Phone Survey 2020-22.

Perhaps as a result of these challenges, **many households moved from engagement in NFE to working on the family farm between the start of 2021 and the start of 2022** (*Figure 14*), especially amongst the top three welfare quintiles. However, these NFE occupations have also been more common amongst people in poverty, as pre-pandemic analysis above indicates. Moreover, during the first year of the pandemic (in May, July and December) based on available data, between 18-32% of households reported disruption of farming, livestock, fishing activities as a negative shock affecting their households.

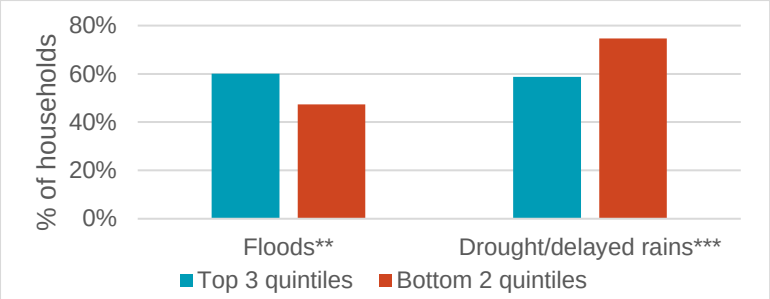
Figure 14: Main work, between start of 2021 and 2022



Source: analysis of Covid-19 National Longitudinal Phone Survey 2020-22.

Disruptions to farming can also occur due to climate-related disasters like drought or floods, as observed prior to the pandemic and sometimes linked to violent conflict. **Into the summer of 2022, the expectations of slow-onset disasters were particularly pronounced amongst households in the bottom two quintiles**, where agriculture remains a mainstay. In this context, delayed rains or droughts could affect harvests and in turn households' income. Indeed, 70% of households working on the family farm expected delayed rains or drought to negatively affect their households, compared to 56% working in their own NFE (*Figure 15*). Richer quintiles were more likely to rely on irrigation which may have enabled some resistance to droughts. In contrast, amongst richer quintiles, flooding as a rapid-onset disaster was self-reported to be a weather shock expected to negatively affect households, and especially those working in NFEs where flood disruptions to wider infrastructure may further affect their ability to operate their business.

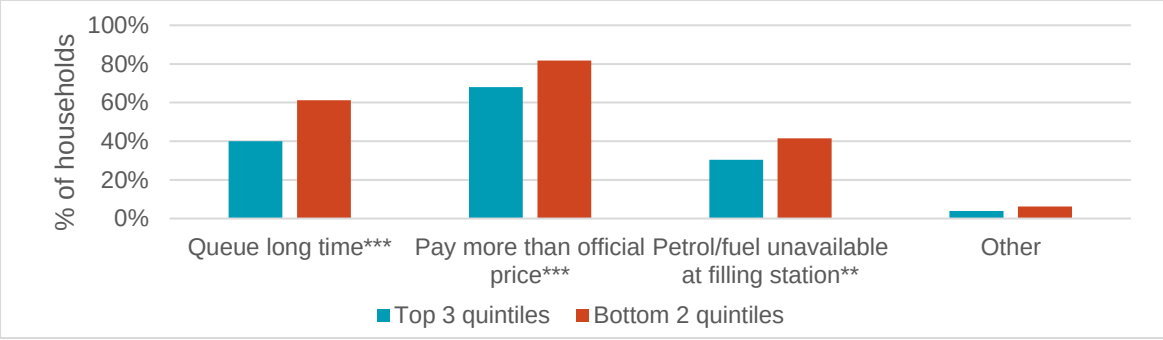
Figure 15: Weather events expected to negatively affect households, June and August 2022



Source: analysis of Covid-19 National Longitudinal Phone Survey 2020-22.

In addition to difficulties in operating NFEs and expectations of extreme weather events, there has been a period of heightened economic crisis more broadly, exacerbated by the Russia-Ukraine conflict. Partly reflecting the resultant cost of living crisis, **many households felt that they had to pay more than the official price for petrol, especially amongst the poorer segments of the population** (Figure 16). Other challenges included long time spent waiting in queues and petrol ultimately being unavailable. This is doubly concerning given the important role of transport in the livelihoods of people in and near poverty, for example in transporting farm produce to markets or in receiving or delivering inputs or goods and services for their off-farm economic activities.

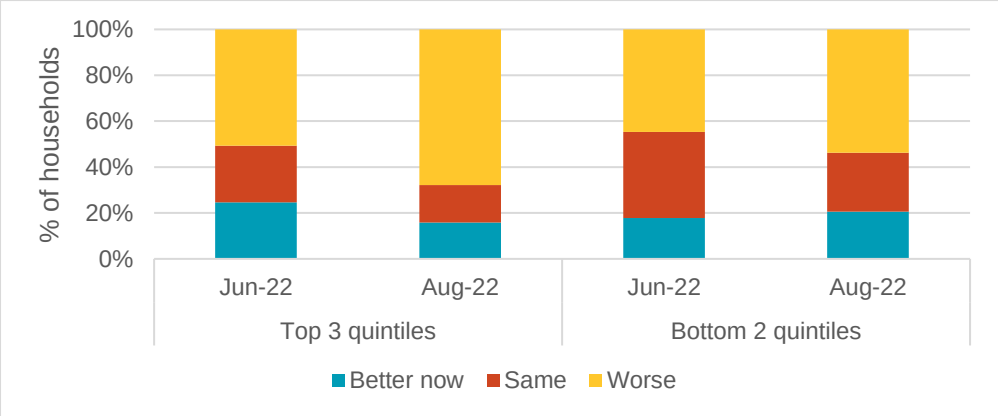
Figure 16: Difficulties with buying petrol in month preceding survey, June 2022 survey



Source: analysis of Covid-19 National Longitudinal Phone Survey 2020-22.

With difficulties persisting over time and with continued expectations of climate-related disasters, many households felt that their situation in the summer of 2022 was worse than a year preceding the survey. **The share of households reporting a deteriorating economic situation was particularly pronounced and worsening amongst the top three quintiles (*Figure 17*), suggestive of continued impoverishment in the country well over two years after the onset of the pandemic**. At the same time, there was still a large share of households in poverty that continued to see their economic situation deteriorate over time, which may also encompass processes of destitution.

Figure 17: Household perception of being financially better off at survey vs 1 year prior



Source: analysis of Covid-19 National Longitudinal Phone Survey 2020-22.

The analysis above has presented several crises that are responsible for depressing households' welfare. As noted above, the challenges encountered in operating NFEs were multifold, with many households experiencing income declines between 2020 and 2021, especially amongst poorer populations and in areas of insecurity. Moreover, challenges to operating NFEs continued into 2022 due to insufficient money or being in debt. A period of economic crisis has contributed to these difficulties, exemplified by rising prices of petrol. Finally, for households that substituted activities to farming, many feel that climate-related disasters will continue to affect their welfare.

Coping with crises

Key messages

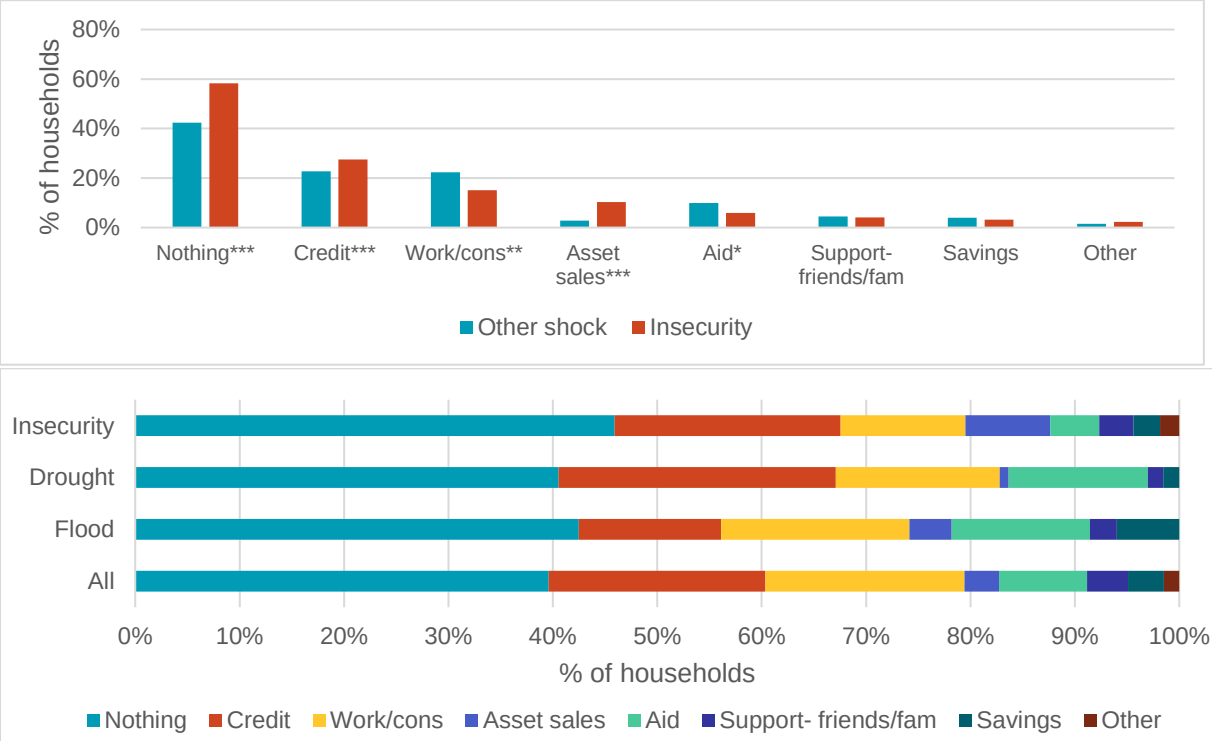
- **Pre-pandemic, common coping strategies to negative shocks included relying on credit (especially amidst drought or insecurity), changing work patterns, and engaging in asset sales (especially when faced with insecurity).**
- **Displacement was the most commonly reported consequence of victimization amongst transient poor households. Distress sale of land, livestock or property was another consequence, prevalent especially amongst chronically poor households.**
- **During the pandemic, households residing in areas of Fulani militia violence saw their receipt of assistance decrease over time, whereas those in areas of Boko Haram violence saw a rise in assistance between July 2020 and March 2021.**
- **With limited support, poorer households were more likely to borrow money (mainly from friends) during the pandemic, typically to purchase food, compared to richer households who borrowed for their NFEs or education. This might drive poor households to a vicious cycle of poverty and debt as they attempt to meet subsistence needs.**

So, in this context of multiple crises affecting the poverty of 'people' and 'place', how do households cope? This section descriptively examines coping strategies to various negative shocks reported by households pre-pandemic, consequences and coping strategies for households experiencing victimisation, and finally how key coping strategies have evolved over the pandemic period. To the extent possible, this latter analysis considers differences by conflict and climate-related disasters during the pandemic period.

Pre-pandemic

A majority of households reported 'doing nothing' when faced with shocks. Other **common coping strategies to negative shocks included relying on credit, changing work patterns, and – much less commonly – engaging in asset sales** (Figure 18, top). Taking out credit was a common coping strategy for households experiencing poor rain causing harvest failure or insecurity. Instead, with rapid-onset flooding causing harvest failures, a larger share of households were forced to draw down on their savings when compared to drought. Households reporting poor rains or flooding causing harvest failures were also more likely to receive aid compared to those experiencing insecurity (Figure 18, bottom). Instead, households reporting insecurity (theft of assets, dwelling damaged/ destroyed, or kidnapping/ hijacking/ robbery/ assault) were more likely than those experiencing climate-related disasters to engage in asset sales, and less likely to receive aid from an NGO or the government.

Figure 18: Coping strategies for negative shocks, 2010-19 pooled data, by insecurity (top) and by various crises (bottom)

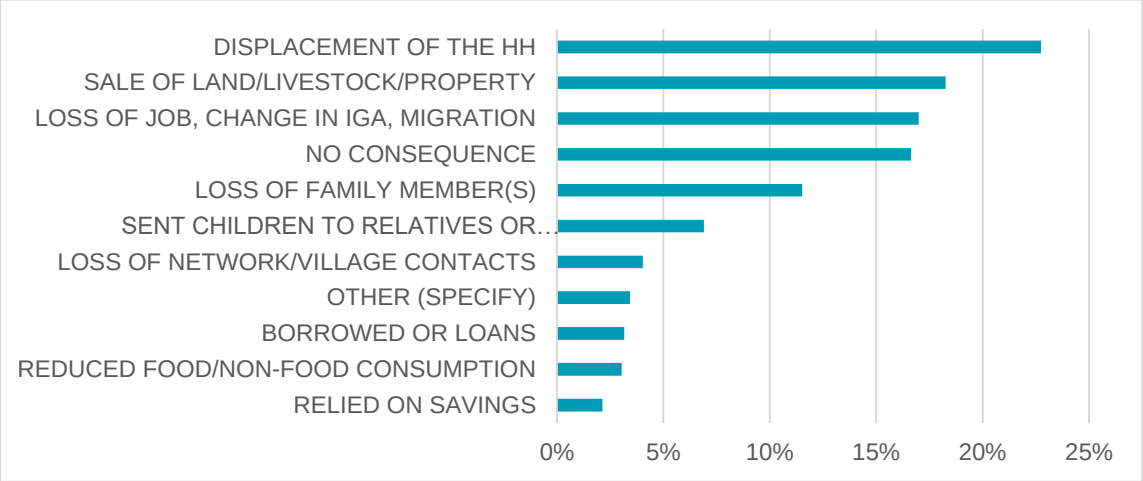


Source: analysis of Nigeria General Household Survey (GHS) 2010/11-2018 data.

We are also able to examine consequences of direct victimisation using the module on self-reported victimisation from the GHS. As a result of the victimisation, one in five households were displaced. **Displacement was the most reported consequence of victimisation amongst transient poor households. Distress sale of land, livestock or property was another consequence, prevalent especially amongst chronically poor households**. This was followed by work-related consequences (reduction in income-generating activities, loss of job, migration, or engagement in additional income generation activities), which was the most common consequence of victimisation amongst resilient households. Yet in spite of seeking support or redress, help was largely limited, with just 6% receiving assistance after

the most recent experience of violence. Moreover, assistance was more commonly received by resilient households (11%) compared to the chronic poor (6%) or transient poor (4%).

Figure 19: Consequences of victimisation, 2010-2015

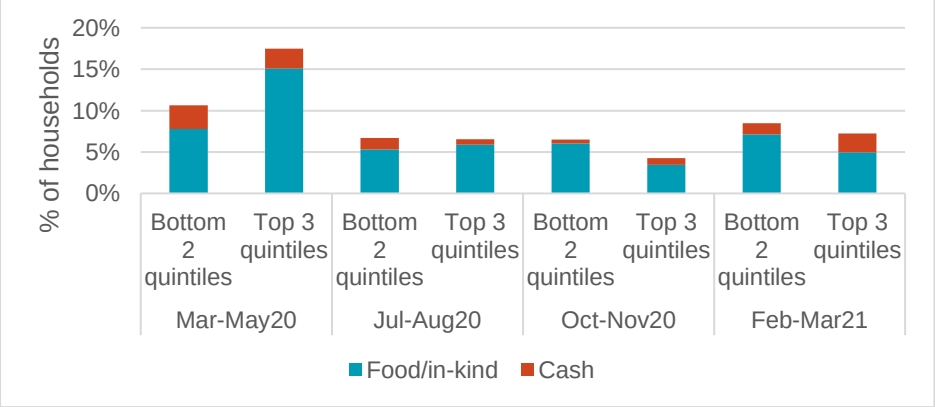


Source: analysis of Nigeria General Household Survey (GHS) 2014/15 data.

Since Covid-19

Given the differences in coping through aid, credit, and asset sales as a result of climate-related disasters or insecurity, we examine these strategies in more detail during the pandemic to understand how responses to crises may have evolved. In terms of aid, there was potential mistargeting of public assistance in the early waves of the pandemic, with households in the top three quintiles more likely to receive support compared to poorer households (Figure 20). However, these differences levelled off over the summer of 2020 and into 2021. Interestingly, **households residing in areas of Fulani militia violence saw their receipt of assistance decrease over time, whereas those in areas of Boko Haram violence saw a rise in assistance between July 2020 and March 2021**. This perhaps reflects the targeting of humanitarian assistance to the Northeast in recent years.

Figure 20: Receipt of public assistance over time, by quintile

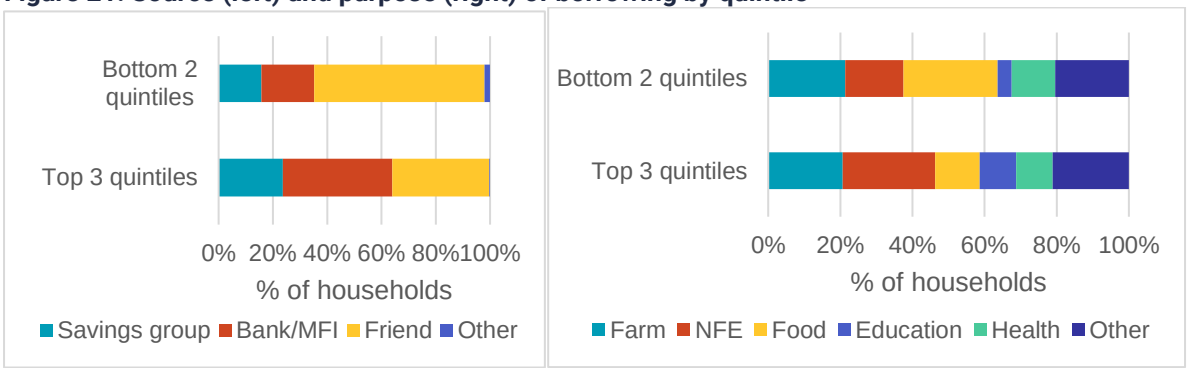


Source: analysis of Covid-19 National Longitudinal Phone Survey 2020-22.

With increasing food insecurity, many households were forced to engage in adverse coping. This included distress sale of assets in the first year of the pandemic, which was particularly pronounced amongst the bottom two quintiles (Diwakar and Adedeji, 2021). Into 2022,

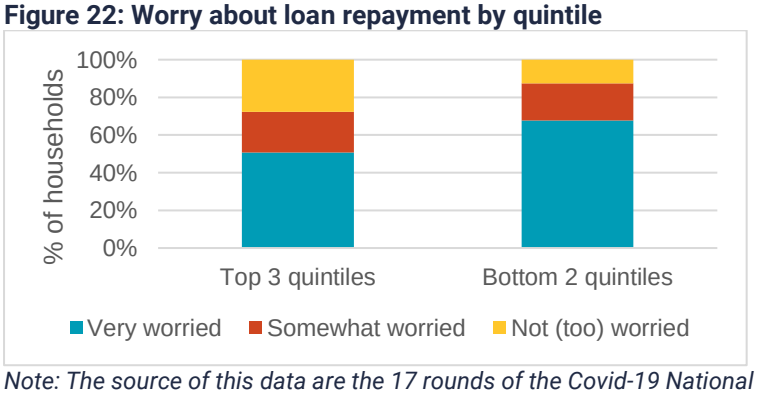
having already considerably drawn down on their assets, households in the bottom two quintiles were more likely to attempt to borrow money (42% amongst the bottom two quintiles during the pandemic, compared to 33% amongst the top three quintiles), typically from friends or relatives (Figure 21, left). The purpose of their loans was predominantly to purchase food, compared to richer segments of the population which were more likely to borrow for their NFEs or for education (Figure 21, right). This difference between subsistence and asset and livelihood development suggests that **richer populations are likely more able to use credit for investments with returns even in a crisis. Instead, poorer segments are forced to borrow to meet subsistence needs, thereby with less ability to repay and trapped in a vicious cycle of poverty and debt**. It is perhaps for this reason that people in the bottom two quintiles were significantly more worried about their ability to repay their loans going forward (*Figure 22*).

Figure 21: Source (left) and purpose (right) of borrowing by quintile



Note: The source of this data are the 17 rounds of the Covid-19 National Longitudinal Phone Survey 2020-22.

Figure 22: Worry about loan repayment by quintile



Note: The source of this data are the 17 rounds of the Covid-19 National Longitudinal Phone Survey 2020-22.

Conclusion and policy implications

This study examined the relationship between poverty dynamics and multiple crises, namely Boko Haram and Fulani militia violence, drought and floods, and the Covid-19 pandemic. It found that chronic and transient poverty was particularly common in Nigeria's Northern states where conflict and climate-related disasters were also prevalent. Moreover, conflict and drought were observed to mediate the relationship between livelihoods and poverty dynamics. In most cases, this was through increasing risks to livelihoods and limiting the potential of existing assets to contribute to household resilience. The pandemic then further contributed to deteriorating welfare by compounding livelihood risks in NFEs and in agriculture, especially when layered with expectations of climate-related disasters as well as a wider economic crises marked partly by soaring fuel prices. As a result, many households felt that their economic situation continued to deteriorate into 2022, especially amongst richer quintiles, indicating processes of impoverishment alongside destitution.

In this context, common coping strategies to negative shocks pre-pandemic included relying on credit (especially amidst drought or insecurity), changing work patterns, and engaging in asset sales (especially when faced with security). During the pandemic, households residing in areas of Fulani militia violence saw their receipt of assistance decrease over time, whereas those in areas of Boko Haram violence saw a rise in assistance between July 2020 and March 2021, though coverage remained limited. With limited aid, poorer households were more likely to borrow money during the pandemic mainly to purchase food, compared to richer households who borrowed for their NFEs or education. This might drive poor households to a vicious cycle of poverty and debt as they attempt to meet subsistence needs.

Policy implications

So, what can be done in this context where profiles of poverty interact with crises contexts to exacerbate poverty trajectories? Our empirical analysis of multiple crises, namely conflict, climate, and Covid-19, shows that these can reinforce each other and create a nuanced relationship with poverty dynamics. Policy instruments should therefore be well-coordinated and consider these crises together. Table 3 provides examples of intervention areas for policies and programming attempting to reduce poverty in Nigeria, expanded on in the text that follows.

Given the important role of asset value particularly at the bottom of the welfare distribution, measures to promote asset development could help reduce poverty persistence. This could centrally involve a graduation-type approach, given the role of cash-plus interventions generally in contributing to increases in income and food security at magnitudes higher than asset transfers alone (FAO, 2016). However, given the study findings around asset theft, such promotive interventions also need to guard against insecurity and risk. Evidence-based

insurance development in farming is one such example of how risk is being managed in Nigeria (Hansen et al., 2017).

Table 3: Challenges and policy and programming interventions

Challenge	Examples of interventions
Asset drawdowns amidst sequenced crises	• Graduation-type approach, especially cash-plus interventions which are proven to increase income and food security by more than asset transfers alone. Such interventions could also prevent negative coping strategies in face of shocks – for instance distress asset sales. • Given the study's findings around asset theft – there is a need for interventions that guard against insecurity and risk related to asset loss, e.g. evidence-based insurance products against loss of assets.
Inadequacy of agriculture amidst climate and conflict shocks	• Further development of climate-smart agricultural (CSA) practices, drawing on examples in place, e.g. Borno implementing conservation agriculture, crop diversification, improved seeds, soil fertility management. • Adoption of technology in agriculture, such as drought-resilient crop varieties or appropriate mechanisation. • CSA as well as technological adoption in agriculture should pay particular attention to the impacts of flooding and drought, insecurities due to violent conflict, and pre-existing vulnerabilities related to poverty and gender.
Volatility of non-farm enterprises amidst conflict and Covid-19	• Reforms of the business environment that take into account the economic, market and political context – as well as potential impact on vulnerable groups. • Use reforms to promote local conflict-resolution and peacebuilding with the aim to foster legitimacy and inclusivity.
Unsustainable debt levels among poorer households following Covid-19	• Debt management interventions to help people struggling with debt. • Social protection instruments, for instance Covid-19 cash transfers aimed at reduction of household debt accumulated during the pandemic and promoting financial recovery from crisis. • Expansion of financial inclusion initiatives, for instance widening the coverage of mobile money and micro-finance institutions.
Inadequacy of risk-informed development	• Recognize interdependences across sectors. • Focus on all facets of risk reduction "including preventing hazards, reducing exposure and vulnerability and building adaptive capacity" (UNDRR, 2021). • Redoubling of public assistance and expansion of coverage in pastoral-farmer conflict areas, given that areas of Fulani militia violence received significantly lower assistance during the pandemic compared to areas affected by BH conflict. • Support recovery programs to go on for longer than they do. • Develop flexibility of underlying political and economic governance structures and a commitment to multilateralism and partnerships

Relatedly, it remains vital to promote an enabling environment for agriculture, which remains a mainstay for people in poverty in rural areas. There is some scope for climate-smart agricultural practices to be further developed, especially given research pointing to high consumption poverty rates amongst low-users of climate smart agricultural practices in North-West Nigeria (Ekpa et al. 2018). Already, Borno state is implementing conservation agriculture, crop diversification, improved seeds, soil fertility management, and livestock seasonal migration – among other practices (FAO 2019). Empirical studies establish a positive impact of improved cassava varieties (Awotide et al. 2015) and drought-tolerant maize varieties (Olagunju et al. 2020) on the welfare of farmers in Nigeria. As such, the adoption of technology in agriculture, such as drought-resilient crop varieties, offers one such pathway, though it is important to recognise potential barriers to take-up, such as

credit constraints, lack of awareness, and gender inequality. CSA practices more broadly could be scaled up, appropriately financed, and adapted to the major climatic risks in each of the states – with particular attention being paid to the impacts of flooding and drought, as well as insecurities brought about by violent conflict.

Alongside agriculture, it is important to help mitigate risks to non-farm enterprises, given the study findings pointing to its association with transient poverty especially in insecure areas, and the income volatility to NFEs experienced during the pandemic. Responses would need to rely on contextual knowledge: 'Once the economic, market and political context is well understood, it is much easier to define interventions that work with capable officials or willing businesses' (McKechnie et al., 2018). Business environment reforms can also help mitigate some sources of risk to non-farm enterprise development, especially where this focuses on identifying and considering how proposed reforms will affect vulnerable groups (White, 2020). This could be focused on 'engaging with key local economic actors, ensuring national reforms are sufficiently flexible to allow for local variation, developing subnational data and assessments, using reforms to promote local conflict-resolution and peacebuilding initiatives to foster legitimacy and inclusivity from the bottom up' (Shepherd et al., 2021).

The interventions discussed above ultimately address only parts of the wider enabling environment needed to address poverty of 'place'. Given the heightened risk profiles of household livelihoods amidst conflict and climate-related disasters, developing responses to polycrisis in Nigeria is critical. This is predicated on a risk-informed process that recognizes interdependencies across sectors when responding to key risks (OECD, 2018; Opitz-Stapleton et al., 2019). 'A systems approach for disaster risk reduction would necessarily begin with a focus on all facets of risk reduction, including preventing hazards, reducing exposure and vulnerability and building adaptive capacity' (UNDRR Stakeholder Engagement Mechanism, 2021, p. 8). It would also be cognizant of the longer-term effects of conflict and climate-related disasters, given our study findings, in turn requiring that recovery programs go on for much longer than they currently do (Diwakar et al., 2022). Sustainability of effects from pro-poor interventions over the long-term moreover will require flexibility of underlying political and economic governance structures and a commitment to multilateralism and partnerships (Singh, 2021).

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Annexes

Annex A: Summary stats

Variable	All	CP	TP	R
Boko Haram violence against civilians, 2010-18 (% households in 20km radius)	0.07	0.13	0.10	0.03
Fulani militia violence, 2010-18 (% households in 20km radius)	0.41	0.34	0.34	0.49
Victimisation, 2010-15 (% households)	0.05	0.09	0.07	0.02
Extreme or severe drought, 2010-18 (% households in 55km radius)	0.21	0.25	0.26	0.16
Flooding, 2010-18 (% households)	0.05	0.10	0.05	0.03
Christian head (%)	0.56	0.33	0.47	0.72
Muslim head (%)	0.43	0.64	0.52	0.27
Traditional head (%)	0.01	0.03	0.02	0.01
Head is female (%)	0.15	0.04	0.10	0.23
Age of head (years)	49.92	45.58	49.82	51.62
Head completed primary education (%)	0.22	0.18	0.21	0.24
Head completed lower secondary education+ (%)	0.34	0.15	0.29	0.46
Household size	5.18	7.27	5.51	4.13
Head in salaried/wage work (%)	0.18	0.05	0.16	0.24
Non-farm enterprise ownership (%)	0.63	0.49	0.69	0.63
Head engaged in agriculture (%)	0.49	0.83	0.58	0.28
Ownership of cultivable land (%)	0.52	0.81	0.59	0.35
Log of asset value	10.52	10.10	10.40	10.77
Urban residence (%)	0.37	0.07	0.28	0.57

Note: baseline values reported, unless stated otherwise

Annex B: Attrition analysis

We test whether attrition is random through a probit with a dependent variable which specifies whether the household has attrited after the first survey wave. We investigate the possibility that attrition is related to the crises variables. Results presented in Table B1 indicate that none of these key variables are significant predictors of attrition across models. As such, we rely on the panel weights provided in the LSMS for our analysis.

Table B1: Attrition probit for poverty dynamics

VARIABLES	Attrited (1)	Attrited (2)
Short-run Boko Haram	0.0001	
	(0.0031)	
Long-run Boko Haram	0.0015	
	(0.0024)	
Any drought (<-1.5)	-0.1699	
	(0.1375)	

Short-run Fulani		-0.0015
		(0.0031)
Long-run Fulani		0.0038
		(0.0033)
Any flood	-0.2988	-0.3143
	(0.2940)	(0.2908)
Religion of head	0.0527	0.0493
	(0.0905)	(0.0897)
Female head	0.0338	0.0390
	(0.0759)	(0.0750)
Age of head	-0.0156*	-0.0117
	(0.0087)	(0.0086)
Age-squared	0.0001*	0.0001
	(0.0001)	(0.0001)
Head with primary education	-0.0533	-0.0377
	(0.0703)	(0.0692)
Head with secondary education	0.0443	0.0454
	(0.0743)	(0.0746)
Household size	-0.0097	-0.0144
	(0.0110)	(0.0110)
Head in agriculture	-0.1247	-0.1451*
	(0.0800)	(0.0804)
Ownership of cultivable land	0.1780*	0.1685
	(0.1018)	(0.1032)
Head in salary/wage work	-0.1225	-0.1416*
	(0.0850)	(0.0856)
Non-farm enterprise	0.0539	0.0594
	(0.0671)	(0.0667)
Log (asset value)	-0.0298	-0.0302
	(0.0229)	(0.0225)
Unemployment rate	0.1470	0.6746
	(0.9832)	(0.9959)
Urban residence	0.1413	0.1606
	(0.1288)	(0.1285)
Constant	1.1780***	0.9684**
	(0.3896)	(0.3833)
Observations	4,538	4,538
Pseudo R-Squared	0.0130	0.0136

*Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

Annex C: Sensitivity analysis

Some of the relationships described above might exist due to reverse causality. For example, poverty might drive engagement in the Boko Haram movement. To explore this, we undertake a linear probability model and adopt fixed effects estimators to exploit the panel structure of the data. Results in Table C1 point to a strong relationship between cumulative conflict and relative poverty status of households. Even so, the direction of causality can be questioned, whereby poverty can contribute to conflict. To examine this further, we follow Mueller and Techasunthornwat (2020) and also add an additional control to examine

contemporaneous conflict. From this, we observe that the relationship between contemporaneous conflict and poverty does not hold when controlling for conflict debt.

Table C1: Boko Haram conflict debt and relative poverty status, fixed effects specification

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Bottom 40	Bottom 40	Bottom 20	Bottom 10	Bottom 40
Conflict debt	0.0830***	0.0630***	0.0589***	0.0602***	0.0717***
	(0.0217)	(0.0208)	(0.0200)	(0.0167)	(0.0249)
Contemporaneous conflict					-0.0294
					(0.0461)
Household FE	Yes	Yes	Yes	Yes	Yes
Region and year FE	No	Yes	No	No	Yes
Drought and flood FE	No	Yes	No	No	Yes
Observations	5,304	5,242	5,304	5,304	5,242
Groups	1,326	1,326	1,326	1,326	1,326
R-Sq within	0.0079	0.1136	0.0059	0.0088	0.1137
R-Sq between	0.0409	0.0342	0.0333	0.0099	0.0322
R-Sq overall	0.0213	0.0423	0.0186	0.0052	0.0406

*Outcome is relative poverty status; Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

We then generalize this to a framework where we consider spatial as well as temporal differencing over the panel waves for robustness. We include a subset of demographic and area variables, excluding the livelihood controls which may themselves be influenced by crises. All variables included in the model include a 100km spatial differencing as well as temporal differencing. Significant results are again largely consistent, pointing to a positive relationship between droughts and poverty, as well as between Boko Haram violence and poverty (Tables C2). Even so, it is worth stressing that these results are not causal, though offer useful insights into the relationships between crises and poverty dynamics.

Table C2: Crises and relative poverty status, spatial and temporal differencing

VARIABLES	(1)	(2)	(3)	(4)
Drought presence (100km radius)	0.185***			
	(0.020)			
Flood presence (100km)		-0.032		
		(0.020)		
Boko haram violence presence (100km)			0.033**	
			(0.015)	
Fulani militia violence presence (100km)				-0.009
				(0.013)
Region and year controls	Yes	Yes	Yes	Yes
Demographics controls	Yes	Yes	Yes	Yes
Observations	3,878	3,878	3,878	3,878
R-squared	0.285	0.274	0.274	0.273

*Outcome is relative poverty status; Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

We finally stratify the sample into households beginning the survey period in poverty and households beginning non-poor (Table C3), which can also help mitigate concerns of reverse causation. When focusing on households that started the period in poverty, victimisation is associated with a higher probability of churning around the poverty line and a lower probability of sustaining escapes from poverty. However, the relationship with drought and floods loses statistical significance. When focusing on households that started the period non-poor, victimisation, drought, and flooding is associated with a higher probability of impoverishment and a lower probability that the household is able to consistently remain out of poverty. Together, these results point to a strong relationship between the direct effects of multiple crises and negative poverty trajectories, conditional on initial poverty status.

Table C3: Crises and poverty trajectories, stratified multinomial logistic regression

VARIABLES		Households starting in poverty	Households starting non-poor
		(1)	(2)
Victimisation	CP	-0.0595	0.1398**
		(0.0703)	(0.0625)
	I/TE	0.1534*	0.0300
		(0.0889)	(0.0633)
	SE/NP	-0.0939*	-0.1698**
		(0.0545)	(0.0784)
Drought	CP	-0.0118	0.1121**
		(0.0474)	(0.0501)
	I/TE	0.0102	-0.0592
		(0.0607)	(0.0369)
	SE/NP	0.0017	-0.0529
		(0.0419)	(0.0418)
Flood	CP	0.0603	0.1535***
		(0.0569)	(0.0586)
	I/TE	-0.0468	-0.1384***
		(0.0671)	(0.0304)
	SE/NP	-0.0134	-0.0151
		(0.0432)	(0.0723)
Obs		695	745
Household FE		Yes	Yes
Area FE		Yes	Yes
Pseudo R-squared		0.2264	0.2324

*Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*