ANALYSING RESILIENCE FOR BETTER TARGETING AND ACTION

RESILIENCE ANALYSIS IN BORNO STATE

NIGERIA

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IGERIA

CONTENTS

FIGURES

TABLES

ACKNOWLEDGEMENTS

ACRONYMS

ABS	Access to Basic Services
AC	Adaptive Capacity
AST	Assets
CH	*Cadre Harmonisé*
CILSS	*Comité Permanent Inter-Etats de Lutte contre la Sécheresse dans le Sahel*
CSI	Coping Strategy Index
ESA	Agricultural Development Economics Division, FAO
EU	European Union
EUTF	Emergency Trust Fund for Africa
FCS	Food Consumption Score
HH	Household Head
HHDDS	Household Dietary Diversity Score
HRP	Humanitarian Response Plan
IDPs	Internally Displaced Persons
LGA	Local Government Area
MIMIC	Multiple Indicators Multiple Causes
NEMA	National Emergency Management Agency
RAP	Resilience Analysis and Policies (team)
RCI	Resilience Capacity Index
RIMA	Resilience Index Measurement and Analysis
RPBA	Recovery and Peace Building Assessment
SEM	Structural Equation Model
SEMA	State Emergency Management Agencies
SO	Specific Objective
SSN	Social Safety Nets
TLU	Tropical Livestock Unit

UN Women	United Nations Entity for Gender Equality and the Empowerment of the Women
USD	United States Dollars
WFP	World Food Programme

OBJECTIVE OF THE ANALYSIS

Borno State, located in the north-east of Nigeria (see Figure 1), has been transformed from a dynamic and populated rural area into a zone of displacement, hazards and food insecurity as the result of escalating levels of violence. Since 2009, the conflict in north-eastern Nigeria has devastated agricultural livelihoods in various ways, including livestock losses; reduced access to fishing grounds; destruction of irrigation and farming facilities; and the collapse of extension services and key agriculture-based value chains. Losses have been caused by levies imposed by Boko Haram on transported production, market and trade facilities (including fish markets); and by reduced production owing to mass displacement and limited access to markets (FAO, WFP and UN Women, 2018).

In 2018, The FAO, UN Women and World Food Programme developed a Joint Action Programme aiming to build the resilience of conflict affected population and public sector institutions in Borno State in an environmentally-friendly and sustainable way. Specifically, the project funded by the EU Emergency Trust Fund for Africa (EUTF), implemented by FAO, UN Women, WFP and local partners, aims at "Restoring and promoting sustainable agriculture based livelihoods for food security, employment and nutrition improvement in Borno State" (FAO, 2018a).

The project directly contributes to national policies and strategies and international approaches to address the humanitarian situation. At federal level, the 2016 Buhari Plan, entitled "Rebuilding the North East", encompasses an agriculture and food security intervention strategy and a small-scale entrepreneurship support programme. The action is integrated in the fourth strategic objective of the Recovery and Peace Building Assessment (RPBA) that aims at increasing equity in the provision of basic services and employment opportunities (World Bank, 2015). The international humanitarian community, led by the National Emergency Management Agency (NEMA) and State Emergency Management Agencies (SEMA), are implementing the '2017 Humanitarian Response Plan (HRP) to reach 6.9 million people in need of urgent assistance in the most affected states of Borno, Adamawa and Yobe. The project also contributes to supporting Objective 3 of the 2017 HRP, which aims to promote resilience through the restoration of livelihoods and basic social services. Overall, the action aspires to improve self-reliance and restore livelihood capacities of conflict-affected populations, and responds to the Specific Objective (SO) 2 and partially the SO 1 of the EU call for proposals as stated by the European Commission's EU Emergency Trust Fund for Africa (EUTF).[1]

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[1] See EU support to response, recovery and resilience in Borno State at
https://ec.europa.eu/trustfundforafrica/region/sahel-lake-chad/nigeria.

Figure 1. **Data collection map**

Nigeria Borno State Local Government Areas (LGAs)

1. Bama
2. Damboa
3. Jere
4. Kala Balge
5. Konduga
6. Kukawa
7. Kwaya Kusar
8. Mafa
9. Monguno
10. Ngala
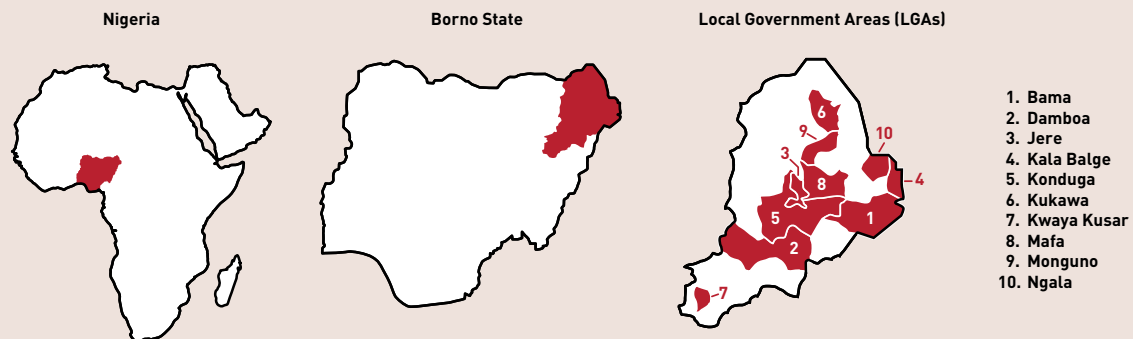
Source:
Authors' own elaboration from www.un.org/Depts/Cartographic/english

The expected results of the project funded by the EUTF are that:

1. Smallholder farmers (men, women and youth) will have skills and knowledge to implement good agricultural, nutrition and gender practices.

2. Smallholder farmers will have diversified food sources and income.

3. Smallholder farmers will have opportunities to access markets and business development.

An impact evaluation answers the question of whether the project successfully meets its objective. In order to estimate the impact of the project, (a minimum of) two data collections must take place: one before (baseline) and one after (follow-up) the project has been implemented. FAO, UN Women and WFP carried out an ad hoc data collection in ten Local Government Areas (LGAs) of Borno State during July and August 2018. The selection of the areas of the data collection took into consideration the coverage of the EU project, the *Cadre Harmonisé* (CH) food security classification, and the presence of internally displaced persons (IDPs).

The baseline survey serves to collect indicators to analyse household resilience capacity and food security using the FAO RIMA tool. The results of the baseline analysis will be used in the future to create a comprehensive impact evaluation of the Action, once panel data becomes available. In addition to the longer-term objective of the data collection, the aim of this report is to provide findings for the resilience and food security analysis in relation to their implications for programme design.

1 KEY MESSAGES

This section summarizes the main results of the analysis and related implications for policy development and programming

Damboa, Konduga and Jere local government areas (LGAs) are inhabited by all categories of households (host, IDP and returnee), while the LGAs of Bama, Kukawa, Mafa, Monguno, Kala Balge and Ngala are inhabited mainly by IDPs and/or returnee communities. The analysis indicates that LGAs with the coexistence of host, IDP and returnee communities have the highest resilience levels, while the least resilient LGAs are those inhabited mainly by IDP and/or returnee households and should be prioritized for interventions enhancing access to productive assets, education and training programmes in order to improve their resilience capacity.

POLICY RECOMMENDATIONS

➤ *Interventions for the least resilient households living in Monguno, Kukawa and Ngala could facilitate access to land and livestock in order to provide households with the means needed to develop agricultural and pastoral activities.*

➤ *Increased access to assets (AST) could be complemented by training programmes to educate participants on good agricultural practices, fish farming, and animal health and production.*

Shocks are systematically related to the individual local government area. In Jere, Konduga, Kwaya Kusar, Monguno and Damboa LGAs, households reported drought and/or water shortages as frequent shocks whereas conflict represents the most frequent shock in Kala Balge.

POLICY RECOMMENDATIONS

➤ *With regard to interventions to minimize the impact of prominent shocks, investments should focus on drought relief and promoting water access in Jere, Konduga and Damboa, while interventions in Kala Balge should focus on alleviating conflict-related damages.*

IDPs and returnee households have less access to food and suffer from poor food diversification, while crop and livestock-related shocks are those reported to be the greatest challenges by host communities.

POLICY RECOMMENDATIONS

➤ *Interventions to enhance short and medium-term food security of IDP and returnee households should be focused on ad hoc emergency food assistance, conditional and unconditional cash transfers, land access promotion, agricultural technologies and improved inputs adoption to enhance agricultural productivity. Moreover, promoting IDP and returnee households' access to productive assets and professional training contributes to raising their resilience and food security through diversification of income sources. In addition, it is essential to encourage good practices of water sanitation and hygiene techniques to improve food and nutrition security.*

➤ *For host communities, investments in training on land irrigation techniques, construction of agricultural dams, and the adoption of agricultural crop production systems resistant to climate shocks such as drought and flood, could play an important role in enhancing their resilience capacity and food security. In addition, the implementation of climate-based agricultural insurance programme to protect farmers against major climate and biological shocks such as drought, flood and livestock and crop disease could encourage their investment in agricultural technology adoption, increase their farm and livestock productivity and therefore stabilize or increase household agricultural production and income, and improve their resilience to food and nutrition security.*

Women and children are those who are most exposed and vulnerable to food and nutrition insecurity in developing countries. Therefore, disaggregation analysis of resilience and food security through vulnerable households is important in order to inform policy-makers. In this report, a sensitivity analysis is performed using households which have many women and children (i.e. households in which the share of women and children is at least greater than 35 percent), called 'households composed by many women and infants'.

The findings suggest that households made up by many women and infants[2] are in particular need of enhancing-resilience interventions relating to access to land, housing and training.

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[2] In developing countries, women and children are the most exposed and vulnerable to food and nutrition insecurity (Ellis, 2003; Babatunde *et al.*, 2008). Children under five years old are vulnerable especially to undernutrition, malnutrition and infectious diseases; lactating women are vulnerable to undernutrition in the context of nursing babies; and widows and divorced women are vulnerable as a result of loss of access rights to land, lack of time to cultivate land and loss of previous partner's contribution to household livelihood (Ellis, 2003). Moreover, female-headed households are found to be more vulnerable because of unequal access to and control of productive resources (Ellis, 2003; Babatunde *et al.*, 2008). The literature shows that a sensitivity analysis of women and children is essential for improving food and nutrition security of these categories of households. Following the evidence presented by the literature, women and children households' sensitivity analysis is performed using households with many women and infants (i.e. households in which the share of women and children is at least greater than 35 percent), referred to as "households composed by many women and infants".

> **POLICY RECOMMENDATIONS**

> ➤ *Policy interventions that enhance access to land and housing would increase resilience capacity of households with many women and children by equipping them with more agricultural productive assets and skills to initiate other related income-generating activities such as trade and services. These households could be earmarked to receive training sessions and practical educational skills that could promote their farming activities or, as envisioned within the scope of activities of the Joint Action Programme, women and girls in these households could be selected to receive training in skills needed to acquire and run businesses. These interventions could therefore improve household resilience and food security through actual income diversification activities, adoption of good agricultural risk management practices and ensuing increased agricultural production, thus enabling each household member to achieve the best possible livelihood.*

Female-headed households are less resilient and more exposed to health-related shocks and conflict than male-headed households.

> **POLICY RECOMMENDATIONS**

> ➤ *In order to enhance the resilience capacity of female-headed households, interventions should prioritize access to basic services (ABS), particularly water sources, hospitals and schools, as well as access to credit.*

> ➤ *Given the importance of crop and livestock production, interventions seeking to support male-headed households could work to improve their resilience to relevant farming and pastoral shocks. Programmes could enhance access to disease and drought-resistant inputs, while also assisting recipients to diversify their income away from primary production activities towards more value-added processing activities.*

Contrary to the quantitative evidence, IDPs, female-headed households and households with many children and women perceive themselves to be more resilient.

Although many households in these categories perceive themselves as subjectively resilient, their quantitative resilience capacity has often been diminished by the incidence of shocks.

> **POLICY RECOMMENDATIONS**

> ➤ *These households should therefore be targeted with social protection schemes during times of duress. Training courses could include content on the adoption of agricultural and/or livestock innovations to cope with shocks, as well as best nutritional practices because of the risk of worsening nutritional outcomes during bouts of food insecurity.*

The LGAs reporting the most frequent exposure to violence are Bama, Jere, Kala Balge and Ngala. The negative effect of violence on food security can be reduced by ad hoc interventions.

POLICY RECOMMENDATIONS

➤ *To help households affected by the conflict preserve their food security, interventions should focus on the provision of formal food assistance as well as agricultural inputs for diversifying crop production.*

➤ *The empowerment of individuals, who have been exposed to episodes of violence, by helping them to regenerate their livelihoods, could play an important role in enhancing their medium to long-term food security. The prioritization of these households for receiving training in agricultural, livestock or enterprise development, alongside increased access to credit, could equip them with the means needed to reconstruct their resilience capacity.*

2 MAIN FINDINGS, POLICY AND PROGRAMMING IMPLICATIONS

This section provides, for each of the findings, key evidence from the analysis and outlines programming and policy implications

2.1 GEOGRAPHICAL PROFILES

MAIN FINDING 1

Damboa, Konduga and Jere local government areas are inhabited by all categories of households (host, IDP and returnee), while in Bama, Kukawa, Mafa, Monguno, Kala Balge and Ngala LGAs are found mainly IPDs and/or returnees' communities. The analysis indicates that LGAs characterized by the coexistence of host, IDP and returnee communities have the highest resilience levels, while the least resilient LGAs are inhabited mainly by IDP and/or returnee households and should be prioritized for interventions to enhance access to productive assets, education and training programmes in order to improve their resilience capacity.

The least resilient households are found living in Monguno, Kukawa and Ngala, while households in Kwaya Kusar, Konduga, Jere and Damboa are characterized by high resilience. Bama, Kala Balge and Mafa report medium-level resilience. Figure 1 presents the average value of the resilience capacity index (RCI) by LGAs, while Figure 2 show the correlation between RCI and its pillars. The low RCI of households located in Monguno is explained by their limited level of education (1.63 years of education on average), their high dependency ratio, weak income and crop diversification, credit constraint and low ranking on the wealth index.

The lower resilience level of households in Kukawa and Ngala is the result of their limited proximity to basic services and infrastructures such as schools, hospitals and agricultural markets. In addition, the households of Kukawa have a limited average level of education (2.42 years), limited participation in associations, high dependency ratio and are obliged to resort to informal coping strategies to overcome bouts of food insecurity. Meanwhile, households in Ngala have a low degree of crop diversification, a low level of agricultural wealth index and suffer from long distances to livestock markets.

Figure 2.   **Resilience capacity index by Local Government Areas (LGAs)**

LGAs	RCI		RCI
1. Bama	46		20-30
2. Damboa	49		30-40
3. Jere	55		40-50
4. Kala Balge	44		50-60
5. Konduga	58		
6. Kukawa	34		
7. Kwaya Kusar	58		
8. Mafa	48		
9. Monguno	20		
10. Ngala	39		
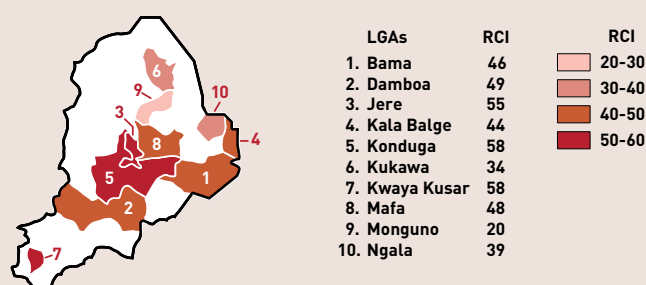
*Source:
Authors' own elaboration from www.un.org/Depts/Cartographic/english*

AST owned, and adaptive capacity (AC) are the most important pillars in household resilience in all of the LGAs, whereas ABS and social security nets (SSN) contribute to a lesser extent (see Figure 2). More specifically, AST serve as the most important pillar in Ngala, Mafa, Jere and Bama; while AC is the most important pillar for household resilience in Kala Balge and Kwaya Kusar. Surprisingly, access to social safety nets (SSN) appears to have no effect on household resilience in Mafa, as households living in this LGA face severe credit constraints and low access to formal transfers.

In general, the SSN support provided to the least resilient households does not translate into accumulation of wealth or human capital. Despite the amount of transfers received, households living in Monguno, Kukawa and Ngala are poor in terms of AST, notably land and the house wealth index. They also report low AC, namely in formal education and participation in trainings.

Despite being the most resilient, host households living in Kwaya Kusar require interventions to enhance ABS, such as the hospital and markets. Indeed, the constraints faced by households are related to their remoteness from basic service structures such as hospitals, water sources, livestock markets and agricultural markets, as well as limited access to formal transfers.

Figure 3.   **Correlation of pillars and resilience capacity index by LGAs**
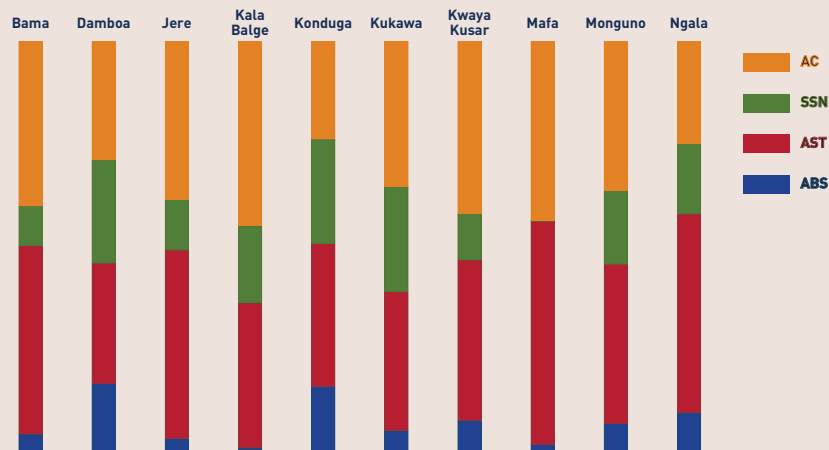
*Source:
Authors' own elaboration*

The food security analysis (Table A7 in Annex III) indicates that the households in Monguno and Kukawa local government areas are those most food insecure within Borno State. The households of Monguno and Kukawa have the lowest food consumption scores (23.70 and 35.06 respectively), and the lowest household dietary diversity scores (3.54 and 5.26).[3] The households living in Kala Balge, Mafa, Kwaya Kusar and Bama have the highest food consumption scores, respectively, while those living in Konduga, Kwaya Kusar, Jere and Mafa have the highest household dietary diversity scores. These results are unsurprising because LGAs with a higher resilience index (Kwaya Kusar, Konduga, Jere and Mafa) are those with the highest food consumption and diversity scores (FCS and HHDDS).

Food expenditures per capita are highest among households living in Kwaya Kusar, Damboa, Konduga and Jere LGAs and lowest among those living in Kala Balge, Monguno, Mafa and Ngala. Among all of the LGAs, Jere is unique as it has a significant level of food produced through self-production per capita per month (USD 21), while the other LGAs have under USD 2 of food produced through self-production per capita per month. Kala Balge, Mafa, Jere, Konduga and Bama are the most dependent on food and gift assistance (see Table A7 in Annex III). Overall, the households living in Monguno, Ngala and Kukawa LGAs have less access to food per capita.

> **POLICY RECOMMENDATIONS**

> ➤ *Given the general importance of AST and AC to the LGAs in Borno State, activities that prioritize the reinforcement of these pillars would be most helpful in strengthening resilience capacity. In particular, the LGAs of Monguno, Kukawa and Ngala are those that probably require the most attention, notably for food security related assistance, as they are the least resilient.*

> ➤ *Interventions to be prioritized include enhancing access to productive assets, education and training programmes which could help diversify income sources and thereby promote the accumulation of wealth and human capital. More specifically, interventions could facilitate access to land and livestock in order to provide households with a means of developing agricultural and pastoral activities. Training programmes could be developed to educate participants on good agricultural practices, fish farming, and animal health and production, as discussed in the joint action programme document. At the same time, investments in mobile schools could enhance access to education for children and minimize potential disruptions in lessons. Given that some families may struggle to send children to school, small transfers could be provided to families to support school fees and offset the economic loss potentially incurred by children who would be unable to work and contribute to the family's total income.*

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[3] According to WFP Technical Guidance Sheet (2008), there are three thresholds of household classification using the food consumption score (FCS): If the household FCS is between 0 and 21, then the household is poor, between 21.5 and 35, the household is borderline and if greater than 35, then the household has an acceptable food consumption behaviour.

MAIN FINDING 2

Shocks are systematically related to the local government area. In Jere, Konduga, Kwaya Kusar, Monguno and Damboa LGAs, households reported drought and/or water shortages as frequent shocks, while conflict is the most frequent shock in Kala Balge.

Many households in Jere (47 percent), Konduga (40 percent), Kwaya Kusar (27.8 percent) and Damboa (24.4 percent) report drought as a frequent risk. Moreover, the households respectively in Damboa (42 percent) and Monguno (30.8 percent) report water shortages. In Kala Balge, the most frequent shocks facing the households are conflict (66.5 percent), fire (47.6 percent), water shortages (16.5 percent) and illness of household members (15.9 percent). Among the most-frequent shocks, conflict and fire are those that affect negatively household food expenditure and therefore overall food security (see Table A3 in Annex II). The households not experiencing shocks significantly are able to diversify their diet as compared to others experiencing shocks (see Table A3 in Annex II).

Figure 4.   **Main shocks reported by households by LGAs**
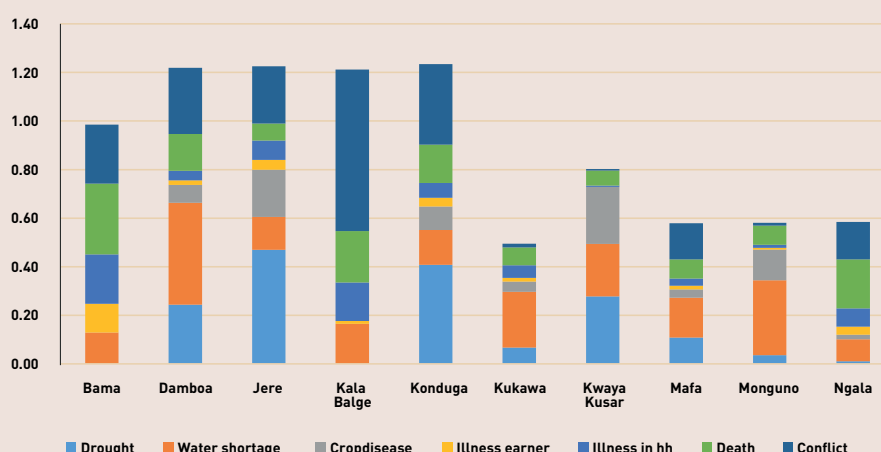
Source:
Authors' own elaboration

POLICY RECOMMENDATIONS

➤ *With regard to interventions tailored to minimize the impact of prominent shocks, investments should focus on drought relief and promoting water access in Jere, Konduga and Damboa, while interventions in Kala Balge should focus on conflict-related damages (see policy recommendations in the following section for more information). Specifically, activities in Jere, Konduga and Damboa could include enhancing access to small-scale irrigation facilities, promoting the production of drought-resistant crops or crops that have lower water needs, and broader water management best practices. Within the context of Kala Balge, there is a need for a better understanding of how conflict has adversely impacted the population in order to effectively tailor policy recommendations to their needs, including the particular root causes behind the bouts of conflict in the area and the damages incurred.*

2.2 IDPS, HOST AND RETURNEE COMMUNITIES

MAIN FINDING 3

IDP and returnee households have less access to food and low food diversification, while crop and livestock-related shocks are the challenges most reported by host communities.

IDP and returnee households report lower access to food and a less diversified diet (lower food expenditure, food consumption and Household Dietary Diversity Scores) than host households. Therefore they are less resilient to food insecurity.

Host households sampled in Borno State are more engaged in the food production system, which contributes to higher food security outcomes relative to IDP and returnee communities (see Figure 5). However, host household engagement in the food production system renders them more vulnerable to crop and livestock-related shocks. In particular, host households reported the highest exposure to shocks related to crop and livestock production, notably drought, water shortages, crop disease, high agricultural input prices and livestock disease.

Figure 5. **Shares of food consumption by household type**

Host **IDP** **Returnee**

■ **expenditure**   ■ **production**   ■ **assistance**
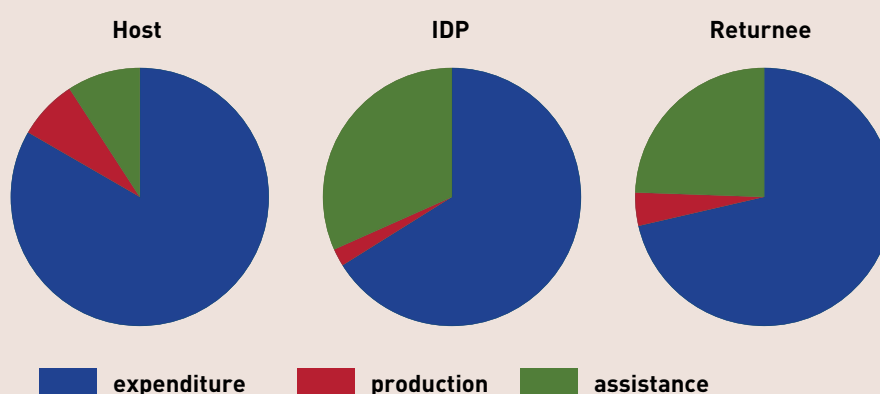
*Source:
Authors' own elaboration*

In comparison with the host households, IDP and returnee households report lower access to food as well as a less diversified diet, demonstrated by lower food expenditures and a lower food consumption score (FCS) and household dietary diversity scores (see Table A6). Lower food security outcomes may partly be an outcome of lower levels of productive and non-productive assets relative to host community households, which limit the diversity of cultivated crops and income sources. IDP and returnee households are also characterized by lower education levels and limited access to training to develop agricultural and livestock techniques or business skills, which further constrains income diversification. These factors contribute to a high reliance on food purchases and food assistance as compared to host communities.

➤ *For host communities, investments in training on land irrigation techniques, construction of agricultural dams, and the adoption of agricultural crop production systems resistant to climate shocks such as drought and flood, could play an important role in enhancing their resilience capacity and food security. In addition, the implementation of climate-based agricultural insurance programme to protect farmers against major climate and biological shocks such as drought, floods and livestock and crop diseases could encourage them to invest in agricultural technology adoption, increase their farms and livestock and therefore stabilize or increase household agricultural production and income, and improve their resilience to food and nutrition insecurity.*

Interventions to enhance short- and mid-term food security of IDP and returnee households should be focused on ad hoc emergency food assistance, conditional and unconditional cash transfers, land access promotion, agricultural technologies and improved inputs adoption to enhance agricultural productivity. Moreover, promoting IDP and returnee households' access to productive assets and professional training contributes to raising their resilience and food security through diversification of income sources. In addition, it is essential to encourage good practices with regard to water sanitation and hygiene techniques to improve food and nutrition security. Furthermore, interventions to support the resilience capacity of IDP and returnee households would also be best focused on increasing access to productive assets and land. Households could then be better placed to diversify their income sources, thereby increasing their purchasing power and minimizing their reliance on food purchases and food assistance. Improving access to education could also provide an important opportunity for building medium to long-term resilience capacity for children and adults. For the latter category of individuals, education programmes could be tailored to help build basic skills in literacy and numeracy, while giving practical insight into occupations practiced by IDPs or returnees. For example, individuals pursuing pastoralism as a livelihood could be provided practical information, and in some cases training, for maintaining their livestock and developing other income sources. Alternative income sources may include the creation of value-added products from livestock, such as articles of clothing from animal skins.

2.3 HOUSEHOLD COMPOSITION AND GENDER OF HOUSEHOLD HEAD

MAIN FINDING 4

Households made up by many women and children are particularly in need of resilience-enhancing interventions related to accessing land, housing and training.

Households that are composed by many women and children[4] are less resilient compared with other household composition types.[5] In particular, these households are characterized by relative deficiencies in AST and AC. In terms of AST, households with many women and children have

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[4] A household is classified as with many women and children if the share of women and children in this household is greater than or equal to 35 percent.

[5] These households amount to 29 percent of the sample.

lower access to land and housing, which limits both their economic opportunities as well as the assets available to sell in times of difficulty. These constraints are particularly important, given that the majority of these households are engaged in farming (71 percent), an occupation in which land possession plays a key role in ensuring resilience capacity. In the case of these households, lower land possession may be attributed to the fact that nearly 50 percent of households in this category are IDP households, while 32 percent are returnees. Consequently, households may have lost land while fleeing conflict, or lacked the means to access land owing to instability.

In terms of AC, this category of household generally has lower education levels and limited access to training. Again, these factors may in part be attributed to conflict or instability, which may have disrupted IDPs' or returnees' education and stymied their access to training. Despite these factors, households with many women and children received a disproportionate amount of both formal transfer funds as well as credit per capita, an expected result of formal aid programmes.

POLICY RECOMMENDATIONS

➤ *Policy interventions that enhance access to land and housing would benefit the resilience capacity of households with many women and children by equipping them with more productive assets to generate income, or to sell during periods of hardship. Given that the majority of households with this type of household composition are also IDPs or returnees, interventions to support these households could particularly target households with many women and children to mitigate their vulnerability. Furthermore, these households could be earmarked to receive training sessions and a basic education leading to practical skills that could promote their farming activities. For example, women could be provided with lessons in basic numeracy and literacy, as well as practical knowledge related to raising a greater diversity of crops and to market and input prices. Within the scope of activities envisioned by the Joint Action Programme, women and girls in these households could be selected to receive training on skills related to acquiring and running businesses. Furthermore, women falling within this category could be targeted for being incorporated into cooperatives, fishing processing units, and processing and trade enterprises. These interventions could therefore improve household resilience and food security through income diversification activities, adoption of agricultural risk best management practices, and thereby increasing agricultural production and enabling all household members to improve their livelihoods.*

MAIN FINDING 5

Female-headed households are less resilient and more exposed to health-related shocks and conflict than male-headed households.

Female-headed households, which represent 17 percent of interviewed households, have a lower resilience capacity on average relative to male-headed households. Female-headed households are disadvantaged in terms of ABS, notably access to water sources, hospitals and schools, which can contribute to higher exposure to health-related shocks.

In terms of income sources, male-headed households obtain more of their income from crop and livestock production, leaving them considerably more exposed to farming and pastoral-related shocks, such as drought, water shortages, and crop and livestock diseases.

In contrast, female-headed households garner more of their income from enterprises.

However, their ability to grow economically is limited by lower access to credit and limited participation in associations. Finally, female-headed households are more exposed to conflict as a shock, which adversely impacts their resilience capacity, and potentially their ABS.

Figure 6.   **Income sources by gender of household head**
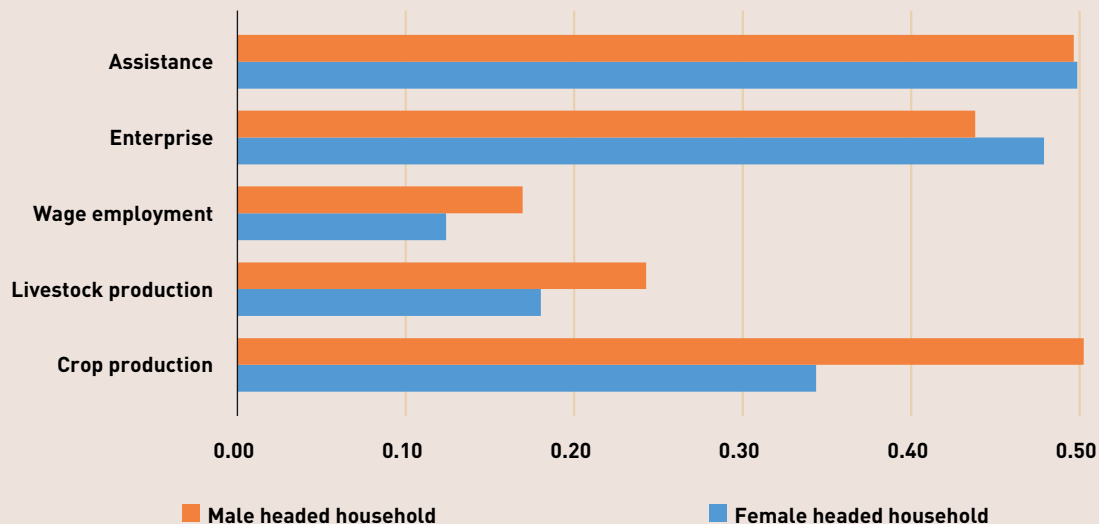
Source:
Authors' own elaboration

POLICY RECOMMENDATIONS

➤ *In order to enhance the resilience capacity of female-headed households, interventions should prioritize ABS, particularly water sources, hospitals and schools. For example, access to water could be improved by providing basic information sessions on best water management practices and distributing water purifying tablets to areas that are particularly disadvantaged in terms of water availability. In view of female household exposure to conflict, which predictably constrains access to hospitals and education, investments in mobile medical centers and schools may provide a short-term solution to limited ABS. As discussed previously in the policy recommendations for IDP and returnee communities, a focus on more practical elements of schooling (basic numeracy and literacy) which can facilitate income diversification may be a productive and feasible investment of resources in the short term. More broadly, female-headed households would benefit from training programmes envisioned by the Joint Action Programme activities, as mentioned previously for households composed of many women and children. Entrepreneurial female-headed households could also be earmarked for initiatives aimed at increasing access to fuel, energy and food technologies.*

Finally, in terms of access to SSN, developing access to mobile money networks could promote female entrepreneurial activities by enhancing access to credit. The promotion of female integration into local associations, such as women's groups, could help empower women and provide them with networks within which to build their businesses.

Given the importance of crop and livestock production, interventions seeking to support male-headed households could work to improve their resilience to relevant farming and pastoral shocks. As previously mentioned for host community households, programmes could enhance access to disease- and drought-resistant inputs, while also assisting recipients to diversify their income away from primary production activities towards more value-added processing activities.

2.4 SUBJECTIVE RESILIENCE

MAIN FINDING 6

> *Contrary to the objective evidence, IDPs, female-headed households and households with many children and women perceive themselves to be more resilient.*

Two subjective resilience indicators are calculated at household level using a specific module of subjective resilience. In this module, a series of questions are asked about the ability of households to deal with times of hardship and disaster when they hit their community. Thirteen questions in this module focus on the absorptive capacity, AC, transformative capacity, learning capacity, anticipatory capacity, knowledge and information, financial capital, social capital, and social and political capital of the households. Household responses are measured on a five point Likert scale, ranging from 'strongly agree' to 'strongly disagree'. The first subjective resilience indicator is based on a set of ten questions regarding a generic shock/hardship (FAO, 2018b), and the second measures the self-reported capacity of the household to cope with severe drought events. The evidence indicates a negative relationship between the subjective resilience index and the RCI. Indeed, with regard to the household profiling in Figure 4 (host, IDP, returnees; female-head vs male-head; and household with many women and children vs other households), those who have a low RCI score have the highest scores on generic and drought subjective resilience indices.

This can be explained by the prior experiences of households in coping with difficulties, recurrence of shocks and hardships faced, and the fact that despite these difficulties, households feel that they are still able to meet their basic needs. Consequently, in their resilience self-estimation, the survival factor in relation to the hardships and shocks seems to be the most important factor. Indeed, while households with low levels of RCI see that they were able to survive despite shocks and difficulties, those with high levels of RCI may suffer more because of the deterioration in their standard of living during these difficult times. Regression analysis (see Table A4 in Annex II) indicates that households with the highest levels of food security have the lowest scores on generic and drought subjective resilience indices. This finding suggests that the higher level of food security household members have, the more they feel the negative impacts of hardship and drought, and therefore perceive themselves as less resilient.

Figure 7.   Subjective Resilience Index
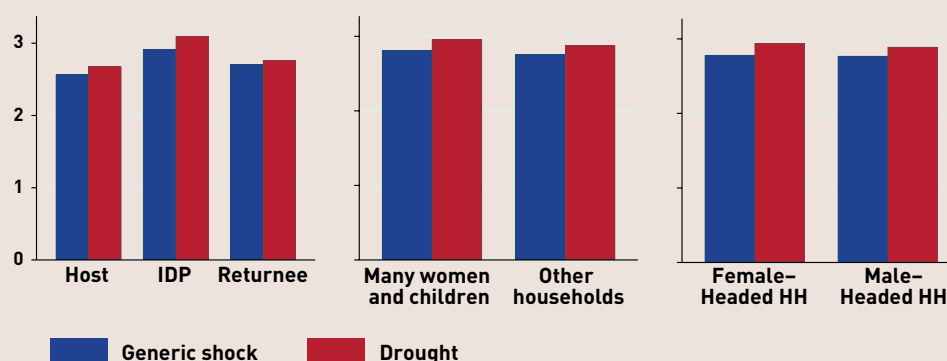
Source:
Authors' own elaboration

POLICY RECOMMENDATIONS

➤ *Although the aforementioned households perceive themselves as subjectively resilient, their objective resilience capacity has often been diminished by the incidence of shocks. These households should therefore be the targets of social protection schemes during times of duress. Interventions could draw on the experiences of previous initiatives in these areas to determine the efficacy of providing cash transfers and access to agricultural inputs, coupled with training to enhance livelihoods. Another option that could be explored is the provision of microcredit products combined with increased access to inputs and practical training courses to better equip households with the means to diversify and reinforce their incomes. Training courses could include content on the adoption of agricultural and/or livestock innovations to cope with shocks. Finally, given the risk of worsening nutritional outcomes during bouts of food insecurity, these households could be targeted for receiving nutrition assistance and information on good nutrition practices, as envisioned by the Joint Programme Action Plan.*

2.5 VIOLENCE EXPOSURE

MAIN FINDING 7

The LGAs reporting the most frequent exposure to violence are Bama, Jere, Kala Balge and Ngala. The negative effect of violence on food security can be reduced by ad hoc interventions.

A very detailed module on violence exposure has been used in a questionnaire devised for Borno State. This allowed the analysis to be tailored to the specific context of Borno where escalating levels of insecurity have affected the living conditions of its populations during the past years. Different dimensions of violence exposure have been taken into consideration in the module, capturing both psychological aspects, such as feelings of insecurity, and physical aspects,

such as the loss of goods or properties and the killings of household members. Furthermore, all the different dimensions have been aggregated into a violence exposure index pooling together all the different aspects of conflict exposure.

The LGAs reporting the highest exposure to violence are Bama, Jere, Kala Balge and Ngala. The feeling of not being safe in their homes is the most widespread aspect of violence exposure in these four LGAs, as well as in the total sample. In fact, 26 percent of the households interviewed report feeling of insecure at home out of the total sample, with a peak of 38 percent of households in Kala Balge. Additionally, many households (more than 20 percent) in Bama and Ngala reported having suffered as a result of stolen goods or property over the past twelve months. In Kala Balge, Bama and Jere the psychological aspects of the violence were significant, especially that ensuing from being a witness of violence (see Table A8 in Annex III).

Despite the emergency status as identified using the CH classification, the households living in Kuwaka do not report high levels of violence exposure, as do the households living in Kuwaya Kusar and Monguno.

The analysis of violence exposure by type of household also highlights striking differences between household types. Returnees' households are the most exposed to violence, followed by IDPs' households (see Table A9 in Annex III). In fact, returnee households reported a high level of households evicted from their land (3.2 percent), witnesses of violence (16.9 percent), most injured in violence (5.4 percent) and those whose members are the most injured or killed (6.9 percent). However, in the three types of households (host, IDP and returnee), feeling insecure at home (25.9 percent, 21.9 percent and 16.9 percent respectively) and being a witness to violence are the common kinds of exposure to violence (28 percent, 27 percent and 24.1 percent respectively). Moreover, the IDPs' households are the most frequently denied access to farmland or pasture (8.1 percent) and evicted from the land (3.1 percent). The returnees' households are the most exposed to all forms of violence including having goods or property stolen (17.5 percent) and threatened with violence and death (4.8 percent), while the IDPs' households are those most exposed to violence related to their activities (evicted from their land and denied access to farmland). These households are those in most immediate need of food assistance and cash transfers. But also, and most importantly in order to restore the households' livelihoods, there should at least be the provision of security services enabling IDP and returnee households to carry out their income-generating activities, have access to land and invest in their activities.

Exposure to violence has negatively affected household food security in Borno State. However, its impact has been counteracted in part by the households' ability to access formal transfers, as well as informal strategies such as relying on relatives and friends; by the availability of agricultural assets and the diversification of the crop production (see Table A5 in Annex II).[6] To help households affected by conflict maintain their food security, interventions should focus on the provision of formal assistance as well as agricultural inputs for the diversification of crop production.

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[6] The coefficients of the interaction terms (violence exposure * formal transfers; violence exposure * informal strategies; violence exposure * agricultural assets; violence exposure * crop diversification evaluated at the mean values) have a lower magnitude than the non-interacted violence exposure coefficient.

POLICY RECOMMENDATIONS

➤ *Relief interventions should be diversified between LGAs, types of livelihoods and degrees of severity of the violence exposure. The LGAs to be prioritized are Bama, Jere, Kala Balge and Ngala, all reporting higher levels of violence exposure.*

➤ *To help households affected by the conflict to preserve their food security, interventions should focus on the provision of formal food assistance as well as agricultural inputs for diversifying crop production. Furthermore, the empowerment of individuals who have been exposed to episodes of violence, by helping them to regenerate their livelihoods, could play an important role in enhancing their medium- to long-term resistance to food insecurity. The prioritization of these households for receiving training in agricultural, livestock or enterprise development, alongside increased access to credit, could equip them with the means needed for reconstructing their resilience capacity. These interventions could target the returnee and IDP households that are the most exposed to any form of violence affecting their security and income-generating activities.*

3 METHODOLOGY AND COVERAGE

This section presents the ad hoc dataset used in this resilience analysis, the project intervention areas, and describes the FAO RIMA-II approach employed for estimating household resilience capacity. It also provides information on sampling design, questionnaire modules, and agencies involved in data collection

The data employed in the analysis is ad hoc dataset collected by FAO, UN Women, and WFP during July and August 2018. In total, 2 049 households were interviewed in ten local government areas (LGAs) in Borno State: Bama, Damboa, Jere, Kala Balge, Konduga, Kukawa, Kwaya Kusar, Mafa, Monguno and Ngala. The sampling design considers the situation of food insecurity with reference to CH (Federal Ministry of Agriculture and Rural Development, FAO Nigeria and CILSS, 2017); the coverage of the FAO,UN Women-WFP project; and the presence of IDPs. The CH analysis of March 2017 classified Borno State LGAs as under emergency, crisis and pressure levels of food and nutrition insecurity situation (Federal Ministry of Agriculture and Rural Development, FAO Nigeria and CILSS, 2017).

Table 1. **Interviewed households by LGAs**

LGAs	EU Project	*Cadre* Harmonisé* Classification	Number of household interviewed
Bama	Yes	Crisis	202
Damboa	Yes	Crisis	205
Jere	Yes	Crisis	200
Kala Balge	No	Emergency	170
Konduga	Yes	Crisis	196
Kuwaka	No	Emergency	192
Kwaya Kusar	No	Crisis	162
Mafa	Yes	Crisis	202
Monguno	Yes	Crisis	253
Ngala	Yes	Crisis	267
Total			2 049

Note:* CH for identification of risk areas and vulnerable populations of sixteen states and the Federal Capital Territory (FCT) of Nigeria.

To reduce the sample dispersion and ensure representative sampling in each area, two randomized sampling procedures were adopted. In the first stage, for each local government area, the villages (primary sampling units) were randomly selected. In the second stage, the random selection of the households was carried out using the probability proportional to size (PPS) to ensure proper sampling representation in these areas. The data was collected for treatment (beneficiaries) and control (non-beneficiaries) groups in each LGA that will not be reached by the joint FAO, UN Women and WFP project.

The questionnaire administered to the households was developed by the FAO in collaboration with UNICEF, UN Women, and national partners. The questionnaire contained different modules dealing specifically with household characteristics: household food and non-food consumption, durable assets, education, dwelling and infrastructure, land and land disputes, crop production, livestock production and fishing, livestock products, agricultural inputs and assets, coping strategies, social networks and shocks, subjective resilience, employment and labour, enterprises and trainings, credit facilities and insurance, other income sources and exposure to violence. The aforementioned module used in this questionnaire was developed by FAO in collaboration with Uppsala University. In addition, conflict-related questions were adapted from surveys presented in "Measuring Violent Conflict in Micro-Level Surveys: Current Practices and Methodological Challenges" (Brück, Justino, Verwimp, and Tedesco, 2016).

The data collection was achieved by employing Computer Assisted Personal Interviewing (CAPI) technologies, using digital tablets to conduct the interviews. These technologies present many advantages compared to the traditional paper questionnaire: they reduce the duration of the interview; limit errors during both the interview and data entry phases; and allow for collecting Geographic Information System (GIS) information at the household level.

The data is used to estimate the household resilience capacity to food insecurity. The definition of the resilience adopted in this report is: "the capacity that ensures adverse stressors and shocks do not have long-lasting adverse development consequences" (RM-TWG, 2014). Based on this definition, the resilience capacity index (RCI) of households is estimated using FAO's RIMA II approach (FAO, 2016). This approach is based on a two-step procedure (FAO, 2016): (1) in the first step, a factor analysis is performed to estimate the four resilience pillars: ABS, AST, SSN and AC using observed variables; (2) in the second step, the RCI is estimated from the pillars, while taking into account food security indicators using the Multiple Indicators Multiple Causes (MIMIC) model. The food security indicators are considered outcomes of resilience (FAO, 2016).

This baseline data exercise will be followed by an end line survey to evaluate the impact of the different projects that are being implemented in this region. Panel data provides the strongest evidence in order to attribute causal relation between the implemented interventions and the effect on beneficiaries.

4 NEXT STEPS

*This section provides information
on the report dissemination, and report using
for the forthcoming project activities*

This data collection was initiated to provide the baseline indicators for the impact evaluation of the FAO-UN Women and WFP action in Borno State. In order to ensure a wide uptake and effective use of the research, the questionnaire was compiled in collaboration with the three partners of the action, and the emerging results were widely disseminated before the elaboration of the report.

All the data are available for any partner to access and use, and additional analysis may be performed on specific data as required.

The report will be widely disseminated; it will inform the way forward for resilience building for FAO and partners.

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ANNEX I
RESILIENCE MEASUREMENT

Following the RIMA-II approach (FAO, 2016), the estimation of the RCI is based on a two-stage procedure.

1. First, the resilience pillars are estimated from observed variables through Factor Analysis (FA). The definition of each pillar of resilience and the related variables are reported below in Table A3.

2. Second, the RCI is estimated from the pillars, taking into account the indicators of food security using the Multiple Indicators Multiple Causes (MIMIC) model. The food security indicators are considered outcomes of resilience.

After estimating the pillars, the RCI is jointly estimated through its pillars and by taking into account the food security indicators. The results of the MIMIC model are shown in Table A1. The model presents a good fit to the data; all the pillars' coefficients are positive and statistically significant with the exception of the ABS pillar.

After estimating the RCI, a min-max scaling is used to transform the RCI value into a standardized index, ranging between 0 and 100. The linear scaling is based on:

$$RCI^* = (RCI - RCI_{min}) \, / \, (RCI_{max} - RCI_{min}) \qquad (1)$$

The descriptive resilience analysis provides a description of household resilience capacity, namely the RCI and RSM. The latter shows the correlation between the RCI and the pillars and between the observed variables and the pillars.

In order to study the determinants of the food security indicators employed for estimating the RCI, the following OLS model is adopted:

$$FS_h = \alpha + \beta R_h + \delta X_h + \varepsilon_h \qquad (2)$$

Where R is a vector of all variables employed for estimating the resilience pillars, X is a vector of household control characteristics, which includes LGA dummies, and ε is an error term. Different models are estimated, for food expenditure per capita and HDDS. Table A2 summarizes the empirical results.

Table A1. **MIMIC results**

	(1) RES
ABS	-0.105
	(0.082)
AST	1.129***
	(0.113)
SSN	0.348***
	(0.052)
AC	0.909***
	(0.122)
Food expenditure per capita	1
	(0)
Household Dietary Diversity Score	0.552***
	(0.0435)
SDAM	0,9172***
	(0,0202)
Chi squared	18.84
RMSEA	0.051
CFI	0.982
TLI	0.947
Observations	2 300

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A2. **Variables employed in the RIMA-II model**

Pillar	Variable	
ABS **Ability of a household to meet basic needs, by accessing and effectively using basic services, such as sending children to school; accessing water, electricity and sanitation; and selling products at the market.**	Improved sanitation	Variable indicating access to improved toilet facility (flushing toilets, ventilated improved pit latrines, pit latrines with a slab and composting toilets).
	Closeness to water source	Indicator of closeness to water source (inverse distance to water source expressed in minutes).
	Closeness to school	Indicator of closeness to school (inverse distance to school expressed in minutes).
	Closeness to hospital	Indicator of closeness to hospital (inverse distance to hospital expressed in minutes).
	Closeness to agricultural market	Indicator of closeness to agricultural market (inverse distance to agricultural market expressed in minutes).
	Closeness to livestock market	Index of closeness to livestock market (inverse distance to livestock market expressed in minutes).
AST **Assets, both productive and non-productive, are the key elements of a livelihood, since they enable households to produce and consume goods.**	Wealth index	The wealth index is created through FA. A list of variables assumes a value of 1 or 0 is used, depending on whether or not a household has specific non-productive assets, such as a table, chairs, bed, mattress, lamp, radio, mobile, bike, stove, jerry cans or motor vehicle.
	Agricultural asset index	The agricultural asset index is created through FA. A list of variables assumes a value 1 or 0 is used, depending on whether or not a household has specific productive assets, such as an axe, hoe, spaying machine, shovel, conventional yoke and tractor.
	TLU	TLU standardizes different types of livestock into a single unit of measurement. The conversion factor adopted is: 0.7 camels; 0.5 cattle, 0.3 donkeys/mules; 0.2 pigs; 0.1 sheep/goats; and 0.01 chickens.
	House value*	Monetary value of the household house expressed in USD.
	Land	Total area (hectares) employed for crop production.
SSN **Capacity of the household to access formal and informal assistance from institutions, as well as from relatives and friends.**	Associations	Numbers of associations the household members participate in.
	Credit (value) per capita*	Total amount (USD) of loans received in the last twelve months.
	Formal transfers (value) per capita*	Total amount (USD) of formal transfers received in the last twelve months. They include cash for work programmes, relief food carried out by non-governmental organizations (NGOs), productive inputs, benefits from elderly people schemes and social action for elderly people programmes.
	Strategies relying on informal network(s)	Number of days the household adopts the following strategies to cope with food shortages: borrow food or rely on help from friends/relatives; purchase food on credit; send household members to eat elsewhere; or send household members to beg.
AC **Ability to adapt to a new situation and develop new livelihood strategies**	Average years of education	Average years of education of household members.
	Share of active members	The dependency ratio is the share of household members actively employed (>15 and <64 years old) over the household size.
	Number of income-generating activities	Sum of the different sources of income for the household. A list of variables that assumes a value of 1 or 0 is used, depending on whether or not a household has been involved in farming activity; wage employment; sale of livestock products; non-farm enterprise; or has received transfers, rent, and income from the sale of assets or other income sources.
	Number of crops	Sum of the different crops cultivated by the household during the last season.
	Participation in training	Dummy variable for participating in training courses (on agricultural techniques, livestock and products, business skills and other).
Food Security **According to the 1996 World Food Summit, food security* exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, 1996).**	Food expenditure per capita	Monetary value (USD) of per capita food expenditure over the last month.
	Household Dietary Diversity Score (HDDS)	Number of different food groups consumed over the past week. The following 12 food groups are used to calculate the HDDS: cereals; root and tubers; vegetables; fruits; meat, poultry, and offal; eggs; fish and seafood; pulses; legumes and nuts; milk and milk products; oil and fats; sugar and honey; and miscellaneous.

Note: * variable used is standardized in the estimation model.

ANNEX II
REGRESSION ANALYSES

Table A3. **Regression analysis: food security indicators**

Variables	(1) HHDDS	(2) Food expenditure
ABS		
Sanitation improved	0.180* (0.103)	-0.036 (0.050)
Closeness to water source	-0.022 (0.050)	-0.041* (0.024)
Closeness to school	0.232 (0.211)	0.042 (0.101)
Closeness to hospital	-0.130 (0.086)	-0.014 (0.041)
Closeness to agric. market	0.037 (0.090)	-0.021 (0.043)
Closeness to livestock market	0.034 (0.084)	-0.024 (0.040)
AST		
Wealth index	4.326*** (0.457)	1.423*** (0.219)
Agricultural index	0.454 (0.571)	0.910*** (0.274)
TLU	-0.096 (0.069)	-0.009 (0.033)
Land	0.079*** (0.020)	0.011 (0.010)
House value	0.000*** (0.000)	0.000*** (0.000)
SSN		
Credit (USD)	-0.002 (0.003)	0.000 (0.001)
Formal transfers pc (USD)	-0.003** (0.001)	-0.003*** (0.001)
Informal strategies	-0.062*** (0.010)	-0.042*** (0.005)
Associations	0.231*** (0.068)	0.078** (0.033)

Table A3. **Regression analysis: food security indicators** - Cont.

Variables	(1) HHDDS	(2) Food expenditure
AC		
Education (average years)	0.043*** (0.009)	0.016*** (0.004)
Dependency ratio	-0.140 (0.366)	0.711*** (0.176)
Income diversification	1.324*** (0.291)	0.274** (0.140)
Trainings	0.032 (0.148)	-0.188*** (0.071)
Crop diversification	0.331 (0.454)	0.691*** (0.218)
Household characteristics		
Female HH	-0.153 (0.110)	-0.151*** (0.053)
Household size	-0.140*** (0.034)	-0.160*** (0.016)
Number of children	0.112** (0.056)	0.103*** (0.027)
Livelihoods		
Farmer	0.206* (0.123)	-0.020 (0.059)
Urban/other	0.397** (0.164)	0.127 (0.079)
Shocks		
No shock	0.214* (0.125)	0.089 (0.060)
Drought	0.015 (0.147)	0.060 (0.070)
Floods	-0.370 (0.563)	-0.011 (0.270)
Water shortage	0.202* (0.119)	0.024 (0.057)
Crop disease	0.036 (0.163)	0.064 (0.078)
Livestock disease	0.471 (0.336)	-0.068 (0.161)
High cost agric. inputs	0.089 (0.236)	0.149 (0.113)
Low prices agric. products	0.215 (0.647)	-0.119 (0.310)
Illness income earner	0.411* (0.237)	0.262** (0.114)
Illness HH	0.448*** (0.164)	0.233*** (0.078)
Death	0.088 (0.124)	0.066 (0.059)
Theft non-agric. asset	0.042 (0.193)	-0.038 (0.092)
Theft agric. asset	-0.163 (0.203)	-0.105 (0.098)
Conflict	-0.022 (0.121)	-0.223*** (0.058)
Fire	-0.027 (0.185)	-0.263*** (0.089)
Shock other	-0.084 (0.329)	-0.116 (0.158)
Constant	6.477*** (0.333)	2.162*** (0.160)
Observations	2 049	2 049
R-squared	0.470	0.316

Note: LGAs dummies included in all models. Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.
Regressions on food consumption and food consumption score are available on request.

Table A4. **Subjective resilience and food security**

Variables	Generic Subjective Resilience Index	Generic Subjective Resilience Index	Drought Subjective Resilience Index	Drought Subjective Resilience Index
Food expenditure per capita	0.0105** (0.005)	0.0112** (0.0048)	0.0173** (0.0075)	0.0148** (0.0073)
Squared of food expenditure per capita	-0.0003** (0.0002)	-0.0003* (0.0001)	-0.0007*** (0.0002)	-0.0006*** (0.0002)
LGAS	No	Yes	No	Yes
Household characteristics	Yes	Yes	Yes	Yes
Pillars variables	No	Yes	No	Yes
Shocks variables	Yes	Yes	Yes	Yes
N	2 049	2 049	2 049	2 049
F-stat	9.426	13.9666	8.9767	12.6323
Prob. > F-stat	0.000	0.000	0.000	0.000
LGAS	No	Yes	No	Yes
R-squared	0.1813	0.2856	0.1741	0.2656
Adjusted R-squared	0.162	0.2652	0.1547	0.2446

Note: *** P<0.01, ** P<0.05, and * P<0.10, standard error in parentheses.

Table A5.　**Effect of violence exposure on food security**

	Food expenditure	Food expenditure	Food expenditure	Food expenditure	Food expenditure
Violence Exposure index (VEI)	-3.321*** (1.163)	-2.317* (1.26)	-2.189* (1.301)	-0.243 (1.676)	-5.450*** 1.357
Agricultural asset index ×VEI		-18.146** (8.811)			
Formal transfers PER capita×VEI			-0.052* (0.027)		
Strategies CSI ×VEI				-0.499** (0.196)	
Crop diversification×VEi					27.407*** (9.056)
Sanitation	-0.759* (0.400)	-0.683* (0.401)	-0.803** (0.400)	-0.825** (0.400)	-0.861** (0.401)
Closeness to water	-0.329* (0.195)	-0.333* (0.195)	-0.322* (0.195)	-0.339* (0.195)	-0.328* (0.195)
Closeness to school	0.024 (0.823)	0.017 (0.822)	0.052 (0.823)	0.021 (0.822)	0.024 (0.821)
Closeness to hospital	-0.438 (0.338)	-0.423 (0.338)	-0.445 (0.338)	-0.424 (0.337)	-0.421 (0.337)
Closeness to agricultural market	-0.183 (0.354)	-0.172 (0.354)	-0.188 (0.354)	-0.196 (0.354)	-0.198 (0.353)
Closeness to livestock market	-0.24 (0.329)	-0.228 (0.329)	-0.237 (0.329)	-0.238 (0.329)	-0.245--- (0.329)
Wealth Index	0.66 (1.654)	0.755 (1.653)	0.801 (1.654)	0.78 (1.652)	1.011 (1.655)
Agricultural Asset Index	6.186*** (2.175)	9.133*** (2.602)	6.107*** (2.173)	6.164*** (2.172)	5.843*** (2.173)
TLU	0.095 (0.266)	0.103 (0.266)	0.099 (0.266)	0.079 (0.266)	0.042 (0.266)
Land (ha)	0.041 (0.079)	0.038 (0.079)	0.037 (0.079)	0.033 (0.079)	0.038 (0.079)
House value	0.000*** (0)	0.000*** (0)	0.000*** (0)	0.000*** (0)	0.000*** (0)
Credit per capita	0.021* (0.012)	0.020* (0.012)	0.022* (0.012)	0.022* (0.012)	0.023* (0.012)
Formal transfers	-0.010* (0.006)	-0.010* (0.006)	-0.004 (0.006)	-0.009 (0.006)	-0.008 (0.006)
Informal strategies	-0.222*** (0.04)	-0.223*** (0.04)	-0.217*** (0.04)	-0.159*** (0.047)	-0.209*** (0.04)
Associations	0.655** (0.262)	0.648** (0.262)	0.640** (0.262)	0.667** (0.262)	0.616** (0.262)
Education (years)	0.118*** (0.036)	0.117*** (0.036)	0.118*** (0.036)	0.120*** (0.036)	0.120*** (0.036)
Dependency ratio	3.283*** (0.758)	3.331*** (0.758)	3.312*** (0.758)	3.262*** (0.757)	3.293*** (0.757)
Income diversification index	0.569 (1.124)	0.361 (1.127)	0.48 (1.124)	0.621 (1.122)	0.754 (1.123)
Trainings	-1.309** (0.578)	-1.292** (0.577)	-1.316** (0.578)	-1.330** (0.577)	-1.336** (0.577)
Crop diversification	3.215* (1.714)	3.055* (1.714)	3.281* (1.713)	3.071* (1.713)	0.663 (1.907)
LGAs dummies	yes	yes	yes	yes	yes
Cons.	9.744*** (0.836)	9.589*** (0.839)	9.809*** (0.836)	9.592*** (0.837)	10.018*** (0.839)

Table A5. **Effect of violence exposure on food security** - Cont.

	Food expenditure	Food expenditure	Food expenditure	Food expenditure	Food expenditure
N	2049	2049	2049	2049	2049
F-stat	15.1	14.784	14.765	14.871	14.973
Prob. > F-stat	0	0	0	0	0
R-squared	0.188	0.19	0.19	0.191	0.192
Adj. R-squared	0.176	0.177	0.177	0.178	0.179

Note: *** P <0.01, ** P<0.05, * P<0.1, and standard error in parentheses.

ANNEX III
DESCRIPTIVE STATISTICS

Table A6. **Descriptive statistics for the full sampleand by household types**

Variable	Host	IDPs	Returnees	Female-headed households	Male-headed households	Many women and children	Other households	Full sample
RCI (Resilience Capacity Index)	56.368	38.412	43.868	40.594	44.598	42.676	44.407	43.904
ABS (pillar, estimate with FA)	-0.081	0.105	-0.101	-0.023	0.005	-0.026	0.011	0
Sanitation (dummy = 1 for access to improved sanitation)	0.666	0.848	0.693	0.783	0.755	0.745	0.766	0.76
Closeness to water (1/distance in minutes)	0.234	0.249	0.259	0.22	0.256	0.254	0.247	0.249
Closeness to school (1/distance in minutes)	0.11	0.118	0.096	0.093	0.113	0.109	0.109	0.109
Closeness to hospital (1/distance in minutes)	0.086	0.132	0.092	0.094	0.113	0.106	0.111	0.11
Closeness to agricultural market (1/distance in minutes)	0.097	0.119	0.07	0.125	0.093	0.089	0.102	0.098
Closeness to livestock market (1/distance in minutes)	0.063	0.106	0.062	0.059	0.088	0.075	0.086	0.083
AST (pillar, estimate with FA)	0.734	-0.429	0.151	-0.276	0.058	-0.135	0.055	0
Wealth index (estimate with FA)	0.222	0.105	0.146	0.104	0.151	0.128	0.149	0.143
Agricultural index (estimated with FA)	0.07	0.025	0.03	0.019	0.039	0.037	0.035	0.036
TLU (Tropical Livestock Units)	0.376	0.101	0.161	0.098	0.194	0.181	0.176	0.177
Land (hectares)	1.897	0.552	1.281	0.674	1.149	0.805	1.174	1.067
House value (USD)	2 128.041	623.075	1 761.311	1 237.26	1 318.095	1 183.017	1 353.635	1 304.09
SSN (pillar, estimate with FA)	0.571	-0.334	0.117	-0.266	0.056	-0.03	0.012	0
Credit pc (USD)	4.406	2.084	2.955	1.798	3.068	3.808	2.455	2.848
Formal transfers pc (USD)	6.853	19.49	15.557	17.784	15.136	17.408	14.853	15.595
Informal network (days relying on support from relatives, friends, etc.)	2.586	3.404	4.238	4.377	3.322	3.437	3.532	3.505
Associations (dummy = 1 for participation)	0.574	0.271	0.377	0.211	0.401	0.35	0.376	0.368

Table A6. **Descriptive statistics for the full sampleand by household types** - Cont.

Variable	Host	IDPs	Returnees	Female-headed households	Male-headed households	Many women and children	Other households	Full sample
AC (pillar, estimate with FA)	0.703	-0.346	0.05	-0.234	0.049	-0.143	0.058	0
Education (year)	7.459	2.682	4.721	3.786	4.449	3.755	4.571	4.334
Dependency ratio (share of members of working age)	0.511	0.482	0.512	0.456	0.506	0.46	0.513	0.498
Income diversification index (number of income-generating activities)	0.444	0.311	0.383	0.325	0.37	0.357	0.364	0.362
Trainings (dummy = 1 for receiving)	0.165	0.069	0.084	0.087	0.095	0.067	0.105	0.094
Crop diversification (number of crops cultivated)	0.175	0.067	0.069	0.059	0.097	0.089	0.091	0.09
FCS (Food Consumption Score)	50.18	43.365	44.794	43.985	45.505	43.387	46.001	45.242
HHDDS (Household Dietary Diversity Score)	7.685	6.029	6.39	6.197	6.551	6.351	6.546	6.49
Food expenditure pc (US dollars, monthly)	13.36	8.326	10.132	9.471	10.057	10.528	9.721	9.955
Food own pc (USD, monthly)	2.184	0.992	5.59	7.302	1.771	1.13	3.384	2.729
Food free pc (USD, monthly)	2.232	4.674	5.837	8.757	3.662	4.356	4.621	4.544
Food consumption pc (USD, monthly)	17.347	13.438	14.034	15.078	14.308	15.132	14.16	14.442
No shock (dummy)	0.249	0.359	0.366	0.344	0.338	0.346	0.336	0.339
Drought (dummy)	0.416	0.114	0.045	0.085	0.169	0.155	0.154	0.154
Floods (dummy)	0.012	0.002	0.005	0	0.006	0.002	0.006	0.005
Water shortage (dummy)	0.214	0.193	0.2	0.163	0.207	0.215	0.193	0.2
Crop disease (dummy)	0.186	0.057	0.044	0.045	0.087	0.092	0.074	0.08
Livestock disease (dummy)	0.033	0.007	0.014	0	0.018	0.017	0.014	0.015
High cost agricultural inputs (dummy)	0.087	0.027	0.014	0.028	0.037	0.045	0.031	0.035
Low prices agric. products (dummy)	0.005	0.002	0.006	0.006	0.004	0.007	0.003	0.004
Illness income earner (dummy)	0.028	0.02	0.047	0.054	0.025	0.029	0.031	0.03
Illness household member (dummy)	0.042	0.079	0.075	0.11	0.062	0.062	0.074	0.07
Death (dummy)	0.106	0.141	0.158	0.223	0.122	0.113	0.15	0.139
Theft non-agric. asset (dummy)	0.021	0.036	0.078	0.042	0.048	0.045	0.047	0.047
Theft agric. asset (dummy)	0.024	0.033	0.068	0.02	0.047	0.04	0.043	0.042
Conflict (dummy)	0.235	0.221	0.145	0.22	0.195	0.197	0.2	0.199
Fire (dummy)	0.035	0.098	0.042	0.07	0.066	0.055	0.072	0.067
Shock other (dummy)	0.021	0.008	0.024	0.008	0.018	0.015	0.017	0.016
Female household head (dummy)	0.134	0.169	0.205	1	0	0.173	0.173	0.173
Household size (number of household members)	7.313	6.345	6.214	5.377	6.739	5.738	6.816	6.503
N child (number of children)	3.588	3.339	3.042	2.93	3.371	3.165	3.347	3.294
N infant (number of infants)	1.078	0.975	0.907	0.707	1.03	1.686	0.683	0.974
Agro/pastoral/fish (dummy)	0.198	0.09	0.142	0.076	0.14	0.139	0.124	0.129
Farmer (dummy)	0.779	0.796	0.596	0.651	0.744	0.713	0.734	0.728
Urban/other (dummy)	0.024	0.115	0.262	0.273	0.116	0.148	0.142	0.143
Host (dummy)	1	0	0	0.161	0.217	0.198	0.211	0.207
IDP (dummy)	0	1	0	0.456	0.471	0.481	0.464	0.469
Returnee (dummy)	0	0	1	0.383	0.312	0.321	0.325	0.324
Crop (dummy)	0.767	0.419	0.369	0.344	0.502	0.477	0.474	0.475
Livestock (dummy)	0.379	0.156	0.247	0.18	0.243	0.237	0.23	0.232
Wage (dummy)	0.256	0.082	0.215	0.124	0.169	0.131	0.174	0.162
Enterprise (dummy)	0.473	0.369	0.538	0.479	0.438	0.449	0.444	0.445
Transfers (dummy)	0.346	0.529	0.547	0.499	0.496	0.491	0.499	0.497
Other (dummy)	0.064	0.026	0.077	0.052	0.042	0.037	0.056	0.050
Observations	425	960	664	355	1 694	595	1 454	2 049

Table A7. **Descriptive statistics by LGAs**

Variable	Bama	Damboa	Jere	Kala/Balge	Konduga	Kukawa	Kwaya Kusar	Mafa	Monguno	Ngala
RCI (Resilience Capacity Index)	45.500	48.843	54.653	43.959	57.575	33.859	57.729	48.056	20.045	39.087
ABS (pillar, estimate with FA)	-0.100	-0.080	0.330	-0.161	-0.182	-0.160	-0.025	0.084	0.369	-0.158
Sanitation (dummy = 1 for access to improved sanitation)	0.847	0.541	0.840	0.612	0.474	0.630	0.994	0.985	0.909	0.745
Closeness to water (1/distance in minutes)	0.173	0.263	0.441	0.232	0.165	0.187	0.149	0.209	0.315	0.300
Closeness to school (1/distance in minutes)	0.099	0.189	0.115	0.078	0.102	0.067	0.102	0.095	0.163	0.073
Closeness to hospital (1/distance in minutes)	0.078	0.182	0.109	0.114	0.099	0.075	0.064	0.091	0.225	0.039
Closeness to agricultural market (1/distance in minutes)	0.079	0.072	0.178	0.070	0.101	0.074	0.064	0.084	0.204	0.039
Closeness to livestock market (1/distance in minutes)	0.031	0.059	0.165	0.064	0.079	0.081	0.056	0.104	0.152	0.032
AST (pillar, estimate with FA)	0.052	-0.113	0.439	-0.509	0.303	-0.468	0.980	0.077	-0.743	0.208
Wealth index (estimate with FA)	0.137	0.144	0.193	0.098	0.163	0.088	0.262	0.175	0.060	0.142
Agricultural index (estimate with FA)	0.018	0.055	0.080	0.012	0.051	0.027	0.065	0.027	0.026	0.011
TLU (Tropical Livestock Units)	0.091	0.262	0.255	0.286	0.279	0.117	0.327	0.076	0.060	0.117
Land (hectare)	1.052	1.134	1.663	0.305	1.871	0.300	1.661	1.054	0.164	1.532
House value (USD)	1 802.708	574.607	1 776.616	220.801	1 416.983	957.873	2 809.250	1 271.302	449.698	1 909.977
SSN (pillar, estimate with FA)	0.357	0.606	0.527	0.108	0.127	-0.712	0.571	0.354	-1.530	0.055
Credit pc (USD)	2.980	3.826	4.541	3.449	2.726	1.020	5.228	0.853	1.092	3.480
Formal transfers pc (USD)	12.715	3.943	23.932	13.058	12.143	16.346	0.126	1.489	41.437	19.653
Informal network (days relying on support for relatives, friends, etc.)	4.337	3.146	3.970	3.259	3.189	2.167	2.358	4.644	2.415	5.019
Associations (dummy = 1 for participation)	0.465	0.517	0.760	0.382	0.413	0.115	0.426	0.307	0.059	0.330
AC (pillar, estimate with FA)	-0.283	0.429	0.450	-0.490	0.158	-0.331	0.993	-0.218	-0.454	-0.025
Education (year)	4.010	6.000	5.315	2.353	3.995	2.422	10.401	3.109	1.625	5.262
Dependency ratio (share of members of working age)	0.513	0.549	0.432	0.396	0.436	0.543	0.547	0.494	0.530	0.516
Income diversification index (number of crops cultivated)	0.272	0.413	0.518	0.361	0.471	0.325	0.364	0.212	0.311	0.381
Trainings (dummy = 1 for receiving training)	0.139	0.068	0.075	0.012	0.026	0.031	0.290	0.317	0.016	0.026
Crop diversification (number of crops cultivated)	0.005	0.167	0.181	0.040	0.165	0.056	0.160	0.069	0.064	0.027
FCS (Food Consumption Score)	51.998	41.532	46.710	60.165	50.125	35.060	55.130	56.005	23.700	42.386
HHDDS (Household Dietary Diversity Score)	6.718	6.868	7.650	7.029	8.245	5.266	7.827	7.248	3.538	5.816
Food expenditure pc (USD, monthly)	10.550	13.641	12.750	6.328	12.951	9.865	11.873	8.159	7.120	7.639
Food own pc (USD, monthly)	0.479	1.930	20.984	1.031	1.411	0.758	1.169	0.244	0.070	0.187
Food free pc (USD, monthly)	5.343	2.890	5.903	9.870	5.804	3.406	1.171	6.843	2.980	2.486
Food consumption pc (USD, monthly)	17.503	18.566	15.509	17.564	18.403	13.166	14.435	13.328	9.437	9.771
No shock (dummy)	0.223	0.234	0.255	0.100	0.179	0.578	0.407	0.540	0.447	0.371
Drought (dummy)	0.000	0.244	0.470	0.000	0.408	0.068	0.278	0.109	0.036	0.011
Floods (dummy)	0.000	0.020	0.015	0.000	0.000	0.005	0.000	0.005	0.004	0.000
Water shortage (dummy)	0.129	0.420	0.135	0.165	0.143	0.229	0.216	0.163	0.308	0.090
Crop disease (dummy)	0.000	0.073	0.195	0.000	0.097	0.042	0.235	0.035	0.126	0.019
Livestock disease (dummy)	0.030	0.034	0.010	0.000	0.010	0.010	0.031	0.020	0.004	0.004
High cost agricultural inputs (dummy)	0.015	0.185	0.010	0.000	0.036	0.016	0.019	0.030	0.032	0.007

Table A7. **Descriptive statistics by LGAs** - Cont.

Variable	Bama	Damboa	Jere	Kala/Balge	Konduga	Kukawa	Kwaya Kusar	Mafa	Monguno	Ngala
Low prices agric. products (dummy)	0.000	0.005	0.005	0.000	0.000	0.021	0.006	0.000	0.004	0.000
Illness income earner (dummy)	0.119	0.020	0.040	0.012	0.036	0.016	0.000	0.015	0.008	0.034
Illness household member (dummy)	0.203	0.039	0.080	0.159	0.061	0.052	0.006	0.030	0.012	0.075
Death (dummy)	0.292	0.151	0.070	0.212	0.158	0.073	0.062	0.079	0.079	0.202
Theft non-agric. asset (dummy)	0.139	0.005	0.070	0.029	0.026	0.031	0.006	0.035	0.016	0.094
Theft agric. asset (dummy)	0.074	0.005	0.090	0.029	0.015	0.010	0.000	0.035	0.016	0.120
Conflict (dummy)	0.243	0.273	0.235	0.665	0.332	0.016	0.006	0.149	0.012	0.154
Fire (dummy)	0.064	0.005	0.030	0.476	0.005	0.026	0.006	0.050	0.028	0.045
Shock other (dummy)	0.010	0.005	0.015	0.000	0.102	0.005	0.037	0.000	0.000	0.000
Female household head (dummy)	0.302	0.205	0.155	0.188	0.112	0.161	0.148	0.109	0.107	0.236
Household size (number of household members)	6.480	6.132	7.580	7.865	7.490	4.505	7.340	7.213	4.957	6.266
N child (number of children)	3.104	2.766	4.275	4.706	4.230	2.141	3.247	3.653	2.375	2.981
N infant (number of infants)	0.757	0.883	1.350	1.329	1.301	0.792	0.883	1.045	0.731	0.824
Agro/pastoral/fish (dummy)	0.054	0.190	0.100	0.165	0.133	0.182	0.259	0.139	0.067	0.067
Farmer (dummy)	0.658	0.780	0.765	0.776	0.832	0.531	0.735	0.856	0.787	0.588
Urban/other (dummy)	0.287	0.029	0.135	0.059	0.036	0.286	0.006	0.005	0.146	0.345
Type of household (dummy)										
Host (dummy)	0.005	0.366	0.480	0.071	0.383	0.026	0.975	0.000	0.000	0.011
IDP (dummy)	0.515	0.410	0.385	0.876	0.393	0.292	0.019	0.767	1.000	0.007
Returnee (dummy)	0.480	0.224	0.135	0.053	0.224	0.682	0.006	0.233	0.000	0.981
Crop (dummy)	0.035	0.668	0.805	0.318	0.811	0.417	0.667	0.361	0.549	0.206
Livestock (dummy)	0.134	0.268	0.435	0.229	0.372	0.203	0.247	0.168	0.107	0.202
Wage (dummy)	0.198	0.180	0.080	0.141	0.102	0.021	0.438	0.119	0.024	0.333
Enterprise (dummy)	0.579	0.571	0.545	0.359	0.505	0.375	0.426	0.337	0.221	0.539
Transfers (dummy)	0.416	0.376	0.725	0.759	0.566	0.609	0.043	0.074	0.656	0.625
Other (dummy)	0.129	0.039	0.115	0.006	0.046	0.021	0.031	0.029	0.004	0.074
Observations	202	205	200	170	196	192	162	202	253	267

Table A8. **Descriptive statistics of violence exposure – percentage of households reporting different dimensions of violence**

Violence exposure indicators	Full sample	Bama	Damboa	Jere	Kala Balge	Konduga	Kukawa	Kwaya Kusar	Mafa	Monguno	Ngala
Not felt safe in your home (dummy)	0.260	0.267	0.156	0.330	0.388	0.352	0.120	0.198	0.317	0.150	0.330
Goods or property stolen (dummy)	0.103	0.238	0.020	0.135	0.053	0.061	0.078	0.049	0.094	0.051	0.210
Threatened with violence or death (dummy)	0.031	0.055	0.044	0.035	0.000	0.051	0.005	0.000	0.025	0.004	0.075
Been evicted from land (dummy)	0.030	0.020	0.010	0.050	0.012	0.051	0.021	0.000	0.030	0.044	0.045
Denied access to farmland or pasture (dummy)	0.046	0.020	0.015	0.015	0.171	0.005	0.026	0.000	0.055	0.138	0.015
Witnessed violence (dummy)	0.211	0.282	0.327	0.405	0.529	0.321	0.021	0.012	0.104	0.028	0.150
Being injured in violence (dummy)	0.033	0.104	0.049	0.030	0.018	0.000	0.021	0.000	0.010	0.004	0.075
Household member injured or killed in conflict (dummy)	0.047	0.114	0.044	0.025	0.112	0.041	0.021	0.006	0.015	0.004	0.086
Violence Exposure Index (combination of the 8 indicators, estimate with FA)	0.092	0.161	0.104	0.117	0.117	0.096	0.048	0.029	0.061	0.037	0.135
Observations	2 049	202	205	200	170	196	192	162	202	253	267

Table A9. **Descriptive statistics of violence exposure – percentage of households reporting different dimensions of violence by household type**

Indicators	Host	IDP	Returnee
Not felt safe in your home	0.278	0.265	0.241
Goods or property stolen	0.066	0.070	0.175
Threatened with violence or death	0.026	0.022	0.048
Been evicted from land	0.024	0.031	0.032
Denied access to farmland or pasture	0.009	0.081	0.020
Witnessed violence	0.259	0.219	0.169
Being injured in violence	0.024	0.022	0.054
Household member injured or killed in conflict	0.019	0.044	0.069
Conflict Exposure Index (combination of the 8 indicators)	0.082	0.081	0.114
Observations	425	960	664

Graphic designer: Tomaso Lezzi

This report is part of a series of country level analysis prepared by the FAO Resilience Analysis and Policies (RAP) team. The series aims at providing programming and policy guidance to policy makers, practitioners, UN agencies, NGOs and other stakeholders by identifying the key factors that contribute to the resilience of households in food insecure countries and regions.

The analysis is largely based on the use of the FAO Resilience Index Measurement and Analysis (RIMA) tool.