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Food and Agriculture
Organization of the
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Drivers and stressors of resilience to food insecurity

Evidence from 35 countries

Background paper for
The State of Food and Agriculture 2021

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Drivers and stressors of resilience to food insecurity

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Abstract

Resilience is often associated with multivalued and multi-faceted strategies, programs, and projects. After approximately 15 years of empirical evidence in the literature, few research questions remain unexplored and unanswered, especially with the recent occurrence of a global pandemic. In this paper, we are assessing whether there are few and consistently relevant elements that determine resilience capacity as well as investigating which shocks are most dramatically reducing resilience. We also investigate which coping strategies are most frequently adopted in the presence of shocks.

Our results show that, diversification of income sources, education, access to land, livestock, and agricultural inputs, are the main drivers of households' resilience capacity. Moreover, the most prevailing shocks are found to be natural, health, and livelihood-related shocks. In addition to this, we show that reducing the quantity and quality of food consumed, seeking an extra job, selling assets, taking credit, relying on relatives and social networks are the most adopted coping strategies. Finally, we found that coping strategies are able to mitigate the adverse effects of shocks on resilience capacity; however, they are not sufficient to offset their long-term negative consequences.

Our conclusion is that adequate investments in resilience are conditional to a) engaging with activities that are broadly consistent across countries and b) fine-tuning the interventions based on context-specificity.

Keywords: resilience, microdata, household, coping strategies, shocks.

JEL codes: O12, N47, Q18.

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1 Introduction

Recent reports indicate that 155 million people in 55 countries were in crisis or worse in 2020, with an increase of around 20 million from 2019 (GRFC, 2021). The increased numbers are especially in Burkina Faso, the Democratic Republic of the Congo, South Sudan, Yemen and the Syrian Arab Republic. People are looking at new challenges (like COVID-19) and the old ones as the main prevailing factors and limited resources and stranded capacities. The new challenges have an unprecedented strength and an increased transmission capacity due to the reinforced interconnectivity of food systems. The United Nations Conference on Trade and Development (UNCTAD) revealed that global e-commerce jumped to USD 26.7 trillion, fuelled by COVID-19. The pandemic, otherwise, has affected over 148 million people (as of May 2021). The funding committed to combating the coronavirus is nearing USD 21.4 trillion, according to data analysis available on Devex's funding platform. The COVID-19 pandemic has revealed the fragility of the global food system and the need for more equitable, sustainable, and resilient food systems. A pandemic such as COVID-19 requires urgent actions; however, this should not come at the cost of averting resources and efforts from sustainable and equal growth and prosperity. Governments and international institutions' capacity to react to shocks might have severe implications for long-term development outcomes. The nexus between humanitarian and development interventions is today more critical than ever: developing longer-term interventions that address humanitarian needs and development and peacebuilding challenges. Resilience considers the capacity that ensures shocks and stressors do not have long-term development consequences. This promotes interventions that fit the double purpose of the humanitarian and development (HD) nexus. An HD-sensitive approach ensures that humanitarian interventions can focus on acute needs. In contrast, those in development can focus on longer-term perspectives, such as promoting peaceful and robust communities and long-term and sustainable growth ad exist from poverty strategy.

A long list of well-established and accepted resilience measurement approaches has brought data-driven evidence on resilience (analysis and interventions). One of the critical elements that have emerged so far is the context specificity of each resilience analysis. Still, there is nearly no cross-countries evidence on elements that consistently emerge as relevant for resilience building. After approximately 15 years of activities, few research questions remain unexplored and unanswered. For instance, looking at the analytical framework developed by Constas *et al.* (2014), we know that resilience has two broad parts, one positive (the resilience structure that will react to a shock) and one negative (frequency and intensity of the shocks). This study brings together the most recent FAO Resilience Index and Measurement Analyses (RIMA) (published both as FAO reports and as papers in peer-reviewed journals) to expand the sample of countries and illustrate the diversity of resilient households. Furthermore, to complement the evidence provided by the RIMA analyses and further increase the number of countries under study and the significance of the results, we use a large set of data from the Multiple Indicator Cluster Survey (MICS) produced by the United Nations International Children's Emergency Fund (UNICEF). The MICS data covers 23 countries from various parts of the world. As the MICS focuses on issues affecting the lives of children and women, a specific RIMA analysis framework was designed to adapt with its structure. In total, this paper uses data from no less than 35 different countries and combines static analysis with dynamic analysis to picture household resilience most accurately and accounting for various contexts. The total sample size from both the RIMA datasets and the MICS datasets is

50 622 households, which gives us tremendous statistical power in our analysis. Specifically, increasing the sample size and the country coverage allows to (i) investigate whether the results remain valid in different contexts, (ii) consider the reality of different groups of households, and (iii) capture the effects of shocks on resilience – which might be challenging with a lower sample size providing statistically insignificant results.

Many of the studied countries in the resilience literature focus on cross-sectional data, while this paper adopts both static and dynamic analyses to identify the critical aspects of resilience. Specifically, we employ two sets of data collected at two different points in time to investigate the determinants of resilience growth or contraction over time for each country. Indeed, d'Errico *et al.* (2018) noted that an expanded analysis using multiple countries could provide robust and consistent evidence. Furthermore, the use of dynamic analysis can investigate the critical drivers of resilience growth over time. In view of this, this paper seeks to answer the following research questions: (i) Are there few and consistently relevant elements that determine resilience capacity? (ii) What shocks are most dramatically reducing resilience? (iii) And what are the most frequently adopted coping strategies? We first provide an overview of the literature on resilience measurement. We then present the data used and the methods adopted. Finally, we report and discuss the results of the analysis before concluding in the last section.

2 Literature review: resilience measurement

With the disparities in the resilience literature, there has been a detailed classification of the different approaches into two main categories: qualitative and quantitative resilience approaches. These can be traced to have been applied in different fields such as engineering, ecology, psychology, and epidemiology (Holling 1996; Gunderson *et al.*, 1997). The two classifications can be further sub-divided into participatory and non-participatory approaches, and these can fall into either one of the two main approaches. By referring to the participatory approach, resilience considers the ability of communities to pool their abilities to build resilience collectively. In this context, the community can accumulate personal knowledge, skills and cumulate resources as an entity. This literature focuses on both physical (e.g., infrastructure) and social. The Analysis of the Resilience of Communities to Disaster (ARC-D), adopted by Clark-Ginsberg *et al.* (2020), is an example of a tool used in this kind of approach. Another approach, called the Flood Resilience Measurement for Communities (FRMC) and formed by the Zurich Flood Resilience Alliance, has been adopted by Flood Resilience Alliance (2020). Undeniably, it is a notable aspect that this kind of methodology depends highly on the facilitators' skills. Evidentially, it becomes a framework limited in scope as it aggregates an entity with little consideration of the disaggregated entities.

To address such a shortfall, the emergence of qualitative approaches transpired in anticipations to explore a different scale at which resilience can be studied. Social studies implored testaments from disaster victims and the famous case studies approach. Studies using this approach include Mock *et al.* (2015), Chacowry *et al.* (2018). Substantial evidence indicates that this approach yields contextual resilience information and takes a holistic dive into the enabling factors on the ground and the disenabling factors of resilience. The advantage of this is that there is room for creating theoretical frameworks that will feed into policy formulations and practice. However, this requires an extended period, and it is hardly trackable and comparable over time (Mavhura *et al.*, 2021).

Aside from these two approaches, the quantitative approach uses development variables that have been collected from systems and a wider variety of the literature. These variables are consolidated and used in various forms such as ranks, scores, and indices to provide a reliable framework from which decisions that affect individuals can be retrieved. A notable use of such indices includes Li *et al.* (2016) and Yoon *et al.* (2016). The indices allow for tracking and comparability over time. They can be used on both large-scale surveys and secondary data. Within this measure, some use static models such as Vaitla *et al.* (2012) and those that use dynamic models such as Cissè and Barret (2018) and Signorelli *et al.* (2016). By narrowing down the resilience literature to food insecurity from earlier studies, there seems to have been an underlying problem that points out that resilience to food insecurity is unobservable *ex ante*. Household resilience can be measured using proxy indicators based on observable variables. Constas *et al.* (2014); d'Errico *et al.*, 2016 propose that this type of measurement lacks robustness in the theoretical framework. As such, these studies are questionable in capturing household resilience.

By considering both *ex ante* and *ex post* possibilities, scholars have applied this framework in numerous ways. One such example is the Resilience Index Measurement Analysis (RIMA II) approach developed by FAO (FAO, 2016; d'Errico *et al.*, 2017; Alinovi *et al.,* 2008; Alinovi *et al.,* 2010). They were among the first to incorporate resilience to food insecurity, by considering both *ex ante* and *ex post* management decisions in the resilience framework. The rationale

behind this methodology is measuring resilience index as a latent variable (unobserved) by adopting a two-stage factor analysis based on observable variables.

2.1 Cross-countries evidence

As expected, a great interest in understanding if there exist main drivers or elements of building resilience has recently been thoroughly highlighted. Some studies, such as Adolf *et al.* (2020), try to identify critical drivers of tropical forest resilience regarding recovery rate from previous disturbances. Kwan and Walsh (2017) investigate the main drivers of resilience for older adults through disaster management. The idea of narrowing down what can be considered as an optimal road to follow in terms of resilience is to no doubt very sought after. With the recent rise in global food security programs, this kind of analysis is desirable and poses an essential role in programmatic designs and policy formations. Several studies have attempted to answer this question about food insecurity. For example, in their study, Tesfahun *et al.* (2017) confirm the critical role of livelihood diversification in improving household resilience to food insecurity for both low and high wealth groups in Ethiopia. Specifically, they find that precautionary savings and income diversification are essential for resilience. These results align with Lascano (2020), who also adds to the literature that, especially for livelihoods involved in farming activities in Malawi, having agricultural-related assets places them on a larger resilience scale.

With the recent onset of the COVID-19 pandemic, which has greatly disturbed the food system, Béné (2020) propose in their review on resilience and impact of shocks that were focusing on assets, savings, and access to any form of income such as insurance are probably one of the critical aspects to building household and community resilience. They also indicate that this proposal, when accompanied by diversification and connectivity such as access to essential services, can ensure a well-balanced functioning system. This kind of information, of course, will significantly rely on how well we can use on-ground evidence to build models that will help us achieve the intended goal. With this phenomenon, the use of quantitative approaches becomes especially crucial.

Nevertheless, one of the underlying drawbacks that the quantitative approach realizes is the superior level of generalization, which may provide inaccurate findings on resilience in some instances. One other notable point is that, for the most part, the selection of the resilience indicators is subjective. However, despite all these drawbacks, there is a general agreement within the literature to favour using this kind of metrics in the resilience analysis frame. With the different applications of the resilience analysis, such as to food and nutrition security (FAO, UNICEF & WFP, 2012), we are motivated to extend our findings to a cross-country micro evidence. It is crucial to eliminate the different information available across countries and identify a strategy to consolidate this information onto policy recommendations. Since the literature is yet to fill the void of a single cross-country study to address emerging patterns from the resilience analyses across countries, this is the first motivation from which we draw our empirical research.

2.2 Shocks and coping strategies

Do households plan strategically for uncertainties that will threaten their livelihood securities? No one answer fits all to this question as the adoption of coping strategies depends on several factors such as the type of shock and physical endowments allocated to the households. With vast information on the potential negative impact of shocks on resilience, there still exists a

gap to verify if this information is consistent across countries. The variability of shocks in the literature can be categorized broadly as self-reported shock or accurate data reported shocks affecting a broad homogeneous sample. It is no surprise that self-reported shocks have shown to carry biases, as the literature suggests that underreporting can be pretty prevailing. As noted by Das *et al.* (2012), response bias is mainly experienced with poor households when long recall periods are used.

Concerning the impact of shocks on resilience, Murendo *et al.* (2019) found that access to essential services and assets improves household nutrition in Malawi in the presence of shocks. Smith and Frankenberger (2018) provides evidence that in Bangladesh, social capital, human capital, exposure to information, and asset holding, among other things, help to mitigate the negative impact of floods on household food security. On a more exciting aspect, a study by Nikoloski *et al.* (2018) report that in Uganda, households affected by diseases (human, livestock, or crop) in one year are more likely to experience a health shock in the following year, indicating that some shocks are persistent. Other studies by Dhanaraj (2016), Pradhan and Mukherjee (2018); Okamoto (2011); Khan (2010) show that in the presence of health shocks, households generally cope by taking credit. However, if the health shock affects the main head of household or the indigent households, the coping strategy adopted is usually reducing food consumption or sending children to work.

Similarly, Knight *et al.* (2015) found that health and economic shocks were the ones reported mainly among the households in KwaZulu-Natal, South Africa. Their study also found that reduced consumption and spending were the most common strategies adopted by the households. Evidence on the effects of conflict on food security and resilience is found in Brück *et al.* (2019), von Uexkull *et al.* (2020), and Malik *et al.* (2020). The authors explore the disruptive effect of conflict in the Gaza Strip (Brück *et al.* 2019) and the Democratic Republic of the Congo (Uexkull *et al.* 2020) while assessing the positive role of resilience intervention in restoring assets or smoothing the negative consequences of shocks (including conflict) in Somalia (Malik *et al.* 2020).

Based on the literature above, we examine the previously mentioned research questions to fill the much-needed gap in the literature. To recap, most study countries use cross-sectional data and have very few dynamic aspects that allow us to see a change in resilience over time. Furthermore, results obtained are yet to be compared using a larger dataset to verify if the results are consistent across various countries. A cross-country analysis of resilience will provide evidence on elements that consistently emerge as relevant for resilience building. Our study combines static and dynamic analyses to investigate main determinants and shocks' effects on household resilience capacity. Using static analysis and dynamic analysis allows us to obtain a more accurate picture of the reality of household resilience.

3 Data and methods

3.1 Data

Over the years, FAO has been conducting resilience analyses using the RIMA methodology in various countries. This study brings together the most recent FAO-RIMA analyses (published both as FAO reports and as papers in peer-reviewed journals) to expand the sample of countries and illustrate the diversity of resilient households living in different contexts. Specifically, we characterize the households based on RIMA pillars: (i) Access to Basic Services (ABS); (ii) Assets (AST); (iii) Social Safety Nets (SSN); and (iv) Adaptive Capacity (AC). As the RIMA questionnaire includes data on shocks, we also investigate the impact of different types of shocks (namely, natural shocks, health shocks, and shocks affecting households' livelihoods) on resilience. Most surveys represent a specific region, and the period they cover extends from 2014 to 2020. Twelve countries are represented – mostly the least developed and low-income countries in the African continent. Table A1 in the Annex describes the RIMA datasets used in this paper.

The questionnaires were administered to households and collected information on socio-demographic characteristics, expenditure, food consumption, distance to essential services, asset ownership, agricultural activity, family wealth, private transfers, labour market participation, and different types of shocks experienced by the household. For the most part, the questionnaires were consistent with each other, thus guaranteeing cross-country comparability. The only disparities observed are the variables included under each pillar, differing from one dataset to another. This limitation is due to the data cleaning process that leads the econometrician to select only the variables most fitted for the analysis and exclude those suspected to be affected by errors resulting from the data collection process. This procedure is somehow subjective, at the discretion of the econometrician who conducts the analysis and explains why it is difficult to harmonize the resilience analysis perfectly and include a predefined set of variables.

However, a series of variables[1] have been used in a vast majority of the datasets under study, which still offers an opportunity to compare household resilience across diverse contexts and identify the key variables contributing to household resilience capacity. Finally, the food security indicators primarily included in the datasets are the Food Consumption Score (FCS), the Household Dietary Diversity Score (HDDS), and Food Expenditure. Pooling all RIMA datasets together allows obtaining a total sample of 32 497 households. A harmonization procedure was required to analyze all these datasets together. Using the Stata software, we created a unique file, where we could easily include additional variables to generate various categories (living context – country income and development level, country affected by a protracted crisis – agro-ecological zone, and main livelihood) and further disaggregate the results to obtain a complete picture of the essential elements of resilience.

[1] Namely, access to an improved source of water and sanitation facilities, access to the agricultural market, school and hospital, wealth index and agricultural wealth index (indexes of non-productive and productive asset ownership, respectively), land and livestock ownership (TLU), access to credit, formal and informal transfers, and social networks, crop diversification, level of education and work ratio (i.e., the inverse of dependency ratio).

To complement the evidence provided by the RIMA analyses, we use a large set of data from the Multiple Indicator Cluster Survey (MICS) produced by the United Nations International Children's Emergency Fund (UNICEF). The MICS data selected for this study cover 23 countries from various parts of the world. They are all nationally representative, except for Pakistan, which covers only the Punjab region. Table A2 describes the MICS datasets used in this paper. For each country, we employ two sets of data collected at two different points in time to investigate the determinants of households' resilience growth and contraction over time. As the MICS focus on the lives of children and women, a specific RIMA analysis framework was designed to adapt with its structure. The variables adopted for the RIMA analyses in both RIMA and MICS datasets are listed in Table A3, along with definitions.

With the MICS datasets, pooling all the countries together allowed us to obtain a final sample of 18 125 households, from which we estimate the Resilience Capacity Index (RCI) at two points in time. This procedure allowed dynamic analyses to investigate the main determinants of a change in RCI over time and the role of shocks in this process. Specifically, since the MICS questionnaires were not designed to provide information on the occurrence of shocks, we used external data (the WFP's Alert for Price Spikes – ALPS indicator). The indicator provides detailed information on staple food price volatility. It monitors the extent to which a local food commodity market experienced unusually high food prices by comparing the level of monthly food prices (both actual and forecast) against estimated seasonal trends. The categories of shock can be either standard, stress, alert, or crisis.[2] Two dummy variables were created at the level of the region: (i) one variable for the occurrence of price shock, taking value 1 if "stress" or "alert" was detected, and (ii) one variable taking into consideration the intensity of the shock, taking value 1 if "crisis" was detected.

In total, this paper has used 63 datasets (17 FAO-RIMA and 46 UNICEF-MICS), with 50 622 households from no less than 35 different countries, and has combined static analysis with dynamic analysis to picture household resilience most accurately and accounting for various contexts. For both RIMA and MICS data, the resilience profiles are based on the country's (i) level of development (UN, 2020) (ii) level of income of the country (World Bank, 2021) (iii) whether the country is affected by a protracted crisis (FAO, 2010), (iv) agro-ecological zones (FAO, 1996) and (v) main livelihood (FEWSNET, 2021). We disaggregated each profile to identify the key determinants of resilience for different contexts. Table A4 reports the frequency distribution for the different profiles analyzed with the RIMA and the MICS data. In all regression analyses, we controlled for profile heterogeneity.

3.2 Methods

As the original MICS surveys are independent and cross-sectional, they cannot make a time-dependent comparison. To overcome this limitation, we employed pseudo-panels techniques to construct a synthetic longitudinal dataset for each country (Deaton, 1985; d'Errico *et al.*, 2019). Specifically, we grouped households that share some common characteristics into "cohorts" and treat the averages of these cohorts as observations instead of individual households. In one country, the criteria for forming cohorts are the following: (i) area (urban/rural), (ii) region, (ii) wealth level, (iv) average adult education level, and (v) household composition (from almost exclusively composed by men to composed mainly by women). It is then possible to match the two datasets to create a balanced panel dataset. We retained only

[2] For more information, visit: https://dataviz.vam.wfp.org/economic_explorer/price-forecasts-alerts

households living in the rural areas.[3] To proceed with the analysis, we adopted the FAO's RIMA methodology (FAO, 2016) to estimate the Resilience Capacity Index (RCI) at the household level.

This approach is based on a two-stage procedure (Figure A1). In the first step, Factor Analysis (FA) is used to identify the attributes, or "pillars," that contribute to household resilience, starting from observed variables. The pillars analyzed under the RIMA model are (i) Access to Basic Services (ABS), (ii) Assets (AST), (iii) Social Safety Nets (SSN), and (iv) Adaptive Capacity (AC). Only those factors able to explain at least 95 percent of the variance are considered. In the second step, we use a Multiple Indicators Multiple Causes (MIMIC) model (Bollen *et al.*, 2010). Specifically, a system of equations was constructed, specifying the relationships between an unobservable latent variable (resilience), a set of outcome indicators (food security indicators), and a set of attributes (pillars). The MIMIC model is made up of two components, namely the measurement Eq. (1) – reflecting that the observed indicators of food security are imperfect indicators of resilience capacity – and the structural Eq. (2), which correlates the estimated attributes to resilience:

$$\begin{bmatrix}\text{Food security indicator 1}\\ \text{Food security indicator 2}\end{bmatrix} = [\Lambda_1, \Lambda_2] \times [\text{RCI}] + [\varepsilon_1, \varepsilon_2] \quad (1)$$

$$[\text{RCI}] = [\beta 1, \beta 2, \beta 3, \beta 4] \times \begin{bmatrix}\text{ABS}\\ \text{AST}\\ \text{SSN}\\ \text{AC}\end{bmatrix} + [\varepsilon 3] \quad (2)$$

Since the estimated Resilience Capacity Index (RCI) is not anchored to any scale of measurement, a scale has been defined setting the coefficient of the food consumption loading ($\Lambda 1$) equal to 1, meaning that one standard deviation increase in RCI implies an increase of one standard deviation in food consumption. The scale defines the unit of measurement for the other outcome indicator ($\Lambda 2$) and the variance of the two food security indicators.

Finally, to ease the understanding and interpretation of the results, the RCI has been standardized through a min-max scaling transformation, based on the following formula:

$$\text{RCI}_{\text{h}}^{*} = \frac{\text{RCI}_{\text{h}} - \text{RCI}_{\text{min}}}{\text{RCI}_{\text{max}} - \text{RCI}_{\text{min}}} \times 100 \quad (5)$$

Where h represents the h^{th} household.

To identify the most relevant aspects of households' resilience capacity, we used two specific methods. First, we employed descriptive statistics using the RIMA datasets and look at the structure of resilience at one point in time, and which components (pillars and variables) emerged as the most important elements of resilience (static perspective). We then employ the MICS datasets organized as pseudo-panel to investigate which are the key drivers of resilience growth over time (dynamic perspective); we used the following regression model:

[3] Since FAO-RIMA data collections take place in rural areas, we include rural and "urban" households from the RIMA datasets; "urban" households in the RIMA datasets refer to households living in the village while maintaining agro-farming livelihoods conditions. On the contrary, the "urban" families included in the MICS surveys are more integrated in an urban way of life; therefore, we excluded these "urban" households from the final sample to grant consistency with the RIMA datasets.

$$\Delta RCI_{h,t} = f\left(\Delta Res_{h,t}, C_{h,t}, HG_{h,t}, L_{h,t}\ AEZ_{h,t}\right) + \varepsilon \quad (6)$$

Where the change in resilience capacity (∆RCI) is seen as a function of changes in the resilience structure (∆Res – i.e., pillars and variables), controlling for the country specificity (C), household gender composition (HG), main livelihood (L), and agro-ecological zones (AEZ). We run two separate models; in the first one (Model 1), the resilience structure is reflected by the pillars of resilience; in the second model (Model 2), the variables of resilience are used as explanatory variables to reflect the resilience structure.

As the RIMA datasets include data on self-reported shocks and coping strategies, we used descriptive statistics to identify the most frequent shocks affecting households' well-being and the most adopted strategies used by the households to cope with these shocks. We then modelled the effect of shocks and adopted coping strategies on resilience by employing the following specifications:

$$RCI_h = f(S_h, HH_h) + \varepsilon \quad (7a)$$

$$RCI_h = f(S_h, CS_h, HH_h) + \varepsilon \quad (7b)$$

$$RCI_h = f(S_h CS_h, HH_h) + \varepsilon \quad (7c)$$

Where, in Eq. (7a), the Resilience Capacity Index (RCI) is a function of the occurrence of Shocks (S), controlling for household characteristics (HH) – namely, gender, household size, and livelihood. We then include coping strategies variables (CS) in the previous specification to investigate how shocks affect resilience capacity change – Eq. (7b). Finally, we use the interaction terms of shocks and coping strategies (S*CS) to estimate the effectiveness of coping strategies in mitigating the impact of shocks on households' resilience – Eq. (7c). These models are employed using the RCI and pillars (ABS, AST, SSN, and AC) as outcome variables.

To explore if shocks (particularly price shocks) can hinder resilience growth over time, we then look at the dynamic analysis. As mentioned above, we employ the MICS datasets, set under the synthetic panel approach. We model the growth of resilience as follows:

$$\Delta RCI_{h,t} = f\left(\Delta Res_{h,t}, C_{h,t}, HG_h, HH_h, AEZ_{h,t}, Prices_{,t}\right) + \varepsilon \quad (8)$$

Where an explanatory variable for the occurrence of price shocks (Prices) is added to Eq. (6). As with Eq. 6, we run two separate models, first using the resilience pillars (Model 1) and then the resilience variables (Model 2) as components of the resilience structure.

Finally, to investigate the most important determinants of resilience change over time for different types of livelihoods, we use the following regression model, separately for farmers, pastoralists, and agro-pastoralists:

$$\Delta RCI_{L,h,t} = f\left(\Delta Res_{h,t}, C_{h,t}, HG_{h,t}\right) + \varepsilon \quad (9)$$

Where L represents the type of livelihood of the household (namely, farmer, pastoralist, or agro-pastoralist).

4 Results and discussion

4.1 The key aspects of households' resilience capacity

Table A5 provides an overview of the resilience structure (pillars and variables) for each country under study. We observe that, for many countries, access to Assets (AST) is the first or second pillar in terms of contribution to resilience capacity, which ultimately means that access to productive and non-productive assets (including agricultural tools, land, and livestock) is key to ensure households' capacity to bounce back after a shock. Asset ownership is crucial to sustaining households' livelihoods and can be used as collateral for accessing credit. Moreover, assets are often used as a buffer when a shock occurs: selling productive and non-productive assets is a common coping strategy adopted by households to respond to shocks, especially by the poorest categories (Barrett, 2002). However, this strategy can be hazardous. If households end up with a shallow level of assets, they may fall into a poverty trap, unable to rebuild a living without external assistance (Banerjee and Duflo, 2011).

Adaptive Capacity (AC) is another key component of resilience in most countries under study. In particular, the diversification of income sources and the level of education of the household members are relevant components of resilience. When a shock occurs that negatively affects households' well-being, the latter will adapt more easily if they can rely (temporarily or not) on other sources(s) of income, allowing them to maintain a decent level of food security. Similarly, looking for an extra job is another common coping strategy, and with a relatively high level of education, household members are more valued in the labour market. Improving people's access to education would allow them to have better access to the labour market and, in turn, better opportunities to expand the portfolio of options available as income-generating activities. In line with this, we observe that the work ratio (i.e., share of people in the age of working in the household) also emerges as an important driver of resilience capacity, suggesting that the higher the number of potential income earners in the household, the more likely the latter is to resist shocks.

This finding confirms that diversifying income-generating activities and income-earning members is critical. These three resilience parameters, namely, diversified income-generating activities, diversified income-earning household members, and educational level, are strongly related. As mentioned above, a relatively high level of education of members allows households to a better position in the labour market. Not only can they access well-paid jobs (thus bringing relatively more money to their family), but they also have access to a larger variety of jobs, allowing them to diversify their sources of income. The MICS data's dynamic analysis provides further evidence on the relevance of strengthening Adaptive Capacity (AC) for resilience building – improving access to education and income diversification.

Table A6 gives the results of Eq. (6). It emerges indeed that, overall, AC (in particular, the level of education of household members and the work ratio – indicating the potential number of income earners) is the main driver of resilience growth over time. If access to Assets (AST) is crucial to support households' resilience in the short term (humanitarian perspective), other types of interventions are needed to build resilience in the longer term (development perspective). Furthermore, in Sahel countries, the analysis shows that access to water, sanitation, and hygiene (WASH) and primary services (especially school, hospital, and agricultural markets) is crucial to support households' resilience capacity. More generally, Table A7 suggests that the harsher the environment of the household (living in an arid climate, in a country affected by a protracted crisis, characterized by a low income and development

level), the more resilience depends on the access (both physical and economic) to these basic services. In addition, looking at changes in RCI over time, we observe that, on average, countries living in semi-arid zones experienced contractions in resilience capacity (Table A6).

Overall, from a short-term (humanitarian) perspective, the results suggest that expanding access to productive and non-productive assets to help households restore (or maintain) their stock of assets would allow them to be better prepared to respond to future shocks. Furthermore, in more remote areas and fragile contexts, building resilience urgently requires improving the availability and quality of primary services. From a longer-term (developmental) perspective, improving access to education and post-education capacity-building projects (e.g., farmer field schools) would help build resilience through better access to the labour market and better opportunities for the diversification of income sources. Finally, a timely and regular provision of social protection interventions is another important aspect to consider for improving resilience in the longer term (Table A6), especially when we consider the occurrence of shocks.

4.2 Dynamics of resilience and the role of shocks and coping strategies

We now focus on which shocks are most dramatically reducing resilience, which ways, and the most adopted strategies to cope with these shocks.

Table A8 reports, for each type of shock, the percentage of households who reported facing the shock over the last 12 months. The most frequently reported shocks are Natural disasters (including drought, flood, storm, fire, cyclones, armyworm, wind, locust, and landslides), Health shocks (illness, accident, or death of a household member), and shocks affecting households' Livelihoods (crop damage or disease, livestock loss or disease, business failure, lousy harvest or fishing season, loss of agricultural or fishing inputs/equipment). Households less frequently report price, conflict, and shocks affecting their income and assets. Table A9 reports, for each type of coping strategy, the percentage of households who reported relying on it to cope with shocks. Overall, most households resort to reducing the quantity and quality of food consumed (60 percent of households). Seeking an extra job and increasing the time spent at work is another frequent coping strategy (37 percent) and the sale of productive and non-productive assets (34 percent). In addition, a large proportion of households seeks help from friends and relatives, e.g. borrowing food (32 percent), and many of them decide to take credit, especially to buy food (30 percent) in times of difficulties.

Moreover, Table A10 reports the most adopted coping strategies for each type of shock faced. For all shocks – natural disasters, livelihood-related and health shocks – reducing food consumption is the most frequently adopted strategy used by households to cope with shocks. Furthermore, we observe that many households decide to increase their labour supply when natural disasters occur, while they are more likely to take credit in the face of health shocks – results consistent with the literature. Asking for help from friends and relatives is one of the most frequent coping strategies for all shocks analyzed, while the sale of productive and non-productive assets is more frequent when natural disasters and health shocks hit the households.

The results of Eq. (7a), Eq. (7b) and Eq. (7c), which aim at identifying the effects of these frequent shocks and those of the adopted coping strategies on households' resilience capacity, are reported in Tables A11, A12 and A13, respectively. The results of Eq. (7a) – without coping strategies variables – show that shocks reduce resilience capacity by almost 30 percent. They do so by contracting Access to Basic Services (ABS), Assets (AST), and Adaptive Capacity (AC); and are otherwise associated with an increase in Social Safety Nets (SSN). This finding

is clearly explained by the disruption of productive assets, the contraction of income sources, and the interruption of access to essential services. An increase in social safety nets (mainly through social protection interventions) does not suffice to counterbalance the negative effect of shocks on the other pillars of resilience (Table A11). We then factor in (7a) the most frequently adopted coping strategies (and obtain Eq. (7b)); to see whether they were effective in mitigating the negative effect of shocks on resilience capacity. The results (shown in Table A12) indicate that the contraction of resilience capacity reduces from almost 30 percent to 16 percent per the natural shocks. Otherwise, coping strategies are insufficient to mitigate the adverse effects of livelihoods shocks, which otherwise are even more disruptive of resilience capacity. The disruption of livelihood strategies can ultimately translate into a long-term threat to resilience capacity.

Furthermore, when regressing the most adopted coping strategies by shock (see Table A10) with the RCI and the pillars, we find that resilience capacity increases; this indicates how the adoption of shock-specific coping strategies manages to maintain and reinforce resilience. While these results look promising, one word of caution refers to the period we are considering. The positive effect on resilience might be valid in the short term, while it casts some doubts about sustainability. Contracting debt, reducing the quality and quantity of food consumed, and increasing working hours cannot be sustainable over the long term and ultimately creates burdens that might be unbearable to the households. Therefore, while these coping strategies might be functional in addressing short-period emergencies, more sustainable strategies must be facilitated.

Finally, Table A14 reports the results of Eq. (8) to explore whether price shocks can have long-term consequences in resilience building. As expected, the occurrence of (intense) price shocks is associated with a contraction of resilience capacity over time. When a household faced a price shock at time t, this inhibits its possibility to see its resilience capacity increasing at time t+1, and this adverse effect is doubled when the shock faced at time t was particularly intense (Table A14).

4.3 Focusing on women and different types of livelihoods

Table A6 gives the results of Eq. (6). We observe that the higher the number of women in the household, the smallest the increase in RCI over time (which is consistent with the literature). Women tend to have lower access to land and other assets, which are essential drivers of resilience capacity over time. Therefore, policies aimed at expanding women's access to assets and helping women restock after a shock are highly encouraged.

Furthermore, education is critical to ensure women's resilience capacity. It is essential to expand access to education for all, especially for girls, to strengthen resilience capacity. More educated women have better access to the labour market and can use the knowledge to expand the portfolio of options available as income-generating activities. Increasing the portfolio of options available for making a living is also a key driver of resilience growth.

Furthermore, households composed mainly of women pay the most significant toll to shocks. Their primary coping strategy is asset selling which is usually counterbalanced by greater access to social protection. In times of shocks, women-headed households are usually supported by greater access to social safety nets, which otherwise fails to counterbalance the contraction of resilience capacity due to more significant disruption of Assets (AST) and Adaptive capacity (AC). This process is crucial to protect women's resilience capacity in the long term.

The main drivers of resilience capacity for each livelihood are summarized in Figure A2. The resilience capacity of pastoralists is mainly driven by Access to Basic Services (ABS) (in particular WASH and hospital services). For pastoralists, access to productive and non-productive Assets (AST) and Adaptive Capacity (AC) is another critical component of their resilience capacity. The resilience capacity of farmers is essentially driver by their level of Asset (AST) endowment (in particular, productive assets such as livestock, land, agricultural tools and machinery, and other agricultural inputs). Adaptive Capacity (AC) is another critical aspect of the resilience capacity of farmers, while it is the primary driver of the resilience of agro-pastoralists. The level of education of household members and crop diversification are two aspects particularly relevant to strengthen agro-pastoralists resilience capacity, followed by Access to Basic Services (ABS) and Assets (AST).

From a dynamic perspective, we observe that households who live from agro-pastoralism can expect the most significant increase in resilience capacity over time, which is not surprising considering our previous result indicating that a robust adaptive capacity is one of the main drivers of the increase in resilience over time. Indeed, agro-pastoralism seems to be the most resilient livelihood strategy. This result is consistent when using RIMA and MICS datasets, and it is in line with the literature and other findings from the RIMA analyses. Specifically, it is an improvement in Access to Basic Services (ABS) (access to WASH and primary services) that drove the increase in resilience capacity of agro-pastoralists (Table A15). This increase suggests the importance, for long-term resilience building, from a more developmental perspective, to consider not only the essential components of resilience (Adaptive Capacity in the case of agro-pastoralists – in particular, the level of education of household members and the number of potential income earners in the family) but also its secondary aspects (Access to Basic Services in the case of agro-pastoralists).

On the other hand, for farmers and pastoralists, Adaptive Capacity (AC) is the critical driver of resilience increase over time (Tables A16 and A17). Specifically, we observe that the RCI increase driven by AC for farmers is more substantial than for pastoralists, which is explained by the fact that AC is relatively more relevant for farmers than for pastoralists. In addition, the analysis indicates that access to Social Safety Nets (SSN) is another crucial driver of resilience growth (Tables A16 and A17). As already mentioned in the previous section, access to SSN is critical to counterbalance the adverse effects of shocks on households' resilience capacity. The rebalance effect is especially valid for pastoralists, whose resilience capacity is particularly compromised when a shock occurs (Table A13). Since access to water and improved sanitation facilities critical components of their resilience capacity, this is not surprising considering that the occurrence of this is usually associated with a contraction of these "luxury infrastructures (see previous section).

Therefore, expanding pastoralists' access to productive and non-productive Assets (the second most relevant aspect of pastoralists' resilience capacity) is crucial for two reasons: (i) to reduce pastoralists' dependency on access to essential services, which are particularly hit when a shock occurs, and (i) to promote their ability to cope with shocks – as already mentioned, the sale of assets is a frequent strategy households rely on to cope with shocks, which allows them to preserve their food security status. Overall, independently of the livelihood strategy, improving access to education would enhance resilience in the longer term through better access to the labour market and better opportunities for the diversification of income sources, which are critical drivers of resilience increase over time.

5 Conclusions

A key finding of d'Errico *et al.* (2018), namely that Adaptive Capacity (AC) is an essential factor contributing to household resilience, is confirmed by the present analysis. However, the role of Access to Assets (AST), found here to be the most critical driver of resilience, was underestimated. The paper finds evidence that shocks have a significant and negative effect on household resilience capacity. Access to productive and non-productive assets (including agricultural tools, land, and livestock) is critical to ensure households' capacity to bounce back after a shock; restocking interventions might prevent falls into poverty traps. While restocking can prevent humanitarian disasters, combining these interventions with better and extended access to education and post-education grants better access to the labour market and better opportunities for diversification of income sources; this ultimately means bridging humanitarian and development interventions for building long-term resilience. This set of policies will also achieve a different outcome that avoids engaging with harmful coping mechanisms that jeopardize their well-being and food security levels.

Our results suggest that the most frequent shocks that threaten households' well-being and food security are natural, health, and livelihood related. In a context of increasing frequency and intensity of shocks, a timely and regular provision of social protection (promoting access to Social Safety Nets) is crucial to protecting resilience and preventing long-term developmental consequences. We now have a clearer idea of what strategies are typically adopted to respond to diverse shocks; in fact, increasing working hours is usually associated with natural shocks, while greater access to credit and social networks is adopted *vis-à-vis* health issues. We also confirm that covariate shocks (such as price shocks) have adverse effects on resilience growth.

One limitation of our analysis is that we are combining countries with very different socio-economic and crisis profiles. Another limitation refers to RIMA and MICS datasets, which are not perfectly comparable, although largely overlapping. That said, we are confident that the statistical power we achieved (more than 50 000 households) suffices to give our findings a substantial impact on the design of resilience-enhancing interventions.

Resilience interventions are essential to address the HD nexus; they can make households more resilient to imminent shocks and increase their longer-term development through a progressive and durable strengthening of households' adaptive capacity. On top of this, addressing the leading causes of resilience contraction will also reduce negative coping strategies.

The main contribution of this paper is to provide a unique statistical power dataset composed of more than 50 000 households. We, therefore, assume that our findings can have external validity. Under this perspective, and while recognizing the limitations of our analysis, we are convinced this analysis indicates that investing in resilience is made up of two significant aspects. There are essential elements of resilience that must be included in every program (diversification of income sources; access to productive assets; education). In addition, there are context-specific aspects required to fine-tune the intervention (e.g., the specificity of coping strategies).

There is ample room for further expanding our findings, especially on the determinants of growth of resilience and on the effect of great pandemics such as COVID-19. However, and bearing in mind the immense portfolio of investments made in building resilience and gathering data-driven evidence on the effectiveness of such efforts, we think this paper constitutes an important milestone in the current literature.

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Annex

Table A1. Description of the RIMA datasets

Country	Coverage	Year	Sample
Chad	National	2015	6 949
Democratic Republic of the Congo	Rutshuru (Nord-Kivu)	2017	1 719
	Rutshuru (Nord-Kivu)	2019	1 643
Mali	National	2014	3 804
Mauritania	National	2017	2 826
Myanmar	Rakhine State	2019	304
Niger	Maradi, Zinder	2018	2 300
Nigeria	Borno State	2018	2 049
Senegal	Matam	2015	414
Somalia	Jowhar district (Middle Shabelle)	2019	599
	Marka district (Lower Shabelle)	2019	622
South Sudan	Lakes State, Central Equatoria (Terekeka)	2019	777
Uganda	Karamoja	2016	1 965
	Karamoja	2019	1 965
	North	2017	3 034
	Southwest	2018	705
Venezuela (Bolivarian Republic of)	Portuguesa State	2020	839

Source: Author's own elaboration.

Table A2. Description of the MICS datasets

Country	Coverage	Year 1	Year 2	Sample
Bangladesh	National	2012	2019	1 109
Democratic Republic of the Congo	National	2010	2017	748
Gambia	National	2010	2018	520
Ghana	National	2011	2017	430
Guinea-Bissau	National	2014	2018	527
Iraq	National	2011	2018	2 190
Kazakhstan	National	2010	2015	313
Kyrgyzstan	National	2014	2016	307
Lao People's Democratic Republic	National	2012	2017	1 186
Mali	National	2009	2015	885
Mauritania	National	2011	2015	543
Mongolia	National	2010	2018	252
Nepal	National	2014	2019	319
Nigeria	National	2011	2016	1 914
Pakistan	Punjab	2011	2017	3 728
Serbia	National	2010	2019	111
Sierra Leone	National	2010	2017	531
Sudan	National	2010	2014	878
Thailand	National	2012	2019	471
Togo	National	2010	2017	380
Tunisia	National	2011	2018	137
Viet Nam	National	2010	2013	255
Zimbabwe	National	2014	2019	490

Source: Author's own elaboration.

Table A3. Variables adopted for the RIMA analyses

Variable	Definition	Datasets
abs_toilet	Dummy for improved sanitation	RIMA (15) & MICS (All)
abs_water	Dummy for improved water source	RIMA (14) & MICS (All)
abs_electricity	Dummy if hh has access to electricity	RIMA (7) & MICS (All)
abs_energy	Dummy for an improved energy source for cooking (electricity/ gas)	RIMA (5) & MICS (All)
abs_closeness	Index for closeness to basic services	RIMA (5)
abs_water	Closeness to a water source	RIMA (4)
abs_school	Closeness to school	RIMA (10)
abs_hospital	Closeness to hospital	RIMA (10)
abs_healthcenter	Closeness to a health center	RIMA (3)
abs_transport	Closeness to public transportation	RIMA (5)
abs_agrimarket	Closeness to the agricultural market	RIMA (11)
ast_wealth	Index for ownership of non-productive assets	RIMA (16)
ast_wscore	Wealth score provided by UNICEF	MICS (All)
ast_agriwealth	Index for ownership of productive assets	RIMA (16)
ast_land	Land ownership	RIMA (15) & MICS (All)
ast_tlu	Tropical Livestock Unit (TLU) per capital	RIMA (14) & MICS (All)
ast_ownhouse	Dummy if any hh member own the dwelling	MICS (All)
ssn_formal	Formal transfers received by the household (dummy or value)	RIMA (14)
ssn_informal	Informal transfers received by the household (dummy or value)	RIMA (13)
ssn_credit	Access to credit (dummy or value)	RIMA (16)
ssn_network	Network of social relations households can rely on in case of need	RIMA (13)
ssn_contraception	Dummy if a woman in the household have access/use of contraception	MICS (All)
ssn_antenatal	Dummy if a woman received antenatal care by professionals during pregnancy	MICS (All)
ssn_delivery	Dummy if a woman received professional assistance during delivery	MICS (All)
ac_educave	Average years of education of household members	RIMA (12) & MICS (All)
ac_educhead	Years of education of the household head	RIMA (3)
ac_lithead	Dummy if the household head can read and write	RIMA (5)
ac_read	Dummy if at least one woman in the household can read	MICS (All)
ac_incomediv	Index for income diversification	RIMA (13)
ac_workratio	Share of working members in the age of working	RIMA (12) & MICS (All)
ac_cropdiv	Index for crop diversification	RIMA (11)
ac_training	Dummy if a household member participated in a training in agricultural practices	RIMA (6)

Variable	Definition	Datasets
fs_fcs	Food Consumption Score	RIMA (15)
fs_foodexp	Food expenditures	RIMA (11)
fs_hdds	Household Dietary Diversity Score	RIMA (8)
fs_shannon	Shannon index	RIMA (2)
fs_CSI	Coping Strategy Index	RIMA (2)
fs_nostunting	Share of not stunting children in the household	MICS (All)
fs_nowasting	Share of not wasting children in the household	MICS (All)
fs_nounderweight	Share of not underweight children in the household	MICS (All)
abs	Access to Basic Services – ABS pillar	All
ast	Assets – AST pillar	All
ssn	Social Safety Nets – SSN pillar	All
ac	Adaptive Capacity – AC pillar	All
RCI	Resilience Capacity Index – RCI	All

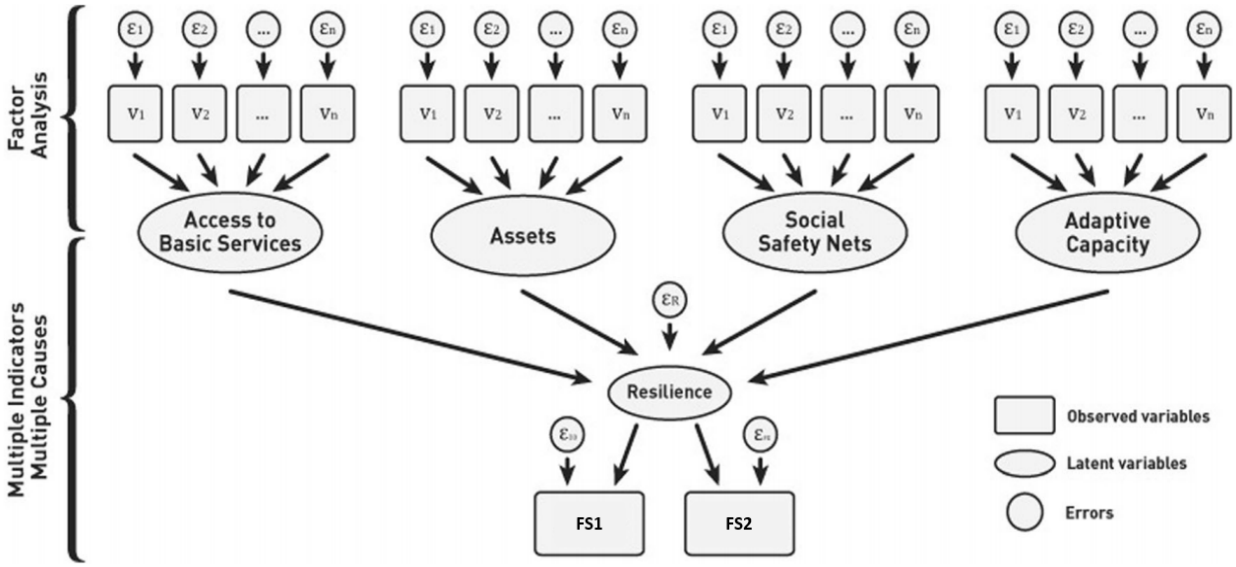
Source: Author's own elaboration.

Table A4. Frequency distribution for different profiles

Profile	RIMA datasets			MICS datasets		
	frequency	percent	total	frequency	percent	total
Development level						
Least developed countries	29 609	91.11	32 497	7 568	41.75	18 125
Developing countries	2 888	8.89		9 845	54.32	
Economies in transition	/	/		712	3.93	
Income level						
Low-income	26 070	80.22	32 497	4 460	24.61	18 125
Lower-middle-income	5 588	17.20		10 594	58.45	
Upper-middle-income	839	2.58		3 071	16.94	
Country with a protracted crisis						
No	11 270	34.68	32 497	14 063	77.59	18 125
Yes	21 227	65.32		4 062	22.41	
Agro-ecological zone						
Hyper-arid/Arid	6 630	20.40	32 497	7 277	40.15	18 125
Dry semi-arid/semi-arid	5 980	18.40		3 217	17.75	
Moist semi-arid	6 949	21.38		/	/	
Mixed	/	/		1 386	7.65	
Sub-humid	8 883	27.33		3 393	18.72	
Humid	4 055	12.48		2 852	15.74	
Main livelihood						
Farmer	12 928	41.23	31 355	1 919	29.54	6 496
Agro-pastoralism	8 170	26.06		541	8.33	
Pastoralism	10 257	32.71		1 395	21.47	

Source: Author's own elaboration.

Figure A1. Estimating resilience with the RIMA methodology



Source: Author's own elaboration.

Table A5. FAO-RIMA datasets: resilience pillars and variables by country

Country *Coverage*	Most important pillars and variables of resilience			
	1	2	3	4
Chad *National*	AST	ABS	AC	SSN
	Agri. wealth index; wealth index; land; TLU	Energy; water; sanitation; closeness to services	Income diversification; education	Formal transfers; credit; informal transfers
Democratic Republic of the Congo *Rutshuru (Nord-Kivu)*	AST	AC	ABS	SSN
	Wealth index; TLU; agricultural wealth index; land	Education; work ratio; income diversification; crop diversification	Closeness to services; sanitation; electricity; water	Social network; credit; informal transfers; formal transfers
Democratic Republic of the Congo *Rutshuru (Nord-Kivu)*	AST	AC	ABS	SSN
	Wealth index; TLU; agricultural wealth index; land	Education; crop diversification; work ratio; agricultural training; income diversification	Sanitation; electricity; closeness to services; water	Social network; credit; informal transfers; formal transfers
Mali *National*	ABS	AST	AC	SSN
	Electricity; water; energy; sanitation	Wealth index; agricultural wealth index	Education; work ratio	Social network; credit
Mauritania *National**	ABS	AC	AST	SSN
	Electricity; sanitation; closeness to services (school, hospital and agricultural markets); water	Education; work ratio	Wealth index; TLU	Credit; social network; formal transfers
Myanmar *Rakhine State*	AST	ABS	SSN	AC
	Agricultural wealth index; wealth index	Closeness to services	Credit; social network	Crop diversification; education

Country *Coverage*	Most important pillars and variables of resilience 1	2	3	4
Niger *Maradi, Zinder*	SSN	AST	AC	ABS
	Credit; formal transfers; informal transfers	Land; TLU; wealth index	Education; crop diversification; work ratio	Closeness to services; water; sanitation; electricity
Nigeria *Borno State*	AST	AC	SSN	ABS
	Wealth index; land; TLU; agricultural wealth index	Education; income diversification; crop diversification; agricultural training; work ratio	Social setwork; credit	Closeness to services; sanitation
Senegal *Matam*	ABS	AC	SSN	AST
	Closeness to services (school, hospital and agricultural markets); electricity; sanitation	Education; work ratio	Credit; social network; informal transfers; formal transfers	Wealth index; land; agricultural wealth index; TLU
Somalia *Jowhar district (Middle Shabelle)*	SSN	AC	AST	ABS
	Credit; Social network; formal transfers	Education; crop diversification	Agricultural wealth index; wealth index; land; TLU	Energy; closeness to services; sanitation; water
Somalia *Marka district (Lower Shabelle)*	ABS	SSN	AST	AC
	Water; sanitation; energy	Informal transfers; social network; formal transfers; credit	Agricultural wealth index; wealth index; land	Income diversification; education
South Sudan *Lakes State, Central Equatoria (Terekeka)*	AC	AST	SSN	ABS
	Education; agricultural training; income diversification	Agricultural wealth index; TLU; wealth index	Formal transfers; credit; informal transfers; social network	Water; energy
Uganda *Karamoja*	AC	AST	ABS	SSN
	Crop diversification; income diversification; work ratio; education	TLU; wealth index; land; agricultural wealth index	Water; closeness to services	Credit; informal transfers
Uganda *Karamoja*	AC	AST	SSN	ABS
	Income diversification; education; crop diversification; work ratio	Land; TLU; agricultural wealth index; wealth index	Credit; informal transfers	Closeness to services; water
Uganda *North*	AC	AST	SSN	ABS
	Education; crop diversification; work ratio; income diversification	Agricultural wealth index; wealth index; land; TLU	Credit; informal transfers; social network; formal transfers	Closeness to services; sanitation; water
Uganda *Southwest*	AST	AC	SSN	ABS
	Wealth index; agricultural wealth index; land; TLU	Work ratio; agricultural training; education; income diversification	Credit; formal transfers	Water; closeness to services
Venezuela (Bolivarian Republic of)	AST	AC	ABS	SSN
	Land	Income diversification	Closeness to services; sanitation	Informal transfers; formal transfers; social network

Note: The pillars and variables of resilience are reported in order of importance (i.e., from highest to lowest contribution to the RCI).

Source: Author's own elaboration.

Table A6. Determinants of RCI change over time (OLS regression) – MICS datasets

	(Model 1) ΔRCI	(Model 2) ΔRCI
Δabs_toilet		0.379
		(1.037)
Δabs_water		-0.976
		(0.954)
Δabs_electricity		-1.865
		(1.402)
Δabs_energy		-1.084
		(2.490)
Δast_landpc		0.0372
		(0.262)
Δast_ownhouse		1.779
		(1.220)
Δast_tlupc		-0.725
		(0.647)
Δast_wscore		1.676
		(1.596)
Δssn_contraception		1.406
		(0.992)
Δssn_antenatal		0.389
		(1.167)
Δssn_delivery		2.187**
		(1.031)
Δac_eduave		0.601**
		(0.265)
Δac_workratio		8.265**
		(3.848)
Δac_read		2.382**
		(1.110)
Gambia	20.13	19.26
	(14.42)	(14.38)
Mali	6.283***	5.106**
	(2.244)	(2.390)
Mauritania	9.708	9.427
	(14.83)	(14.95)
Nigeria	13.92	13.67
	(14.49)	(14.35)
Sierra Leone	5.200	4.579
	(14.47)	(14.31)

	(Model 1) ΔRCI	(Model 2) ΔRCI
Sudan	13.61	12.47
	(14.80)	(14.74)
Zimbabwe	4.555	3.492
	(14.47)	(14.29)
HH: Mostly men	-0.645	-0.601
	(1.044)	(1.046)
HH: Mixed	-2.674***	-2.696***
	(1.010)	(1.012)
HH: Mostly women	-2.684**	-2.697**
	(1.233)	(1.234)
Agro-pastoralism	4.644	4.552
	(10.32)	(10.27)
Mixed	13.40	13.59
	(14.45)	(14.29)
Pastoralism	1.024	1.251
	(10.63)	(10.62)
Trade	14.81	14.22
	(13.85)	(13.58)
AEZ: Humid	-1.228	-1.891
	(2.221)	(2.234)
AEZ: Semiarid	-3.331**	-3.178**
	(1.584)	(1.601)
AEZ: Subhumid	0.0918	-0.152
	(2.024)	(2.044)
AEZ: Mixed	-2.310	-2.184
	(1.819)	(1.848)
ΔABS	-0.109	
	(0.639)	
ΔAST	0.491	
	(0.521)	
ΔSSN	0.706**	
	(0.333)	
ΔAC	2.639***	
	(0.672)	
Constant	-11.33	-10.98
	(14.60)	(14.47)
Observations	6 496	6 496
R-squared	0.017	0.020

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Author's own elaboration.

Table A7. Resilience pillars for different profiles – RIMA datasets

Profile	Pillars of resilience in order of contribution to the RCI			
	1	2	3	4
Development level				
Developing countries	AST	AC	SSN	ABS
Least developed countries	AST	ABS	AC	SSN
Income level				
Low-income	AST	AC	ABS	SSN
Lower-middle-income	AC	AST	ABS	SSN
Upper-middle-income	AST	AC	ABS	SSN
Country with a protracted crisis				
No	AC	AST	SSN	ABS
Yes	AST	ABS	AC	SSN
Agro-ecological zone				
Hyper-arid	ABS	AC	AST	SSN
Dry semi-arid	AC	AST	SSN	ABS
Moist semi-arid	AST	ABS	AC	SSN
Sub-humid	AST	AC	ABS	SSN
Humid	AST	AC	ABS	SSN
Main livelihood				
Farmer	AST	AC	ABS	SSN
Agro-pastoralism	AC	ABS	AST	SSN
Pastoralism	ABS	AST	AC	SSN

Source: Author's own elaboration.

Table A8. Most frequently reported shocks by profile (%) – RIMA datasets

Profile	Natural disaster	Livelihood-related	Health shocks	Price shocks	Conflict-related	Income/ asset-related
Development level						
Developing countries	33.62	38.68	28.81	2.49	39.51	0.00
Least developed countries	36.30	31.98	16.20	14.94	6.5	5.41
Income level						
LICs	39.30	31.42	17.23	14.98	7.29	5.06
LMICs	17.13	33.55	13.10	10.58	8.86	5.06
UMass	61.62	62.22	48.15	0.00	79.86	0.00
Protracted crisis						
No	59.69	44.92	22.85	18.50	10.82	3.40
Yes	23.52	26.02	14.38	11.37	8.70	5.74
Agro-ecological zone						
Hyper-arid	31.07	25.01	12.82	26.38	6.56	5.54
Dry semi-arid	29.41	44.23	11.17	9.18	16.29	7.09
Moist semi-arid	12.66	7.41	8.30	0.98	3.91	0.13
Sub-humid	67.39	49.23	22.1	20.85	10.32	3.4
Humid	25.52	34.43	38.72	6.97	11.5	12.26
Main livelihood						
Farmer	38.09	19.4	13.14	9.47	6.18	0.22
Agro-pastoralism	35.34	47.53	28.38	9.31	8.18	11.65
Pastoralism	32.68	34.73	11.53	22.92	8.87	6.04
Overall	**36.04**	**32.61**	**17.39**	**13.84**	**9.43**	**4.93**

Source: Author's own elaboration.

Table A9. Coping strategies by profile – RIMA datasets

Profile	Food	Asset	Exp.	Child	Credit	Help	Beg	Job	Migr.	Barter
Development level										
Developing countries	87.02	39.09	/	/	55.49	50.71	16.54	/	/	/
Least developed countries	58.89	29.43	7.61	3.46	27.46	30.59	21.57	36.39	14.29	17.3
Income level										
LICs	56.93	31.57	7.61	3.46	25.96	29.65	21.23	39.13	13.69	17.76
LMICs	79.55	23.82	/	/	46.03	43.08	20.9	22.93	17.48	16.17
UMass	/	/	/	/	/	/	/	/	/	/
Protracted crisis										
No	92.11	31.05	/	/	32.75	40.81	15.76	37.87	8.25	25.68
Yes	43.46	29.67	7.61	3.46	27.82	26.96	24.45	35.14	18.8	12.03
Agro-ecological zone										
Hyper-arid	74.13	12.74	/	/	39.17	37.54	24.06	22.93	17.48	16.17
Dry semi-arid	64.76	30.84	11.22	9.00	35.82	48.91	16.12	35.61	14.74	/
Moist semi-arid	5.19	32.45	5.74	0.85	9.28	3.78	31.7	/	/	/
Sub-humid	85.87	31.57	13.64	10.42	25.71	36.97	15.88	38.73	9.68	26.99
Humid	97.10	35.07	/	/	58.26	51.20	16.32	42.08	20.84	10.43
Main livelihood										
Farmer	44.92	34.38	5.74	0.85	21.86	23.10	25.22	48.91	12.57	/
Agro-pastoralist	81.55	30.28	13.64	10.42	40.70	42.37	15.19	35.84	13.79	17.5
Pastoralist	69.36	21.60	11.22	9.00	32.16	40.28	19.26	28.61	15.92	16.94
Overall	59.52	33.81	9.63	3.17	30.44	31.97	25.21	37.01	14.23	17.25
Observations	**26 910**	**26 910**	**10 026**	**10 026**	**26 910**	**27 189**	**25 689**	**27 189**	**17 912**	**9 684**

Source: Author's own elaboration.

Table A10. Coping strategies by shock faced – RIMA datasets

		Natural disaster	Livelihood-related	Health shocks
Most adopted coping strategies	1	Reduce quantity and/or quality of food consumed	Reduce quantity and/or quality of food consumed	Reduce quantity and/or quality of food consumed
	2	Seek for extra job/increase labour	Ask help from friends and relatives (e.g., borrowing food)	Take credit (especially to buy food)
	3	Ask help from friends and relatives (e.g., borrowing food)	Seek for extra job/increase labour	Ask help from friends and relatives (e.g., borrowing food)
	4	Selling productive and/or non-productive assets	Take credit (especially to buy food)	Selling productive and/or non-productive assets
	5	Take credit (especially to buy food)	Selling productive and/or non-productive assets	Seek for extra job/increase labour

Source: Author's own elaboration.

Table A11. Effects of self-reported shocks on resilience (OLS regression) – RIMA datasets

	(1) RCI	(2) ABS	(3) AST	(4) SSN	(5) AC
Natural shock	-0.291***	-0.179***	-0.0777***	0.0713***	-0.0906***
	(0.0410)	(0.0107)	(0.0114)	(0.0155)	(0.0154)
Livelihood-related shock	-0.540***	-0.0656***	0.138***	0.0110	0.0845***
	(0.0469)	(0.0103)	(0.0122)	(0.0152)	(0.0138)
Health shock	-0.0816	0.0146	0.0244*	0.163***	0.0339*
	(0.0580)	(0.0129)	(0.0142)	(0.0188)	(0.0187)
Agro-pastoralism	1.752***	0.0935***	0.0434***	0.0300	0.0893***
	(0.0810)	(0.0126)	(0.0133)	(0.0194)	(0.0190)
Pastoralism	0.0607*	0.0435***	-0.000337	0.172***	0.0194
	(0.0356)	(0.0126)	(0.0128)	(0.0184)	(0.0179)
Female-headed HH	-0.567***	-0.0143	-0.0795***	0.0263	-0.0899***
	(0.0518)	(0.0127)	(0.0129)	(0.0187)	(0.0177)
HH size	0.00588	-0.0132***	0.0249***	0.0188***	0.00162
	(0.00636)	(0.00132)	(0.00182)	(0.00177)	(0.00171)
Constant	0.296***	0.175***	-0.160***	-0.189***	0.0200
	(0.0670)	(0.0149)	(0.0178)	(0.0222)	(0.0217)
Observations	**31 403**	**31 403**	**31 403**	**31 403**	**31 403**
R-squared	**0.038**	**0.015**	**0.019**	**0.009**	**0.004**

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Author's own elaboration.

Table A12. Role of the most frequent coping strategies (OLS regression) – RIMA datasets

	(1) RCI	(2) ABS	(3) AST	(4) SSN	(5) AC
Natural shock	-0.161***	-0.0330***	0.101***	0.0487***	0.0402**
	(0.0452)	(0.0119)	(0.0131)	(0.0188)	(0.0182)
Livelihood-related shock	-0.611***	-0.0669***	0.134***	0.0286*	0.0988***
	(0.0450)	(0.0110)	(0.0131)	(0.0173)	(0.0159)
Health shock	-0.115*	0.0132	0.0548***	0.117***	0.0789***
	(0.0603)	(0.0137)	(0.0154)	(0.0223)	(0.0223)
Reduce food consumption	0.236***	-0.0343**	-0.0549***	-0.0974***	-0.130***
	(0.0524)	(0.0143)	(0.0156)	(0.0228)	(0.0215)
Asset selling	-0.220***	0.0396***	0.0304**	0.0505***	-0.0889***
	(0.0504)	(0.0137)	(0.0126)	(0.0195)	(0.0202)
Taking credit	0.300***	-0.00419	-0.0244*	0.230***	0.00200
	(0.0523)	(0.0129)	(0.0136)	(0.0198)	(0.0181)
Help from friends and relative	-0.0193	-0.0255**	-0.0590***	0.0426**	-0.0519***
	(0.0525)	(0.0129)	(0.0137)	(0.0178)	(0.0173)
Seeking extra job	-0.229***	0.0247**	-0.0164	-0.00543	0.0771***
	(0.0480)	(0.0121)	(0.0140)	(0.0158)	(0.0153)
Agro-pastoralism	1.781***	0.111***	0.0936***	0.0145	0.118***
	(0.0683)	(0.0143)	(0.0152)	(0.0200)	(0.0190)
Pastoralism	0.0991**	0.0876***	0.106***	0.0489**	0.0904***
	(0.0395)	(0.0127)	(0.0155)	(0.0214)	(0.0183)
Female-headed HH	-0.691***	-0.0418***	-0.114***	0.0656***	-0.103***
	(0.0483)	(0.0129)	(0.0133)	(0.0201)	(0.0190)
HH size	0.0127*	-0.00367**	0.0359***	0.0163***	0.0227***
	(0.00756)	(0.00182)	(0.00236)	(0.00294)	(0.00293)
Constant	0.184**	0.0628***	-0.267***	-0.200***	-0.0955***
	(0.0848)	(0.0196)	(0.0242)	(0.0321)	(0.0313)
Observations	**26 910**	**26 910**	**26 910**	**26 910**	**26 910**
R-squared	**0.053**	**0.005**	**0.031**	**0.009**	**0.010**

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Author's own elaboration.

The sample is reduced to include only those datasets containing all the variables of the model (i.e., those country data for which we do not have information on livelihoods are not included in this model)

Table A13. Coping strategies on resilience capacity (OLS regression) – RIMA datasets

	(1) RCI	(2) ABS	(3) AST	(4) SSN	(5) AC
0.health#0.credit	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)
0.health #1.credit	0.297***	-0.00994	-0.0285*	0.238***	-0.0128
	(0.0581)	(0.0139)	(0.0147)	(0.0218)	(0.0208)
1.health#0.credit	-0.00334	-0.0129	0.0374*	0.116***	0.0847***
	(0.0763)	(0.0191)	(0.0211)	(0.0286)	(0.0315)
1.health#1.credit	0.00185	0.0473***	0.0674***	0.365***	0.0483*
	(0.0812)	(0.0176)	(0.0212)	(0.0333)	(0.0290)
0.natural#0.food	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)
0.natural#1.food	-0.243***	-0.139***	-0.0603**	-0.0412	-0.0792***
	(0.0767)	(0.0227)	(0.0238)	(0.0323)	(0.0304)
1.natural#0.food	-0.146	0.00241	-0.0693**	-0.0749	0.158***
	(0.0972)	(0.0288)	(0.0322)	(0.0458)	(0.0498)
1.natural#1.food	-0.721***	-0.127***	0.0249	-0.0210	0.0263
	(0.0730)	(0.0244)	(0.0259)	(0.0309)	(0.0345)
0.natural#0.job	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)
0.natural#1.job	-0.350***	0.0134	0.0600***	0.0884***	0.0368**
	(0.0783)	(0.0145)	(0.0171)	(0.0189)	(0.0157)
1.natural#0.job	0.130***	-0.0504***	0.105***	0.106***	-0.0999***
	(0.0491)	(0.0195)	(0.0224)	(0.0250)	(0.0262)
1.natural#1.job	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)
0.livelihood#0.food	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)
0b.shk_livelihood#1.food	0.804***	0.0930***	-0.0587***	-0.0743***	-0.0183
	(0.0690)	(0.0197)	(0.0204)	(0.0256)	(0.0236)
1.shk_livelihood#0.food	-0.142	-0.114***	0.0271	0.113**	0.0619
	(0.0918)	(0.0298)	(0.0333)	(0.0460)	(0.0442)
1.livelihood#1.food	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)
0.livelihood#0.help	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)
0.livelihood#1.help	-0.137*	-0.00519	-0.00503	0.0426*	-0.0589**
	(0.0787)	(0.0162)	(0.0162)	(0.0235)	(0.0230)
1.livelihood#0.help	-0.0751	0.0499**	0.124***	-0.0648**	0.0670***
	(0.0473)	(0.0207)	(0.0235)	(0.0257)	(0.0230)
1.livelihood#1.help	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)
Agro-pastoralism	1.764***	0.110***	0.0818***	-0.00649	0.128***
	(0.0689)	(0.0143)	(0.0157)	(0.0207)	(0.0195)
Pastoralism	0.0632	0.0861***	0.101***	0.0297	0.101***
	(0.0425)	(0.0131)	(0.0158)	(0.0220)	(0.0187)

	(1) RCI	(2) ABS	(3) AST	(4) SSN	(5) AC
Female-headed HH	-0.686***	-0.0430***	-0.114***	0.0677***	-0.103***
	(0.0483)	(0.0129)	(0.0133)	(0.0200)	(0.0190)
HH size	0.0139*	-0.00352*	0.0358***	0.0164***	0.0225***
	(0.00758)	(0.00183)	(0.00236)	(0.00294)	(0.00293)
Constant	0.0133	0.0765***	-0.248***	-0.186***	-0.127***
	(0.0880)	(0.0209)	(0.0248)	(0.0328)	(0.0332)
Observations	**26 910**	**26 910**	**26 910**	**26 910**	**26 910**
R-squared	**0.054**	**0.005**	**0.033**	**0.010**	**0.009**

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Author's own elaboration.

Table A14. Impact of price shocks on resilience change over time (OLS regression) – MICS datasets

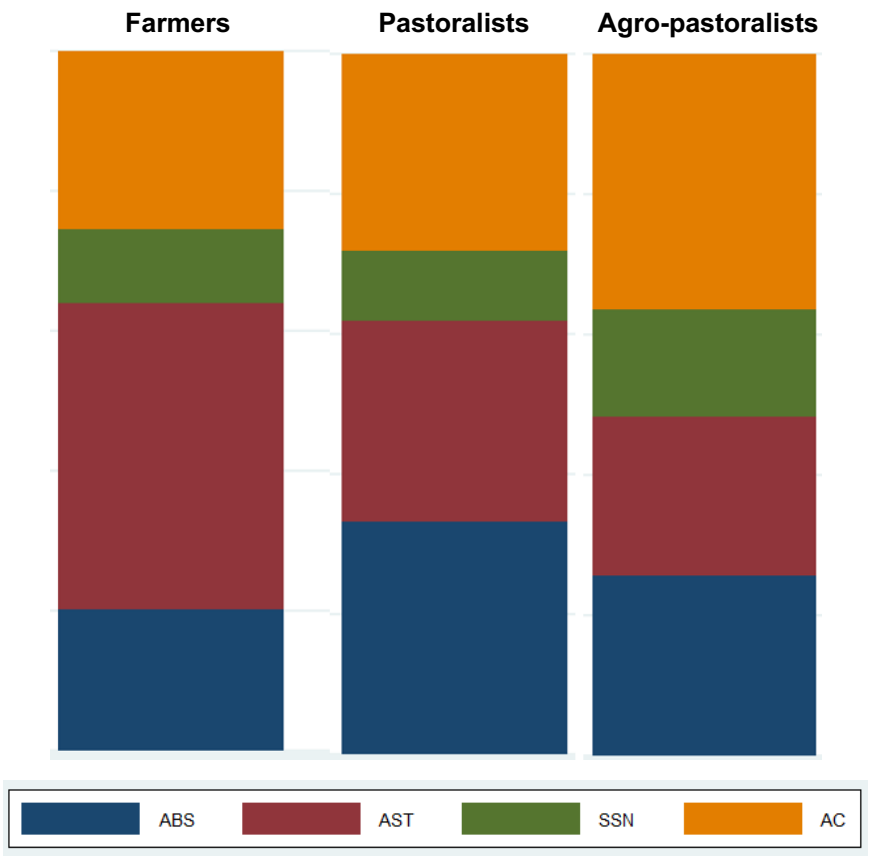
	(Model 1) ΔRCI	(Model 2) ΔRCI
Δabs_toilet		0.101
		(1.432)
Δabs_water		-0.428
		(1.346)
Δabs_electricity		-0.110
		(2.006)
Δabs_energy		-3.994
		(3.511)
Δast_landpc		1.183**
		(0.462)
Δast_ownhouse		0.748
		(1.646)
Δast_tlupc		0.486
		(1.197)
Δast_wscore		4.895**
		(2.389)
Δssn_contraception		2.813**
		(1.338)
Δssn_antenatal		-1.631
		(1.750)
Δssn_delivery		2.198
		(1.400)
Δac_eduave		0.166
		(0.408)
Δac_workratio		2.152
		(5.117)
Δac_read		0.884
		(1.465)

	(Model 1) ΔRCI	(Model 2) ΔRCI
The Gambia	43.92**	47.83***
	(17.71)	(17.77)
Mali	23.74***	26.78***
	(7.348)	(7.567)
Mauritania	16.64	28.45*
	(15.94)	(16.03)
Nigeria	39.95*	45.76*
	(23.56)	(23.49)
Sudan	50.70**	54.23***
	(19.83)	(20.12)
Zimbabwe	36.34**	40.50**
	(17.25)	(17.26)
HH: Mostly men	-0.0398	-0.0376
	(1.422)	(1.430)
HH: Mixed	-2.393*	-2.307*
	(1.383)	(1.383)
HH: Mostly women	-1.587	-1.606
	(1.768)	(1.773)
Agro-pastoralism	-10.13	-10.13
	(9.000)	(8.959)
Mixed	24.57	28.13
	(20.40)	(20.38)
Pastoralism	-25.40***	-25.11***
	(8.447)	(8.751)
Trade	-8.351	-9.017
	(8.965)	(8.939)
Price shock	2.157	0.929
	(8.498)	(8.471)
Price shock (intense)	-16.72*	-18.59*
	(9.554)	(9.564)
ΔABS	1.249	
	(0.872)	
ΔAST	0.534	
	(0.611)	
ΔSSN	0.249	
	(0.400)	
ΔAC	1.033	
	(0.875)	
Constant	-25.80	-29.31
	(23.21)	(23.15)
Observations	**3 513**	**3 513**
R-squared	**0.013**	**0.017**

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Author's own elaboration.

Figure A2. Resilience structure matrix by livelihood



Source: Author's own elaboration.

Table A15. Determinants of RCI change over time for agro-pastoralists (OLS regression) – MICS datasets

	(Model 1) ΔRCI	(Model 2) ΔRCI
Δabs_toilet		4.122
		(2.534)
Δabs_water		-4.904
		(3.432)
Δabs_electricity		2.522
		(4.941)
Δabs_energy		14.74
		(15.14)
Δast_landpc		-3.636
		(2.655)
Δast_ownhouse		0.741
		(3.293)
Δast_tlupc		1.385
		(2.575)
Δast_wscore		6.002
		(8.779)

	(Model 1) ΔRCI	(Model 2) ΔRCI
Δssn_contraception		0.579
		(2.702)
Δssn_antenatal		-6.844
		(11.80)
Δssn_delivery		0.812
		(3.032)
Δac_eduave		0.411
		(1.054)
Δac_workratio		0.105
		(11.48)
Δac_read		0.0600
		(3.426)
Mauritania	-27.61	-35.84
	(21.79)	(22.02)
Nigeria	-9.514	-17.34
	(12.55)	(14.54)
Sudan	-5.754	-11.09
	(5.404)	(7.070)
Zimbabwe	-2.127	-7.522
	(9.045)	(10.10)
HH: Mostly men	-2.285	-2.806
	(3.979)	(4.063)
HH: Mixed	-2.304	-2.344
	(3.515)	(3.575)
HH: Mostly women	-5.850	-5.117
	(5.275)	(5.349)
ΔABS	3.140*	
	(1.691)	
ΔAST	-0.296	
	(1.230)	
ΔSSN	-0.153	
	(0.659)	
ΔAC	0.597	
	(2.514)	
Constant	11.48***	11.94***
	(2.743)	(3.399)
Observations	**541**	**541**
R-squared	**0.016**	**0.028**

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Author's own elaboration.

Table A16. Determinants of RCI change over time for farmers (OLS regression) – MICS datasets

	(Model 1) ΔRCI	(Model 2) ΔRCI
Δabs_toilet		4.122
		(2.534)
Δabs_water		-4.904
		(3.432)
Δabs_electricity		2.522
		(4.941)
Δabs_energy		14.74
		(15.14)
Δast_landpc		-3.636
		(2.655)
Δast_ownhouse		0.741
		(3.293)
Δast_tlupc		1.385
		(2.575)
Δast_wscore		6.002
		(8.779)
Δssn_contraception		0.579
		(2.702)
Δssn_antenatal		-6.844
		(11.80)
Δssn_delivery		0.812
		(3.032)
Δac_eduave		0.411
		(1.054)
Δac_workratio		0.105
		(11.48)
Δac_read		0.0600
		(3.426)
Mauritania		-35.84
		(22.02)
Nigeria	-4.578	-17.34
	(2.856)	(14.54)
Sudan	21.87***	-11.09
	(7.877)	(7.070)
Zimbabwe	-36.67	-7.522
	(28.01)	(10.10)
HH: Mostly men	-2.574	-2.806
	(1.841)	(4.063)
HH: Mixed	-3.950**	-2.344
	(1.814)	(3.575)

	(Model 1) ΔRCI	(Model 2) ΔRCI
HH: Mostly women	-4.073*	-5.117
	(2.156)	(5.349)
ΔABS	-2.449**	
	(1.081)	
ΔAST	-0.536	
	(1.364)	
ΔSSN	1.596**	
	(0.788)	
ΔAC	6.429***	
	(1.306)	
10.country	-47.30***	
	(3.632)	
Constant	6.182**	11.94***
	(3.088)	(3.399)
Observations	**1 919**	**541**
R-squared	**0.029**	**0.028**

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Author's own elaboration.

Table A17. Determinants of RCI change over time for pastoralists (OLS regression) – MICS datasets

	(Model 1) ΔRCI	(Model 2) ΔRCI
Δabs_toilet		4.122
		(2.534)
Δabs_water		-4.904
		(3.432)
Δabs_electricity		2.522
		(4.941)
Δabs_energy		14.74
		(15.14)
Δast_landpc		-3.636
		(2.655)
Δast_ownhouse		0.741
		(3.293)
Δast_tlupc		1.385
		(2.575)
Δast_wscore		6.002
		(8.779)
Δssn_contraception		0.579
		(2.702)

	(Model 1) ΔRCI	(Model 2) ΔRCI
Δssn_antenatal		-6.844
		(11.80)
Δssn_delivery		0.812
		(3.032)
Δac_eduave		0.411
		(1.054)
Δac_workratio		0.105
		(11.48)
Δac_read		0.0600
		(3.426)
Mauritania		-35.84
		(22.02)
Nigeria		-17.34
		(14.54)
Sudan	2.549	-11.09
	(2.165)	(7.070)
Zimbabwe		-7.522
		(10.10)
HH: Mostly men	0.319	-2.806
	(2.567)	(4.063)
HH: Mixed	-4.336*	-2.344
	(2.569)	(3.575)
HH: Mostly women	-3.920	-5.117
	(3.207)	(5.349)
ΔABS	-0.937	
	(1.749)	
ΔAST	1.296	
	(1.225)	
ΔSSN	1.876**	
	(0.930)	
ΔAC	3.255**	
	(1.489)	
Constant	-0.367	11.94***
	(2.069)	(3.399)
Observations	**1 395**	**541**
R-squared	**0.013**	**0.028**

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Source: Author's own elaboration.

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