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John M. Ulimwengu, Julia Collins, Wondwosen Tefera, and Julie Kurtz

Building Community Resilience for Food Security in a Shock-Prone Country

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Authors

John M. Ulimwengu is a Senior Research Fellow at the International Food Policy Research Institute (IFPRI): j.ulimwengu@cgiar.org

Julia Collins is a Senior Associate Scientist at AKADEMIYA2063: jcollins@akademiya2063.org

Wondwosen Tefera is a Senior Associate Scientist at AKADEMIYA2063: wtefera@akademiya2063.org

Julie Kurtz is an Economist at the U.S. Department of Agriculture (USDA): juliekurtz63@gmail.com

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Abstract

In a world rocked by environmental, political, and economic shocks, achieving resilience has emerged as a goal because it captures the essence of well-being over time despite the inevitable ups and downs captured in snapshots of present circumstances. After decades of conflict and environmental shocks in South Sudan, including the eruption of civil war in 2013 shortly after its independence in 2011, communities there lack stability and suffer from exorbitantly high rates of food insecurity, poor health indicators, and low educational and livelihood opportunities. International development agencies have sought to support South Sudan, but years of financial investment have failed to alleviate recurrent humanitarian crises. This paper outlines a general framework for resilience and resilience measurement, assesses initial baseline data collected from South Sudan, and builds a novel quantitative and qualitative methodology for measuring community resilience in countries like South Sudan burdened by shocks and weak institutions.

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1. INTRODUCTION TO A RESILIENCE FRAMEWORK

Resilience is notoriously difficult to measure. Yet the concept is of increasing interest to policymakers because it captures not only the ability to "bounce back" but also the potential for a household, community, or society to "bounce forward" after a shock alters the system. While challenging to measure, the goal of resilience drives many development interventions. The panoply of approaches to measuring resilience reflects the breadth of disciplines the concept draws from, including ecology, medicine, and psychology (Holling 1973; Walker et al. 2004; Walker et al. 2009; Fleming and Ledogar 2008; Béné 2013). In the humanitarian and development sector, resilience definitions typically reflect the capacity to recover from a shock, adapt to a changing environment, and the degree to which the institutional environment supports transformation to enhance resilience to future shocks (d'Errico and Di Giuseppe 2017).

In the case of South Sudan, we aim to measure resilience in a war-torn environment with dysfunctional or even dismantled major institutions and infrastructure, but which has operative local community institutions and traditions, in addition to the presence of local and foreign development institutions. Over many decades in South Sudan, conflict, climate crisis, chaos, and violence look less like "shocks" than like equilibrium. Despite these challenges, we analyze and track resilience in seven areas of operation of the Partnership for Recovery and Resilience (PfRR), establishing a framework and baseline that can track the country's future progress.[1] Given that the South Sudanese are nearly constantly grappling with shocks, we define *resilience* as "positive adaptation despite adversity" based on numerous skills, protective factors, characteristics, and family and community-level attributes. We utilize the Resilience Index Measurement and Analysis-II (RIMA-II) methodology for quantitative estimations of resilience (FAO 2016), but hold a broad definition of resilience, incorporating both qualitative and quantitative data, that more adequately reflects the complexity of the concept and life in South Sudan.

2. A COUNTRY IN NEED OF RESILIENCE

Following four decades of civil war, the international community met South Sudan's independence in July 2011 with goodwill, dedicating itself to partnering with the government to put the country on a trajectory towards food security, health, education, and economic growth and development. However, the resumption of civil war in 2013 hindered the country's road to development. The protracted conflict created a humanitarian crisis that has left tens of thousands of people dead, displaced millions more, and degenerated food security across the country.

In addition to political conflict and violence, South Sudan faces climatic shocks—prolonged droughts and floods—and pest infestations that further destabilize food production and access. In 2017, parts of South Sudan, particularly in the north, experienced a famine that affected roughly half of the population. In October 2019, the country declared a state of emergency due to flooding in 30 of its 79 counties. An estimated 72,600 metric tons of cereal could not be harvested as a result of the floods (WFP 2019). According to the United Nations' World Food Programme, as of January 2019, 6.3 million people—54 percent of South Sudan's population—faced emergency acute food insecurity.

Over 80 percent of South Sudan's population participates in agricultural production. The effects of a long-drawn-out conflict and climate change

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[1] The South Sudan Partnership for Recovery and Resilience (PfRR) is a collective of donors, UN agencies, and non-governmental organizations working to increase resilience and reduce the vulnerability of the South Sudanese people and the institutions that represent them through seeking solutions at the individual, household, and community levels, while also working closely with local authorities and institutions (PfRR 2023).

coupled with a weak national policy system and generally ineffectual institutions have severely affected the food security, nutrition, and well-being of South Sudan's most vulnerable, who predominantly rely on agricultural production and regional market access for their livelihoods and food access. South Sudan requires a broad coalition of support to address not only the urgent humanitarian crisis but also to help restore production systems and help communities cope, recover, and build their resilience to shocks and crises. Restoring production systems and productivity is important because growth in the agricultural sector remains the most effective driver for poverty reduction and restoring livelihoods in many African countries (Christiaensen, Demery, and Kuhl 2011).

In addition to disruptions to food access, destabilization by the war, droughts, and weak national institutions, South Sudanese face significant local and domestic shocks—tribal violence, revenge, cattle raiding, robbery, alcohol abuse, domestic violence, rape, child abuse, and early child marriage plague communities.

Education and literacy levels are low, especially for girls, and school access has plummeted since the 2013 civil war. Greed, natural resource conflicts, and political corruption have sowed deep seeds of mistrust across the country. In addition to restoring vibrant agricultural productivity and market, supporting resilience in South Sudan will require a holistic approach that facilitates diverse livelihood development for young women and men, supports existing community institutions, builds institutions and laws to protect communities' natural resources, and addresses gender inequality, domestic violence, and deep psychological trauma across the country.

PfRR aims to produce business model interventions across South Sudan that integrate humanitarian and development services through community-based delivery mechanisms, emphasizing the productive sector as the foundation for resilience. The partnership coordinates collaborative activities among partners and stakeholders to define and deliver interventions that achieve social cohesion, resilience, and recovery for long-term development.

3. MEASURING AND EXPLAINING RESILIENCE

3.1 Approaches to measuring resilience

Resilience is an inherently dynamic concept, usually defined as the ability of an individual, household, community, or other social unit to maintain a minimum level of well-being despite stressors or shocks. Thus, it is best measured with panel or longitudinal data in which changes in well-being over time, as a result of shocks, are observed. A "gold standard" resilience impact assessment framework described by Béné et al. (2017) calls for high-frequency panel data measuring shocks and stressors, households' responses, and changes in well-being indicators. However, this type of data is not widely available. Moreover, many environments that particularly call for resilience strengthening also present significant challenges for the collection of such high-frequency data.

Several approaches to measuring resilience using different types of data have been developed in the past decade. One of the most prominent is the Resilience Index Measurement and Analysis-II (RIMA-II) methodology developed by the Food and Agriculture Organization of the United Nations (FAO), which has been implemented in around 15 African countries to estimate households' ability to maintain well-being in the face of shocks (FAO 2016). RIMA-II estimates a household-level resilience capacity index which can be used to rank households and identify those expected to show the lowest resilience. First, using a more extensive set of underlying variables, factor analysis is used to construct four pillars expected to contribute to overall resilience—access to basic services, assets, adaptive capacity, and social safety nets. Second, structural equation modeling is used to estimate a predicted resilience capacity index for each household as a latent variable, based on the pillar values and on outcome variables, most of which are focused on food security.

The RIMA-II approach has gained considerable acceptance and has been incorporated into the monitoring and evaluation of resilience-building efforts under the framework of the Comprehensive Africa Agriculture Development Programme (CAADP). The CAADP Biennial Review, which regularly assesses the progress of African countries and regions toward CAADP goals and commitments, calls for the measurement of the share of agricultural households that are resilience to climate and related shocks, with RIMA-II as a suggested measurement methodology (AUC-DREA 2017).

However, other approaches to measuring resilience have been proposed. TANGO International developed a method similar to RIMA II: It first constructs scores based on underlying variables expected to contribute to resilience, then estimates resilience capacity based on the constructed scores (Smith and Frankenberger 2018). Rather than RIMA II's four pillars, the TANGO approach relies on three estimated capacities—absorptive capacity, which is the ability to weather and recover from shocks; adaptive capacity, which is the ability to make changes in livelihood strategies in response to shocks; and transformative capacity, which is the presence of an enabling environment for resilience (Upton et al. 2022). In addition, whereas RIMA II uses a structural equation model to estimate the resilience capacity index based on the pillars and additional outcome variables, the TANGO method estimates overall resilience capacity based only on the three underlying capacities. The resulting resilience capacity index is commonly used in regression analyses to examine its effects on welfare and well-being outcomes.

Béné et al. (2017) developed a methodology specifically for the ex-post measurement of resilience impacts of an intervention in the absence of baseline data. Their analysis looks at differences in self-reported responses to shocks in treatment and control groups, with lower levels of negative coping strategies indicating higher resilience. The method also analyzes differences in self-reported abilities to adequately respond to shocks to assess changes in resilience levels.

Finally, Cissé and Barrett (2018) advance a methodology that uses ordinary least squares regression analysis to estimate the probability of a household reaching or maintaining a given level of well-being, as measured by analysis of poverty, food security, or a similar outcome indicator, conditional on several factors. The estimated probability is comparable to the predicted resilience capacity index of the RIMA II method. Households can be classified as resilient or not based on an identified threshold probability level.

The various methods reflect different conceptions of resilience and present different advantages and disadvantages in terms of data requirements. Upton et al. (2022) conducted a comparative analysis of several resilience measurement methods, applying the RIMA-II, TANGO, and Cissé and Barrett methodologies to panel survey data from Ethiopia and Niger. The researchers compared the distribution of resilience according to each method as well as the ability of each method to predict future well-being. The authors find that the

methods differ in terms of the group of households identified as having greater or lower resilience capacity. While none of the methods is highly effective at predicting future well-being, the Cissé and Barrett method was found to perform best.

However, in this analysis, we use the RIMA-II methodology. This choice is dictated partly by RIMA's status as the de facto preferred resilience measure under CAADP and partly by data availability—we use cross-sectional data, not the panel data required for the Cissé and Barrett method. Moreover, our dataset does not include information on coping strategies and self-assessed recovery as required by the methodology of Béné et al. However, it is important to bear in mind the findings of Upton et al. (2022) that RIMA results are not synonymous with households' actual ability to maintain or improve their welfare over time. The estimated RIMA index, therefore, should not be thought of as "resilience" as such but rather as predicted resilience capacity—a latent variable associated with household and location characteristics, grouped under the pillars, which is expected to contribute to resilience and ultimately to the desired well-being outcomes. This predicted capacity should be tested against actual welfare changes in future analyses when further waves of data from the population studied are available.

3.2 Measuring resilience in the context of Southern Sudan

In this analysis, we apply the RIMA-II methodology to cross-sectional household survey data collected by Management Systems International (MSI) in 2018 in seven PfRR Candidate Partnership Areas (CPA) in South Sudan to estimate households' resilience capacity. Following FAO (2016), we implement the RIMA-II methodology using four pillars:

- Access to basic services—households' access to and use of services such as education, extension, markets, and health facilities;
- Social safety nets—availability of formal or informal social protection and other resources to lessen the impact of shocks;
- Assets—a household's physical assets; and
- Adaptive capacity—a household's ability to absorb and adapt to shocks and stressors through, for example, alternative livelihood strategies.

Since the MSI survey data does not include detailed information on assets, we used predicted values of household assets based on recorded assets of similar households in the same areas from data collected by WFP and FAO. For each CPA, we use the

WFP/FAO data to run truncated Tobit regressions for landholdings and the number of different assets owned, e.g., mattress, cell phone, bicycle, etc., using as explanatory variables attributes of the location and household characteristics that are also recorded in the MSI data, e.g., age, sex and education level of household head, type of toilet, and primary water source. We then use the regression results to predict the level of each asset for households in the same CPA in the MSI data, based on locational and household characteristics. These predicted land and asset levels are used to calculate the Assets pillar.

The RIMA-II methodology measures "food security resilience", or the ability of the household to maintain food security in the face of stressors and shocks. As such, household food security indicators are considered to be functions of resilience. The MSI data contains only one binary variable indicating whether a given household lacked food at any time within the past 12 months. This food security measure has minimal variation across households and, thus, is not informative for resilience analysis. The proportion of households that experienced a period with a lack of food in the past 12 months was over 75 percent in four out of the seven CPAs, which reflects the widespread food insecurity in these areas.

In consequence, we used five predicted food security variables—the Food Consumption Score (FCS), the Household Diet Diversity Score (HDDS), and the number of meals consumed by three different age groups—as the resilience outcome variables. FCS measures the number of food groups consumed by the household in the past seven days (WFP 2008). HDDS measures the number of food groups consumed by the household in the past 24 hours (FAO 2010). The variables on meals consumed measure the per capita number of warm and cooked meals consumed the previous day by children aged 2 to 5 years, by children aged 6 to 12 years, and by all individuals over 12 years, respectively.[2] The variables to compute these food security variables were measured in the data collected by WFP/FAO in the same CPAs. The five food security variables were then predicted for each household in the MSI dataset based on the values of similar households in the WFP/FAO data using a methodology similar to that employed for the predicted Asset variables

described earlier. In addition to greater variation, the predicted variables offer richer information than the binary food security variable in the MSI data. While the predicted variables do not provide detailed information on the quantities of individual food groups consumed by the household, they give important insight into the household's overall food and nutrition security. Dietary diversity variables, such as the HDDS, have been found to be good predictors of undernutrition indicators and to reflect the influence of shocks and stressors on household food and nutrition security (Headey and Ecker 2013).

We estimate the resilience capacity measure in two steps. First, the four pillars are constructed from the survey data. We estimate the pillars using principal component analysis (PCA). Given that the variables composing the pillars are discrete, we first estimate polychoric correlations between the variables and then apply PCA to the correlation matrix.[3] The pillars are then standardized using the min-max procedure[4] so that all values fall between 0 and 1.

In the second step, the resilience capacity index is estimated based on the pillars and outcomes. This is a latent variable derived from the pillars and the food security variables using structural equation modeling and a maximum likelihood estimator. A resilience capacity score is generated for each household and then standardized so that values fall between 0 and 1, with higher scores indicating greater resilience capacity.

The mathematical expression of the RIMA framework is as follows (FAO, 2016):

$$(1) \quad y = \lambda\eta + \varepsilon$$

$$(2) \quad \eta = \beta x + \zeta$$

where η is the latent variable representing resilience capacity; y is an indicator or outcome of resilience; and $(x_1, x_2, …, x_n)$ are the determinants of resilience capacity. In our analysis, as is typically done in RIMA-II analyses, the food security indicators are used as y-variables, and the four resilience pillars are entered as the x-variables. Figure 3.1 demonstrates the resilience capacity measurement framework graphically.

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2 Households without members in each of these age groups were excluded from the analysis.
3 Standard methods of performing factor analysis, i.e., those based on a matrix of Pearson's correlations, assume that the variables are continuous and follow a multivariate normal distribution. If the model includes variables that are dichotomous or ordinal, a factor analysis can be performed using a polychoric correlation matrix. See Kolenikov and Angeles (2009) for a discussion of the advantages of using polychoric correlations when performing PCA on discrete variables.
4 (Z-Zmin) / (Zmax-Zmin)

Figure 3.1. Resilience capacity measurement framework
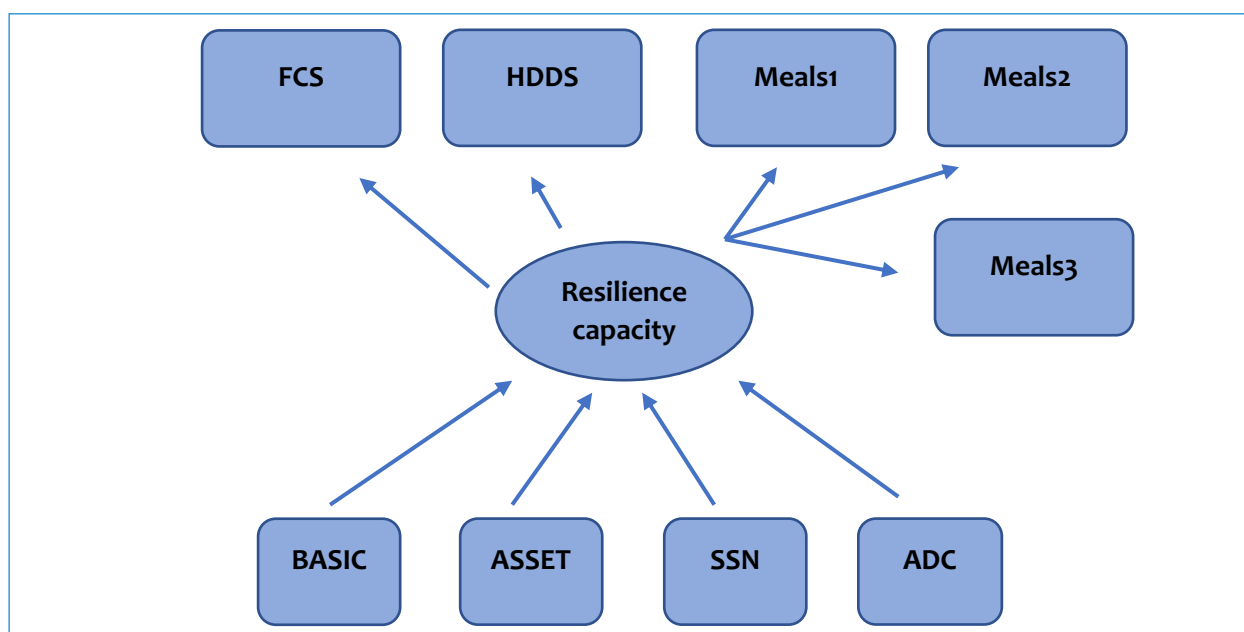
Source: Authors, based on FAO (2016)
Note: BASIC—Access to Basic Services; ASSET—Assets; SSN—Social Safety Nets; ADC—Adaptive Capacity;
FCS—Predicted Food Consumption Score; HDDS—Predicted Household Dietary Diversity Score;
Meals1—Per capita number of cooked meals consumed the previous day by children over 12 and adults;
Meals2—per capita number of cooked meals consumed the previous day by children aged 6 to 12 years;
Meals3—Per capita number of cooked meals consumed the previous day by children aged 2 to 5 years.

We calculate the pillar scores using the available variables that best reflect the concepts underlying each pillar. The indicators used to construct each are listed in Table 3.1.

Table 3.1. Resilience capacity index pillars and indicators

Pillar	Indicators
Access to Basic Services	Participation in vocational training
	Existence of agricultural extension workers
	Distance to nearest primary school
	Access to a common open market
	Health facility provides free care
	Time to reach the health facility
	Respondent satisfied with the quality of health services
Assets	Predicted number of cell phones
	Predicted number of tables
	Predicted number of beds
Social Safety Nets	Access to remittances from within South Sudan
	Access to remittances from outside of South Sudan
Adaptive Capacity	Educational attainment of household head
	Number of agriculture-related livelihood activities in which household members are involved
	Number of non-agriculture-related livelihood activities in which household members are involved
	Number of formal employers of household members
	Number of crop types planted in 2018
	Access to information to warn about potential natural disasters

Source: Authors

Following the computation of the resilience capacity index, we perform a Tobit regression analysis to estimate the effects of household characteristics and other factors on predicted resilience capacity. To account for the social and institutional environment, we construct variables to represent the quality of governance as perceived by households, the strength of institutions, and exposure to conflict. A polychoric principal component analysis is used to estimate scores for each variable based on a more extensive set of underlying variables, as was done to calculate the pillars. Indicators used to construct governance, institutions, and conflict scores are shown in Table 3.2.

Table 3.2. Governance, institutions, and conflict indicators

Pillar	Indicators
	Respondents' ratings of the government's efforts to:
Governance	− create jobs;
	− keep prices down;
	− reduce crime;
	− improve basic health services;
	− combat HIV/AIDS;
	− address the educational needs of the country;
	− provide water and sanitation services;
	− ensure that everyone has enough food;
	− fight corruption;
	− resolve violent conflicts between communities;
	− maintain roads and bridges;
	− provide a reliable supply of electricity;
	− defend the country
Institutions	Number of organizations or groups named that support this community
Conflict	Number of community institutions named that affect the daily lives of households

Source: Authors

4. DATA AND DESCRIPTIVE ANALYTICS

4.1 Data

The Community Household Resilience Survey was conducted by MSI in 2018. Data were collected from seven counties in South Sudan that reflected the existing PfRR CPAs: Torit, Bor South, Wau, Yei, Rumbek East, Yambio, and Awiel West. Consultations with various stakeholders facilitated the selection of these seven CPAs. These stakeholders discussed how community resilience relates to conflicts, livelihoods, poverty, shocks, and markets factors, and the separate distinct impacts of these factors on men, women, children, and elders. Enumeration Areas were selected within the CPAs with the probability of selection being proportional to household size. The sampling frame was based on the 2008 Population and Housing Census conducted in South Sudan, with some updated information (Lubaale 2018). Though sample sizes (n) differ for individual questions, the number of households surveyed is sufficient to use the survey results to guide policy design and implementation (Table 4.1).

Table 4.1. Household and sample size in the seven Candidate Partnership Areas

	Torit	Bor	Wau	Yei	Rumbek	Yambio	Aweil	Total
Total households	19,822	31,353	27,722	37,847	unknown	25,353	28,661	
Households selected	445	704	622	748	445	570	643	4,177

Source: PfRR survey data

Survey data was collected from a total of 4,177 households drawn from the seven CPAs. The survey collected household-level data on several pertinent issues, including access to basic services, such as education, health, WASH, etc.; sources of livelihood; food security; institutions; conflict; and governance. All tables, figures, and analyses in this paper are based on the survey data collected under MSI from the seven CPAs.

4.2 Descriptive analysis

4.2.1 Demographics

The average size of the households surveyed ranged between 5 and 7 members in the seven CPAs (Table 4.2). Most households identify as Christian, predominantly Catholic or Anglican. There is a small percentage of Adventist households across the counties, while Aweil has a sizeable Pentecostal population. The proportion of the population that is Muslim is less than one percent, except in Wau (9 percent) and Aweil (2 percent).

Bor and Rumbek are ethnically homogenous. Torit, Yambio, and Aweil, while dominated by a single ethnic group, contain small populations of ethnic minorities. Wau and Yei on the other hand, are ethnically heterogeneous. Households in all counties face displacement with the migration of members. In between 20 and 45 percent of households, one or both parents live outside the household. Fathers more commonly live outside the household than mothers.

Table 4.2. Selected demographic indicators

	Torit	Bor	Wau	Yei	Rumbek	Yambio	Aweil	Total
Household size, avg., number	5	7	6	5	7	6	6	5
Christian, % of households	99	100	91	99	100	100	98	99
Member of the largest ethnic group in the county, % of households	81	100	38	53	100	94	98	81
Parent not living in household, %								
Mother	26	18	30	34	18	42	28	26
Father	32	22	42	42	23	46	40	32

Source: PfRR survey data

4.2.2 Trust in people and institutions

Research shows that social relationships are essential to helping people escape and remain out of poverty. Strong social infrastructure, supported by public safety and trust in leadership and institutions, facilitates stronger institutions and community relationships (Scott et al. 2018). This subsection explores social trust, infrastructure, and risks in the seven CPAs.

Leadership and predominant institutions—The impact of institutions and local leadership on households is heterogeneous across the seven CPAs. Paramount chiefs and other traditional chiefs, as well as local government, were reported by survey respondents to play the most significant leadership roles, though their influence varies across the CPAs. Most surveyed households in Torit, Bor, and Yambio counties indicated that traditional leaders play a more prominent role than political leaders (Table 4.3). The relative importance of the traditional leaders was found to be smaller in the other four counties. A negligible proportion of respondents believed political leaders had more influence than traditional leaders, though many were unsure which leaders were more important.

Table 4.3. Relative importance of leadership categories, percent of all households reporting

	Torit	Bor	Wau	Yei	Rumbek	Yambio	Aweil
Traditional	71	73	33	49	40	85	34
Political	1	3	2	7	2	4	4
Both equally	9	4	9	12	13	4	10
Not sure	19	20	57	33	45	7	52

Source: PfRR survey data

Survey responses also showed that only a modest proportion of households were familiar with their region's humanitarian, development, and service agencies. Awareness was highest in Torit, where 51 percent of households indicated knowing development agencies. Surveyed households in Wau (13 percent) and Yambio (17 percent) were least aware of agencies, despite over 30 percent of households in those CPAs stating that NGOs affect their household.

Conflict and resolution—Communities face pervasive social risks and threats of violence, both domestically and outside the home. Compared to other CPAs, the prevalence of households affected by such social risks is highest in Torit, Bor, Yei, and Yambio counties. Outside the home, households reported burglaries/robberies, including livestock raids in three counties, as the most common risk (Table 4.4). Within households, the strongly associated risks of alcohol abuse, domestic violence, child abuse, and teen pregnancy are common, with particularly deleterious effects on women and children. In five of the seven CPAs, at least 30 percent of households indicated rape as a prevalent social risk.

Table 4.4. Population affected by social risks, percent of all households reporting

	Torit	Bor	Wau	Yei	Rumbek	Yambio	Aweil
Burglaries	37	61	68	55	21	49	49
Robberies	54	56	57	61	51	73	26
Assaults	37	48	25	42	6	46	20
Gang	39	52	54	33	25	52	35
Vandalism	21	34	28	31	12	32	19
Violent dispute	60	64	39	43	21	44	20
Alcohol abuse	93	79	53	74	21	84	49
Substance (drug) abuse	32	58	34	63	2	61	11
Teen pregnancy	70	40	47	58	13	70	46
Domestic violence	89	65	45	64	20	73	35
Child abuse	76	61	39	55	14	58	26
Prostitution	22	32	23	42	1	55	18
Rape	31	43	31	51	11	41	10
Cattle raiding or rustling	47	82	9	7	63	1	5

Source: PfRR survey data

A select number of surveyed households identified the causes behind local conflict, primarily attributing it to tribal affiliation, firearms availability, lack of rule of law, and revenge. A small portion of respondents believe conflict is ethnically based—less than 10 percent in Aweil, Yambio, and Wau, but between 10 and 25 percent thought so in Torit, Rumbek, Yei, and Bor. More respondents believed conflicts to frequently arise over natural resources, especially forests and water. More than 60 percent of the respondents in Aweil, Yambio, Bor, and Yei blamed conflicts on oil disputes, while more than 75 percent of the survey households in Rumbek and Bor indicated that fishing is a major source of conflict. The primary bottleneck to conflict resolution households identified was a lack of trust, followed by dishonesty among conflicting parties, lack of seriousness, and political greed. In Bor, Yei, and Yambio, political greed and external influences were viewed as the main factors thwarting conflict resolution in those areas.

The majority of households identified death as the primary effect of conflict in their community. Civil war—particularly in Bor, Yei, Yambio, and Wau—and loss of household assets—particularly in Bor,

Yei, and Rumbek—are widespread. While most men and women feel safe during the day in their communities, far fewer feel safe at night—this discrepancy between day and night safety was most notable in Bor, Wau, Yei, and Yambio. Perceived sense of safety levels were comparable across sexes, except in Aweil, where women were roughly half as likely as men to report feeling safe during the night.

4.2.3 Access to basic services

We examine access to education, health and sanitation services, and community opinion of various government functions.

Education—The proportion of household members that have ever been to school differs across the seven areas of South Sudan. In Yambio, Wau, Yei, and Torit, 40 to 60 percent of the surveyed households have members who have been to school. However, in Aweil, Bor, and Rumbek East, less than 35 percent of households have members who have ever been to school (Table 4.5). For all counties, female household members are much less likely than male members to have attended any school.

Table 4.5. School attendance and distance to school, percent of all households

	Torit	Bor	Wau	Yei	Rumbek	Yambio	Aweil
Ever been to school	43	16	55	45	15	59	32
Male	64	28	72	63	29	83	51
Female	24	4	36	27	3	38	13
Distance to primary school less than 5 km	86	55	83	69	36	71	69
Distance to secondary school less than 5 km	43	14	58	51	10	39	40

Source: PfRR survey data

Access to primary school is the poorest for households in Bor and Rumbek East. A larger percentage of households live more than 5 km from a secondary school than from a primary school in most counties—no secondary school exists for 40 percent or more of households in Torit, Bor, and Rumbek East. However, households in Bor and Rumbek East identified cultural barriers, not the physical distance to school, as the predominant reason members did not attend school. Other significant obstacles to school attendance include a low value placed on education or the need for youth to help support the family.

Health—In Wau, Yei, and Bor, a higher percentage of households reported receiving quality healthcare services, as measured by their opinions on the timeliness of receiving health care, whether sufficient information was provided to patients,

and the availability of qualified health providers. Among the seven areas, households in Aweil and Torit reported the lowest quality of health care.

Water—While multiple water sources may be available in each community, most households depend on one or two primary sources. Hand pumps are the predominant water source for the seven communities; deep boreholes (without a network), shallow wells, and water vendors also provide primary access for many. Most households reported traveling less than 30 minutes to the nearest available water source.

Community view of government services—The seven areas surveyed generally have a poor view of government services. In Torit, Wau, Yei, and Yambio, most households gave a "poor" or "very poor" rating to overall government performance.

Across the seven areas, the government services rated the poorest ("very poor") were those focused on job creation, social equity ("ensuring everyone has enough"), road and bridge maintenance, and electricity provision. Many households gave "poor" ratings for the government's role in keeping prices down and fighting corruption. Households collectively gave the government the highest rating ("very good") for HIV prevention, addressing educational needs, and national defense.

4.2.4 Productive capacities

Using the survey data, we assess whether agricultural production and value chains currently satisfy households' fuel and food needs in the seven study areas. We consider the types of agricultural production and employment opportunities, livelihood skills development, market infrastructure, and effects of climate change on agricultural livelihoods.

Food insecurity and agricultural production—Food insecurity is a real and ubiquitous risk in South Sudan, exacerbated by warfare, conflict, and climate change threats. Most households in the seven CPAs experienced a lack of food at some point over the previous 12-month period. More than 80 percent of households in Torit, Bor, Yei, and Rumbek reported having lacked food at some point. Wau households were less likely to have faced food insecurity—36 percent of households there reported experiencing a lack of food at some point over the previous 12-month period. Civil war and conflict were reported to be the main drivers of food insecurity in most counties, followed by climate shocks like drought (Table 4.6). More than 50 percent of households in Torit, Bor, Rumbek, and Aweil reported that drought adversely affected their food security. Torit, Bor, and Aweil also reported experiencing food insecurity due to significant flooding (Table 4.6).

Table 4.6. Causes of lack of food, percent of all households

	Torit	Bor	Wau	Yei	Rum-bek	Yambio	Aweil
Long dry spell	68	72	4	8	57	13	51
Civil war or other conflict	31	26	81	94	48	81	4
Locust, animal, or insect pests	22	33	0	18	40	19	24
Flooding	35	80	0	1	3	0	32
Destroyed by unknown	12	23	23	28	7	63	13

Source: PfRR survey data

According to the survey data, most households responded to food insecurity by purchasing food with their own resources or relying on relatives. In Bor and, to a lesser extent, Wau, Torit, and Yei, households relied on food aid from the World Food Programme or other NGOs. Government food aid plays a minimal role—only in Bor and Yei did it reach more than 5 percent of households. In some communities, wild plants and animals are important to how households cope with food shortages.

In addition to social and environmental factors that inhibit food security, the survey also showed that human activities can threaten the productivity of the soil and, therefore, food security resilience.

Bush burning is prevalent in all seven counties. Moreover, timber harvesting is common in all counties, but especially in Rumbek and Yambio, further threatening land and biodiversity resilience. Most counties also suffer significant overgrazing, with adverse long-term consequences for resilience.

With respect to farming, all counties focus on producing carbohydrate-dense grains—Torit, Bor, Rumbek, and Aweil rely on sorghum, while Yambio and Yei prioritize maize. Households in all seven counties cultivate additional crops, particularly sesame, vegetables, and cassava (Table 4.7).

Table 4.7. Most important crops grown, percent of all households

	Torit	Bor	Wau	Yei	Rumbek	Yambio	Aweil
Sorghum	91	83	35	14	76	2	93
Maize	3	5	22	61	2	48	3
Cassava	0	0	1	11	0	13	0
Vegetables	2	1	15	5	0	1	1
Sesame	2	9	16	4	22	35	3

Source: PfRR survey data

Livelihoods—Most of the working population is engaged in crop production, with 70 to 90 percent of both men and women farming in all counties. Wau is an exception, as only about 50 percent of households there reported being engaged in crop production. In most surveyed counties, women are more likely than men to work in food and dairy processing, baking, retail, and tailoring. Men dominate in construction, mechanic, and carpentry industries and, to a lesser degree, livestock production. Insecurity, lack of employment opportunities, and lack of capital were all cited as significant obstacles to obtaining sustainable livelihoods in the surveyed CPAs.

Market access—The survey shows that most households have regular access to markets. The lowest access was found for households in Torit. Yambio has the highest general market access (Table 4.8). Among households with access, nearly all have access to daily markets, except in Yambio, where daily markets are less common. Most markets serve patrons both immediately around the market and beyond. In all CPAs, a small percentage of markets have primarily a regional focus. A sizable proportion of markets in Rumbek, Bor, and, to a lesser extent, Yei serve only the local population.

Table 4.8. Access to market, percent of all households

	Torit	Bor	Wau	Yei	Rumbek	Yambio	Aweil
Access to common open market (% yes)	55	67	66	89	80	94	80
Market operates daily (% yes)	98	97	97	93	95	62	88
Market serves people around and beyond (% yes)	70	44	87	54	18	75	80
Market serves people around or beyond (% yes)							
Local only	27	50	12	37	69	15	15
Regional only	3	7	1	9	13	10	5
Both	70	44	87	54	18	75	80

Source: PfRR survey data

5. RESULTS

5.1 Pillar construction

The factor loadings of the first factor, identified through principal component analysis of the group of variables representing each pillar, can be thought of as the weight of each variable in the overall pillar. Table 5.1 shows the factor loadings and mean values of each variable constituting the Access to Basic Services pillar. Indicators of access to high-quality health care play the most prominent roles in the pillar, followed by indicators related to education and training, with market access making the smallest contribution to the pillar.

Table 5.1. Access to Basic Services, role of variables in pillar estimation

Pillar variables	Factor loadings on first factor	Mean value
Health facility provides free care, 0/1	0.626	0.602
Respondent satisfied with quality of health services, 0/1	0.592	0.547
Time to reach the health facility *	0.388	2.395
Distance to primary school **	0.382	3.463
Participation in vocational training, 0/1	0.244	0.098
Existence of agricultural extension workers, 0/1	0.212	0.120
Access to a common open market, 0/1	0.146	0.769

Source: PfRR survey data analysis
* 0: more than 2 hours; 1: 1–2 hours; 2: 30–59 mins; 3: 15–29 mins; 4: less than 15 mins
** 0: none; 1: 15+ km; 2: 10–14 km; 3: 5–9 km; 4: less than 5 km

A modest majority of households in the research areas have access to a health facility providing free care, and a similar share was satisfied with the quality of care received on the last visit to the health facility. Relatively long travel times to reach health care were the norm, with half of households spending 30 minutes or more to reach the health facility and nearly 20 percent traveling for one hour or more. Two-thirds of households live less than 5 kilometers from a primary school. Access to other types of training is relatively limited—only 10 percent of households reported that a member participated in vocational training, and 12 percent reported knowing extension workers from whom they could obtain advice on agricultural production. Over three-quarters of households reported having access to a common open market to buy and sell goods.

The Assets pillar (Table 5.2) is constructed from the predicted numbers of specific assets the household owns, based on asset holdings of similar households in the more detailed FAO-WFP dataset. The predicted number of tables owned by households makes the largest contribution to the pillar, followed by the predicted numbers of cell phones and beds. As demonstrated by the low mean values for each indicator, the majority of households were predicted not to own these assets. This is particularly the case for cell phones. Only about one-quarter of households were expected to own at least one table or at least one bed.

Table 5.2. Assets, role of variables in pillar estimation

Pillar variables	Factor loadings on first factor	Mean value
Tables, predicted number	0.983	0.508
Cell phones, predicted number	0.855	0.138
Beds, predicted number	0.685	0.656

Source: PfRR survey data analysis

Access to remittances from within and from outside South Sudan made equal contributions to the Social Safety Nets pillar (Table 5.3). Overall, access to remittances is relatively low—only 8 percent of households receive remittances from within the country and 3 percent from abroad.

Table 5.3. Social Safety Nets, role of variables in pillar estimation

Pillar variables	Factor loadings on first factor	Mean value
Access to remittances from South Sudan, 0/1	0.596	0.081
Access to remittances from outside South Sudan, 0/1	0.596	0.030

Source: PfRR survey data analysis

The variables that contribute the most to the Adaptive Capacity pillar are those concerned with the agricultural activities: the number of agricultural livelihood activities and the number of crops planted (Table 5.4). The number of nonagricultural livelihood activities, access to information to warn about natural disasters, and the number of formal employers make smaller contributions to the pillar, while the educational attainment of the household head makes a negative contribution. [5]

Table 5.4. Adaptive Capacity, role of variables in pillar estimation

Pillar variables	Factor loadings on first factor	Mean value
Agricultural livelihood activities, number	0.708	2.974
Crop types planted in 2018, number	0.686	2.794
Nonagricultural livelihood activities, number	0.493	1.436
Access to information to warn about natural disasters, 0/1	0.250	0.075
Formal employers, number	0.062	0.368
Educational attainment of household head *	-0.008	1.273*

Source: PfRR survey data analysis
* 0–None; 1–Primary or khalwa; 2–Secondary; 3–Certificate; 4–Diploma; 5–First degree; 6–Postgraduate

On average, surveyed households were involved in three different agricultural livelihood activities, with the most common being cultivation of crops, such as sorghum, maize, sesame, vegetables, and legumes, and livestock production, including goats, poultry, and cattle. Households planted an average of just under three crop types. The majority of households also pursued nonagricultural livelihood activities in addition to agricultural activities. The most common nonagricultural activities included firewood collection, petty trade, alcohol brewing, and casual labor. Most households did not have access to information on emergencies. Over half of household heads, 57 percent, reported not having received any education, while one-third reported having advanced as far as the Certificate level.

Although not used in our analysis to estimate households' resilience capacity, principal component analysis (PCA) was also used to construct pillars representing the quality of governance, the strength of institutions, and exposure to conflict. We use these in our examination later of what factors may determine the predicted resilience capacity of households.

Respondents were asked to rank the quality of the government's efforts in a variety of areas, including ensuring access to food and jobs, keeping prices low, and improving basic services, including health and education. Respondents' perceptions of the quality of governance in resolving conflict and providing health services and water and sanitation carried the most weight in the overall Governance score, followed by variables related to other education and to prices (Table 5.5). Efforts in the areas of national defense, HIV/AIDS, and providing electricity played the smallest roles in the construction of the score.

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5 This negative contribution is an artifact of the PCA methodology used to construct the pillar. It reflects negative correlations between the educational attainment of the household head and other pillar variables. It should not be understood as indicating that educational attainment harms adaptive capacity or resilience capacity. However, any positive contributions of education are not measured here.

Table 5.5. Governance, role of variables in score construction

Pillar variables	Factor loadings on first factor	Mean value
Conflict	0.671	2.468
Health services	0.647	2.418
Water and sanitation	0.640	2.325
Education	0.613	2.580
Prices	0.604	2.001
Crime	0.599	2.429
Jobs	0.595	1.731
Food	0.575	1.899
Corruption	0.556	1.915
Roads and bridges	0.550	1.882
Defense	0.480	2.978
HIV/AIDS	0.460	2.568
Electricity	0.449	1.710

Source: PfRR survey data analysis
Note: Variables measure respondents' ratings of the quality of the government's efforts in each area, ranging from 1 (very poor) to 5 (very good).

Rankings of the government's efforts from 1 (very poor) to 5 (very good) averaged between 2.0 and 2.6 for most of the variables that carried stronger weight in the pillar; this corresponds to a medium-to-poor ranking of the quality of government. The highest average ranking was provided for the government's efforts regarding national defense, while efforts to provide electricity received the lowest average ranking.

The number of organizations that households listed as supporting the community and the number of institutions listed as affecting households' daily lives made the largest contributions to the score on Institutions (Table 5.6). The presence of a traditional leader in the community or local area also contributed to the pillar.

Table 5.6. Institutions, role of variables in score construction

Pillar variables	Factor loadings on first factor	Mean value
Organizations supporting the community, number	0.487	1.822
Institutions affecting daily lives, number	0.480	2.222
Presence of a traditional leader, 0/1	0.339	0.778

Source: PfRR survey data analysis

Among indicators of conflict exposure, the number of ways listed by households in which the community has been affected by conflict played the largest role in the construction of the conflict score, followed by the number of ways in which the household is affected by conflict (Table 5.7). The presence of ethnic-based conflict in the past year played the smallest role in the score. On average, households listed 3.5 ways in which their communities had been affected by conflict and 2.9 ways in which the household had been affected. Only one-eighth of households reported the presence of ethnic-based conflict in the past year.

Table 5.7. Conflict, role of variables in score construction

Pillar variables	Factor loadings, Factor 1	Mean value
Ways in which community is affected by conflict, number	0.813	3.452
Ways in which household is affected by conflict, number	0.787	2.940
Presence of ethnic-based conflict in past 12 months, 0/1	0.366	0.127

Source: PfRR survey data analysis

Approximately one-third of surveyed households were headed by a woman. Figure 5.1 shows there are modest differences in average pillar scores and predicted food security outcomes between male-headed and female-headed households. Female-headed households showed slightly higher scores for the Access to Basic Services and Social Safety Nets pillars, and moderately lower scores for the Assets and Adaptive Capacity pillars. Institutions, governance, and conflict scores are slightly higher among female-headed households. Female-headed households had lower predicted values for four of the five food security outcome variables.

Figure 5.1. Average pillar scores and food security outcomes for female- and male-headed households
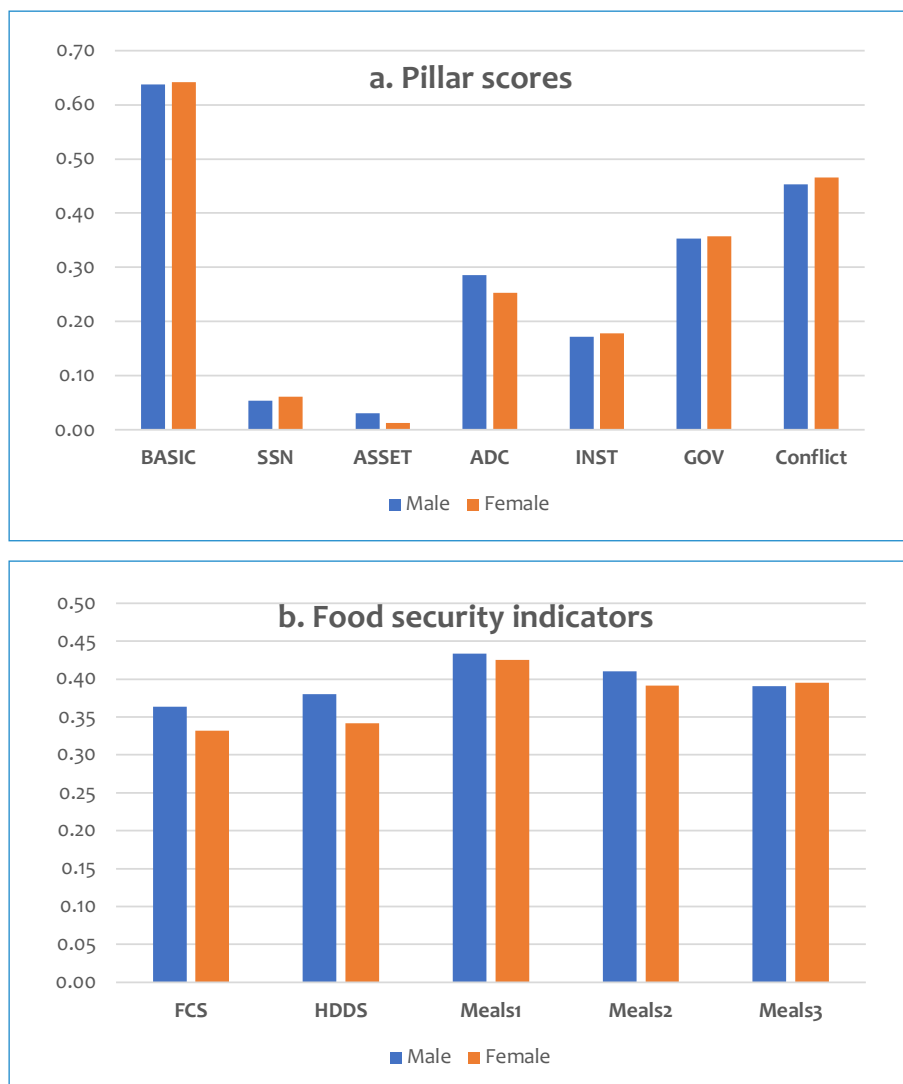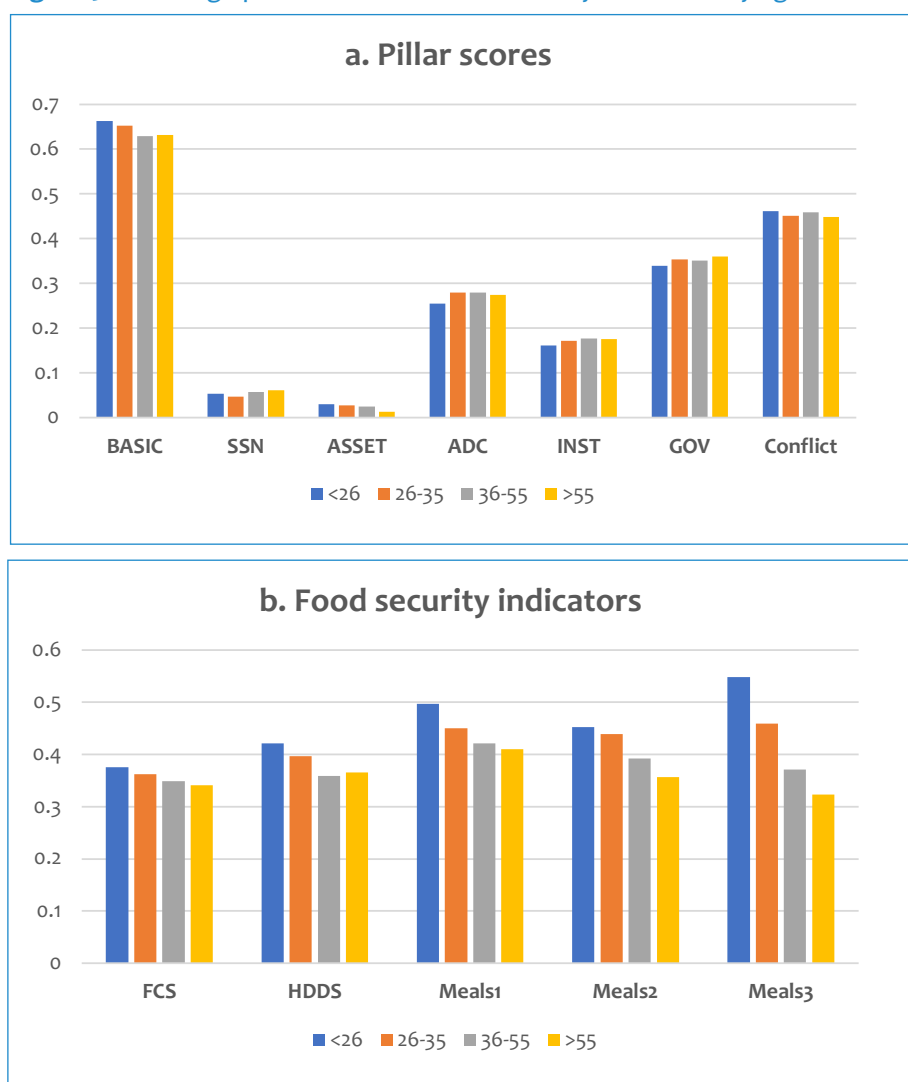

Source: Authors, from modeling results
Note: BASIC—Access to Basic Services; SSN—Social Safety Nets; ASSET—Assets; ADC—Adaptive Capacity;
INST—Institutions; GOV—Governance;
FCS—Food Consumption Score; HDDS—Predicted Household Dietary Diversity Score;
Meals1—Predicted per capita number of cooked meals consumed the previous day by children over 12 and adults;
Meals2—Predicted per capita number of cooked meals consumed the previous day by children aged 6 to 12 years;
Meals3—Predicted per capita number of cooked meals consumed the previous day by children aged 2 to 5 years.

Nearly half of household heads are 36 to 55 years old; just over one-quarter are over 55, and just under one-quarter are between 26 and 35. Six percent of households have a head aged 25 years and under. Trends regarding the pillar scores by age show that households with the youngest heads have the highest scores on the Access to Basic Services and Assets pillars, but the lowest on the Adaptive Capacity pillar (Figure 5.2). Households with younger heads also had lower scores for the institutions and governance variables. The patterns between the age of the household head and the Social Safety Nets pillar and the conflict score are mixed. However, a clear pattern emerges on food security outcomes by age of household head, with households with younger heads having higher predicted values on food security indicators on average, and households with older heads showing progressively lower predicted values on average.

Figure 5.2. Average pillar scores and food security outcomes by age of household head

a. Pillar scores

Categories: BASIC, SSN, ASSET, ADC, INST, GOV, Conflict
Legend: ■ <26 ■ 26-35 ■ 36-55 ■ >55

b. Food security indicators

Categories: FCS, HDDS, Meals1, Meals2, Meals3
Legend: ■ <26 ■ 26-35 ■ 36-55 ■ >55

Source: Authors, from modeling results
Note: BASIC—Access to Basic Services; SSN—Social Safety Nets; ASSET—Assets; ADC—Adaptive Capacity;
INST—Institutions; GOV—Governance;
FCS—Food Consumption Score; HDDS—Predicted Household Dietary Diversity Score;
Meals1—Predicted per capita number of cooked meals consumed the previous day by children over 12 and adults;
Meals2—Predicted per capita number of cooked meals consumed the previous day by children aged 6 to 12 years;
Meals3—Predicted per capita number of cooked meals consumed the previous day by children aged 2 to 5 years.

5.2 Resilience capacity estimation results

The results of the structural equation model step in implementing the RIMA-II methodology are presented in Table 5.8. As expected, the estimated resilience capacity score positively affects all five food security measures. Resilience capacity has stronger impacts on dietary diversity, as measured by the FCS and HDDS, than on quantities of food consumed. Each of the four pillars positively affects the resilience capacity score, with the strongest effects from the Assets pillar.

Table 5.8. Resilience capacity structural equation model results

	(1)	(2)	(3)	(4)	(5)	(6)
	RES	**FCS**	**HDDS**	**Meals1**	**Meals2**	**Meals3**
BASIC	0.051***					
SSN	0.066***					
ASSET	0.300***					
ADC	0.049***					
RES		1.000	1.201***	0.486***	0.453***	0.771***
Constant		0.295***	0.305***	0.401***	0.371***	0.344***
Observations	4,200	4,200	4,200	4,200	4,200	4,200

LR test of model vs. saturated: chi2(21) = 3773.29, Prob > chi2 = 0.0000.
Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Source: PfRR survey data analysis
Note: Pillar variables are expressed as indices ranging from 0 to 1. BASIC—Access to Basic Services;
SSN—Social Safety Nets; ASSET—Assets; ADC—Adaptive Capacity; RES—Predicted resilience capacity;
FCS—Food Consumption Score; HDDS—Predicted Household Dietary Diversity Score;
Meals1—Predicted per capita number of cooked meals consumed the previous day by children over 12 and adults;
Meals2—Predicted per capita number of cooked meals consumed the previous day by children aged 6 to 12 years;
Meals3—Predicted per capita number of cooked meals consumed the previous day by children aged 2 to 5 years.

Table 5.9 presents the average resilience capacity score by CPA, religion, and sex and age of the household head. The resilience score is first normalized so all values fall between 0 and 1. There are considerable differences in estimated resilience capacity among the CPAs, ranging from 0.647 in Bor to 0.161 in Rumbek East. Differences in other dimensions are less dramatic, but apparent, nonetheless. Anglican households showed higher resilience scores than the mean, while Catholic, Pentecostal, and Muslim households showed lower scores. As reflected by their better performance on food security indicators (Figures 5.1 and 5.2), male-headed households and households with younger heads had higher resilience scores than households with female or older heads.

**Table 5.9.** Estimated resilience capacity by household characteristic

Characteristic	Estimated resilience	Characteristic	Estimated resilience
All households	0.403	**Religion**	
Candidate Partnership Areas		Anglican	0.475
Bor	0.647	Adventist	0.404
Yei	0.464	Catholic	0.368
Torit	0.431	Pentecostal	0.356
Yambio	0.394	Muslim	0.314
Wau	0.314	**Age of head of household**	
Aweil	0.299	25 years or younger	0.451
Rumbek East	0.161	26 to 35 years	0.425
Sex of head of household		36 to 55 years	0.394
Male	0.413	56 years or older	0.387
Female	0.382		

Source: PfRR survey data analysis
Note: Average resilience capacity scores are expressed as indices ranging from 0 to 1.

To estimate the response of resilience capacity to the change in each pillar, we compute the elasticity of the resilience capacity score with respect to each pillar (Figure 5.3). Elasticities are positive for all pillars, and highest for Access to Basic Services—a one percent increase in this pillar value can be expected to increase the resilience capacity score by 0.58 percent. Increases in the Adaptive Capacity, Assets, and Social Safety Nets pillars increase the score by 0.24 percent, 0.12 percent, and 0.07 percent, respectively.

**Figure 5.3.** Elasticities of resilience capacity with respect to pillar values
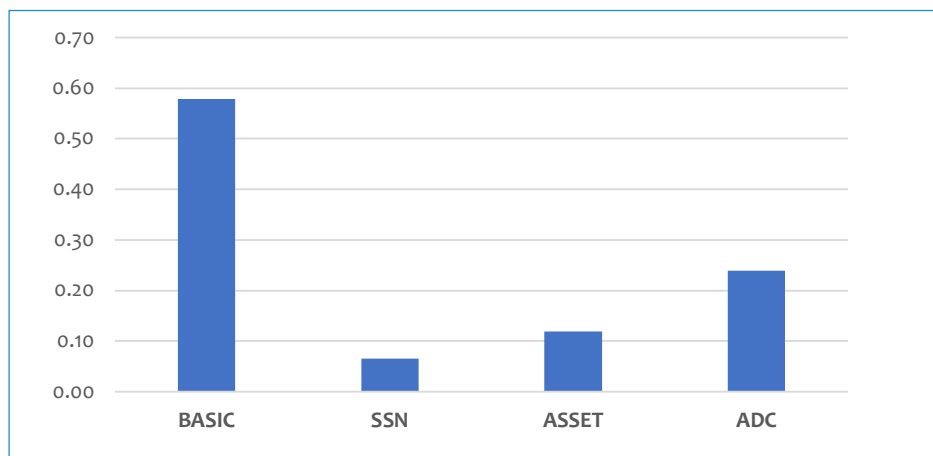
Source: Authors, from modeling results
Note: BASIC—Access to Basic Services; ASSET—Assets; SSN—Social Safety Nets; ADC—Adaptive Capacity

As expected, the elasticities of food security measures with respect to the resilience capacity score are positive (Figure 5.4). The highest effects are seen on dietary diversity as measured by the HDDS and FCS—an increase of one percent in resilience capacity is expected to increase the HDDS and FCS by 0.18 and 0.16, respectively. Among the diet quantity indicators, the number of meals consumed by the youngest children shows the strongest effects, with an elasticity of 0.11.

Figure 5.4. Elasticities of food security with respect to resilience capacity
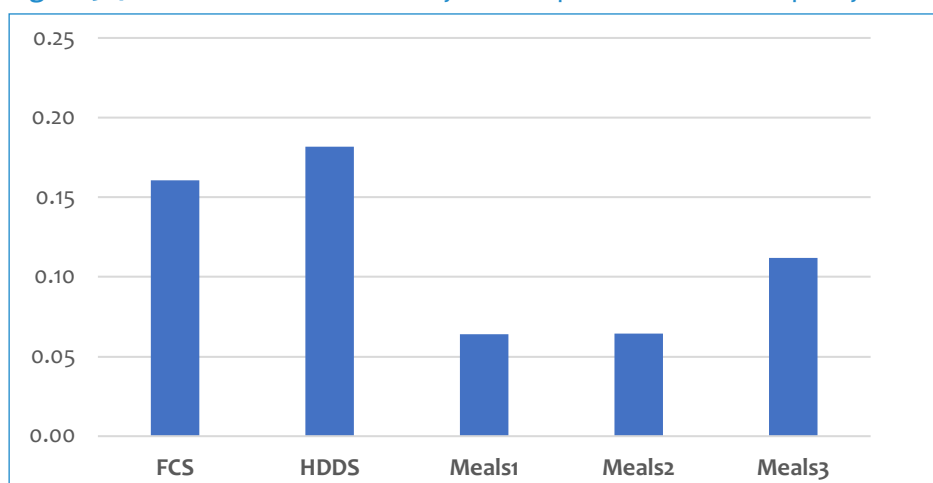
Source: Authors, from modeling results
Note: FCS—Food Consumption Score; HDDS—Predicted Household Dietary Diversity Score;
Meals1—Predicted per capita number of cooked meals consumed the previous day by children over 12 and adults;
Meals2—Predicted per capita number of cooked meals consumed the previous day by children aged 6 to 12 years;
Meals3—Predicted per capita number of cooked meals consumed the previous day by children aged 2 to 5 years.

5.3 Determinants of resilience capacity

To understand the determinants of resilience capacity beyond the pillar variables used to estimate the resilience capacity score, we perform a regression analysis using household characteristics and other variables. The dependent variable is the normalized resilience capacity score which ranges between 0 and 1. The first column of Table 5.10 displays the results of a regression analysis exploring the effects of the gender and age of the household head, the religion of the household, and the CPA in which the household resides on the resilience capacity score. Female-headed households show significantly lower resilience capacity than male-headed households, reflecting these households' worse performance on food security indicators (Figure 5.1). This echoes the findings of previous RIMA analyses in the Karamoja region of Uganda and in Somaliland, which found female-headed households to have lower resilience scores in most areas (FAO 2017; 2018).

Table 5.10. Determinants of resilience capacity

| Variables	(1) RES	(2) RES
Female-headed household, 0/1	-0.0869***	-0.0869***
Household head aged 26-35 yrs., 0/1	-0.0107	-0.0107
Household head aged 36 to 55 yrs., 0/1	-0.0371***	-0.0368***
Household head aged over 55 yrs., 0/1	-0.0623***	-0.0618***
Anglican, 0/1	0.0074*	0.0081*
Pentecostal, 0/1	0.0078	0.0074
Muslim, 0/1	-0.0083	-0.0082
Adventist, 0/1	0.0245	0.0246
Torit, 0/1	0.0875***	0.0850***
Bor, 0/1	0.3010***	0.3010***
Wau, 0/1	-0.0365***	-0.0384***
Yei, 0/1	0.1110***	0.1100***
Rumbek East, 0/1	-0.1940***	-0.1940***
Aweil, 0/1	-0.0497***	-0.0597***
Constant	0.4050***	0.4050***
Institutions		-0.0136
Conflict		-0.0186**
Governance		0.0338***
Observations	3,810	3,810

Source: PfRR survey data analysis

Results for the age of the household head imply that households with older heads tend to show lower resilience capacity than those with younger heads—households with heads aged 36 to 55 years and over 55 years both show significantly lower resilience capacity than the omitted category, households with heads aged 25 years and under. Household religion does not appear to have a strong impact on resilience capacity; only Anglican households show weakly significantly higher resilience capacity than Catholic households, the omitted category.

Geographic location is found to have a highly significant effect on household resilience capacity. This result is not surprising due to considerable differences across the seven study areas in access to services and the level to which humanitarian and development organizations are present. Yambio is the omitted CPA; households in Torit, Bor, and Yei show significantly higher resilience capacity than those in Yambio, with the highest point estimate for Bor. Households in Wau, Rumbek East, and Aweil show significantly lower resilience capacity, with the largest magnitude difference for Rumbek East.

In column 2 of Table 5.10, we add the calculated pillar scores for institutions, governance, and conflict as explanatory variables to the regression. As expected, conflict has a significant negative effect on resilience capacity, while perceived governance quality has a significant positive effect. The coefficient for institutions is not significant.

Figure 5.5. Estimated pathways to food security and resilience—example of Rumbek Candidate Partnership Area
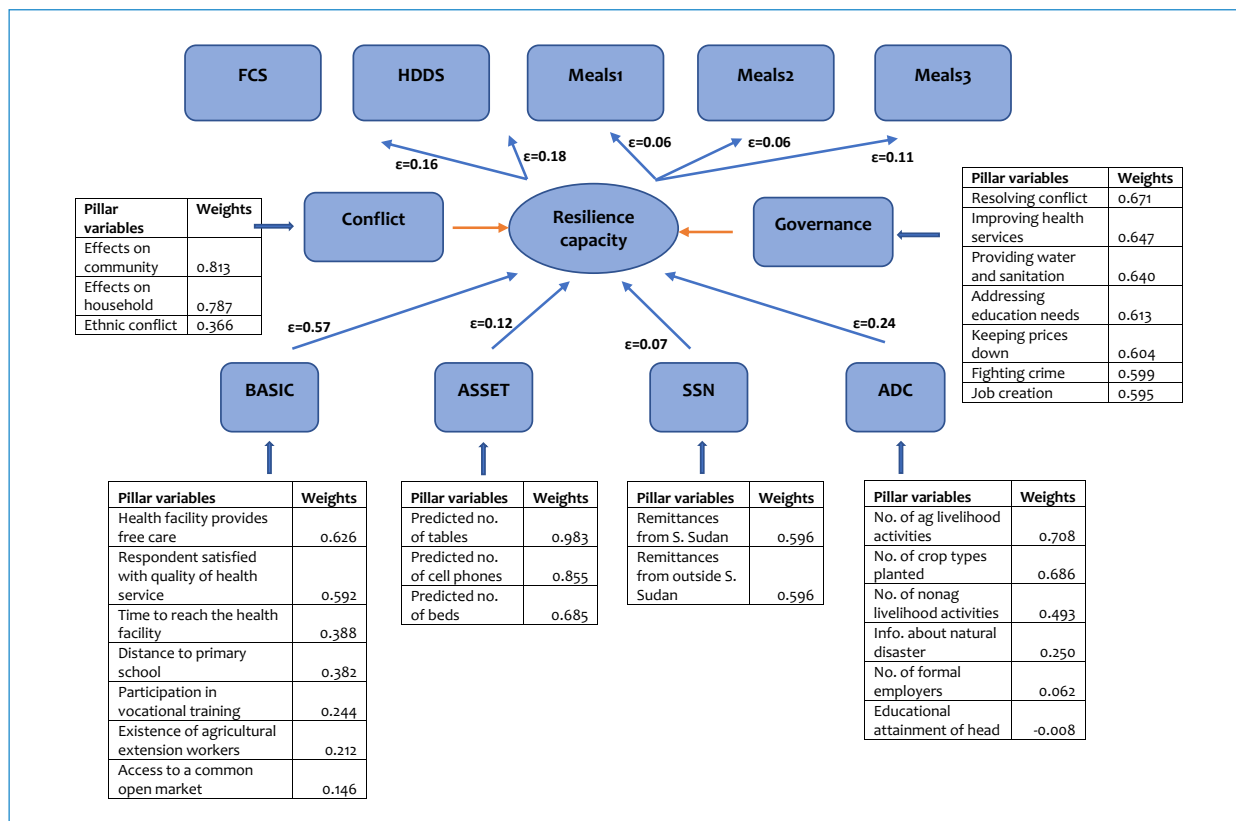
Source: Authors, from modeling results
Note: Only the first seven component variables are shown for the Governance score. ε signifies the elasticities of resilience capacity with respect to pillar values or the elasticities of food security with respect to resilience capacity.
BASIC—Access to Basic Services; ASSET—Assets; SSN—Social Safety Nets; ADC—Adaptive Capacity;
FCS—Food Consumption Score; HDDS—Predicted Household Dietary Diversity Score;
Meals1—Predicted per capita number of cooked meals consumed the previous day by children over 12 and adults;
Meals2—Predicted per capita number of cooked meals consumed the previous day by children aged 6 to 12 years;
Meals3—Predicted per capita number of cooked meals consumed the previous day by children aged 2 to 5 years.

As an example, Figure 5.5 shows graphically the complete pathway to resilience and food security for households in Rumbek, based on the RIMA estimation results. The listed variables define the number, magnitude, and nature of pathways that policymakers and development partners should consider when planning to improve food security in Rumbek by increasing household resilience.

6. CONCLUDING REMARKS

Household surveys and focus group discussions conducted for this research in 2018 confirm that food insecurity is a real and ubiquitous risk in South Sudan. Most households in the targeted seven partnership areas experienced a period in the previous 12 months during which they had insufficient food. Civil war and conflict are the main drivers of food insecurity in most of the seven counties studied, followed by climate shocks, like drought and significant flooding.

Among the partnership areas, households in Bor were found to have the highest predicted resilience capacity index, while those in Wau had the lowest. Households in Wau have low access to social safety nets, including both informal borrowing arrangements and formal cash transfers. This may be attributed to sustained insecurity and consequent restrictions on movement and limited humanitarian support since 2016, resulting in a relatively significant depletion of livelihoods for households there. From the July 2016 crisis to the end of 2017, most areas of Wau County were not accessible.

In addition to area-specific factors, the results also point to the gender and age of the head of household, conflict prevalence, and governance quality as other key drivers of resilience. Female-headed households tend to have a lower degree of resilience compared to their male counterparts. Households with younger heads have higher resilience capacity indices than households with older heads. As expected, an increase in conflict prevalence has the potential to reduce resilience significantly. Several respondents complained about how conflict has led to schools closing, raising the costs of education, depleting remote communities of quality teachers, and making it difficult for parents to obtain incomes from which to pay school fees.

Often overlooked in resilience-building programs, the quality of local governance is a major driver of community-level resilience—our findings show that higher quality community governance is associated with higher resilience capacity for households in the community. Households in the seven CPAs studied generally have a poor view of the quality of government services—households complained about poor job creation, poor transportation infrastructure, lack of equity in livelihood opportunities, and poverty.

Chiefs, other traditional leaders, and local government agents play the most prominent leadership roles, though their influence varies across areas. NGOs and faith-based organizations also play a modest role in some communities. Households in three counties indicated that traditional leaders play a significantly larger role than political leaders in enabling households to meet their needs.

As expected, resilience positively affects food security (vulnerability), as measured by the predicted HDDS. Across the CPAs, those areas with the highest average resilience capacity—Bor South, Torit, and Aweil North—also have the lowest food insecurity and the highest degree of access to humanitarian resources. At the time of the PfRR survey, Yei and Wau had recently registered high food insecurity due to an escalated conflict situation with limited movement and humanitarian access. This resulted in relatively low predicted resilience capacity indices for households in these counties.

Given the complex nature of the crises facing South Sudan, a broad coalition of continuing support is needed both to address the urgent humanitarian crisis and also to help restore production systems so that communities can cope, recover, sustain, and expand their livelihoods and build their resilience to future shocks and crises. In recognition of this need, PfRR places community institutions at the center of all efforts to build the resilience of livelihoods and production systems across the country. PfRR seeks to support communities in designing models for the provision of integrated humanitarian and development services through community-based delivery mechanisms that will serve as the foundation for their recovery and increased resilience. Such an approach is based on an integrated program framework for resilience, adapted to South Sudan, comprising four pillars:

- Re-establishment of access to basic services;
- Rebuilding trust in people and institutions;
- Restoring productive capacities; and
- Nurturing effective partnerships.

The results of the research presented in this paper demonstrate the importance of these elements in improving the resilience of households in South Sudan, while highlighting the particular importance of providing sufficient and high-quality basic services to achieve this objective.

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AKADEMIYA

Headquarters
Kicukiro/Niboye KK 341 St 22
KIGALI - RWANDA

Mailing address
P. O. Box 1855
kigali-contact@akademiya2063.org

Telephone
📞 +250 788 318 315
📞 +221 33 865 28 81

Website
🌐 www.akademiya2063.org

📘 @AKADEMIYA2063

🐦 @AKADEMIYA2063

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