Food and Agriculture Organization of the United Nations

ANALYSING RESILIENCE FOR BETTER TARGETING AND ACTION

FAO RESILIENCE ANALYSIS REPORT

FOOD AND NUTRITION SECURITY RESILIENCE PROGRAMME IN SOUTH SUDAN

BASELINE REPORT

RESILIENCE INDEX MEASUREMENT AND ANALYSIS II - RIMA II

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ABBREVIATIONS AND ACRONYMS

ABS	access to basic services
AC	adaptive capacity
AST	assets
CSI	Coping Strategy Index
FAO	Food and Agriculture Organization of the United Nations
FCS	Food Consumption Score
FHH	female-headed households
FIES	Food Insecurity Experience Scale
FNS-REPRO	Food and Nutrition Security Resilience Programme
GAP	good agricultural practices
HDDS	Household Dietary Diversity Score
IPC	Integrated Food Security Phase Classification
M&E	monitoring and evaluation
MEAL	monitoring, evaluation, accountability and learning
MHH	male-headed households
NGO	non-governmental organization
PSU	primary sampling unit
RAP	Resilience Analysis and Policies
RCI	Resilience Capacity Index
rCSI	Reduced Coping Strategy Index
RIMA	Resilience Index Measurement and Analysis
RTEA	Resilience Team for Eastern Africa
SSN	social safety net
SSP	South Sudanese pound
SSU	secondary sampling unit
ToC	Theory of Change
TLU	tropical livestock units
UN	United Nations
USD	United States Dollar
WUR	Wageningen University & Research

EXECUTIVE SUMMARY

The Food and Nutrition Security Resilience Programme (FNS-REPRO), funded by the Government of the Netherlands through FAO, is a four-year programme of USD 28 million that contributes directly to the operationalization of the United Nations Security Council Resolution 2417 by addressing the "cause-effect" relationship between conflict and food insecurity in the Republic of South Sudan, the Republic of the Sudan (Darfur) and Somaliland. The programme became operational in October 2019. Its design allows FAO and partners to set examples of building food-system resilience in protracted crises. The programme adopts an innovative area- and livelihood-based approach that looks at the multidimensional threats and risks that communities are exposed to, while identifying and utilizing opportunities for improved livelihood resilience. It focuses on value chains that can contribute to more resilient food systems, resulting in improved food and nutrition security and localized peace dividend. These value chains include fodder (Somaliland), seeds (South Sudan) and gum Arabic (the Sudan – Darfur). Activities for FNS-REPRO are built around these value chains.

This report acts as a baseline for the FNS-REPRO project for South Sudan. The purpose of the current study is two-pronged. The first is to collect baseline values for the identified project indicators, which will be tracked over time and used to establish the impact of the project. The second is to identify and document lessons learned that will help in continuously realigning the current project's theory of change and assist in defining and designing similar food security projects in the future, in South Sudan and in other parts of the world with similar contexts. In this regard, the baseline study was structured around the project indicators that can be measured at household level as well as indicators that will be used to estimate household resilience capacity. Estimation of the household resilience capacity is done using the FAO RIMA-II tool (FAO, 2016). Overall, the study employed a panel design with both intervention and comparison households.

The roll-out of the project activities in the seven target locations is in the form of a phased approach that started with Yambio and Torit counties in 2020, extending to Aweil, Bor and Wau counties in 2021 and Renk and Akobo in 2022. The current baseline survey focused on Yambio and Torit counties, the first areas of the project roll-out. The data collection covered about 600 households from the two counties (407 treatment and 192 control) in October 2020. A team comprising FAO staff together with external enumerators from the roster in Torit and Yambio field offices participated in the exercise. The enumerators were trained for two days in mobile data-collection techniques (implemented using Kobo Collect), systematic discussion of the questionnaire and the basics of FAO's Resilience Index Measurement and Analysis (RIMA) methodology facilitated by FAOSS Monitoring and Evaluation (M&E) and RIMA experts from RTEA and South Sudan.

MAIN FINDINGS IN BRIEF

The average household resilience capacity is estimated at 35. There is no significant variation between the treatment (35.3) and control (35.2) groups. Female-headed households have a lower resilience capacity (32.6) than male-headed households (36.7). Among the counties, Ikotos and Yambio had the highest resilience capacities (41 and 40 respectively), followed by Torit (38), Ibba (35), Magwi (33) and Nzara, with a Resilience Capacity Index (RCI) of 30. Adaptive capacity and assets contribute most to the resilience capacity of the beneficiary households, while access to basic services had the least contribution to the RCI. Participation in multiple sources of income and cultivation of multiple crops were the most important determinants of adaptive capacity. Size of land cultivated and ownership of agricultural assets were the main drivers of the asset pillar.

Based on the Integrated Phase Classification (IPC) analysis period of October to November 2020, an estimated 6.35 million people (52.6 percent of the population) faced Crisis (IPC Phase 3) or worse acute food insecurity, of which 2.102 million people faced Emergency (IPC Phase 4) acute food insecurity. In the first projection period of December 2020 to March 2021, an estimated 5.82 million people (48.3 percent of the population) will likely face Crisis (IPC Phase 3) or worse acute food insecurity, with 11 000 people likely to be in Catastrophe (IPC Phase 5) acute food insecurity in Pibor County in Pibor Administrative Area. During this period, an estimated 1.79 million people are likely to face Emergency (IPC Phase 4) acute food insecurity. In the second projection period of April to July 2021, an estimated 7.24 million people (60 percent of the population) are likely to face Crisis (IPC Phase 3) or worse acute food insecurity. Food Insecurity Experience Scale (FIES) analysis is ongoing, with its findings reflected in the final report. This will provide the percentage of food-insecure households (experiencing moderate or severe food insecurity). About 17 percent of the households have acceptable food consumption as measured by the Food Consumption Score (FCS), while 40 percent have borderline food consumption. The Household Dietary Diversity Score (HDDS) stands at six, which means that the households consumed about six food groups during the 24 hours preceding the survey.

An evaluation of the determinants of household food security status through a regression analysis using the FCS and HDDS as dependent variables, shows that asset ownership measured by the household non-productive assets and agricultural inputs as well as transfers and the number of income sources were positively and significantly associated with both FCS and HDDS.

The main shocks that undermine food security in the study area are crop failure and poor harvests (42 percent), livestock diseases and death (36 percent), serious illness and death of household heads (30 percent) and unemployment and shortage of food within the household (26 percent).

The three main sources of household income are agriculture and sale of cereals, vegetables and other crops (93 percent), casual labour related to agriculture (36 percent) and casual labour related to non-agricultural activities (22 percent).

The average size of land cultivated by the surveyed households during the last season preceding the survey was about one hectare. Households cultivated an average of three crops including maize (89 percent), cassava (63 percent) and groundnuts (62 percent) as the most frequently mentioned crops cultivated in the last season. Cultivation of indigenous crop varieties was relatively low. For instance, about 10 percent of the households reported cultivation of local vegetables, while about six percent cultivated sweet potatoes.

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1 INTRODUCTION

The rationale for the baseline study is to conduct preliminary implementation measurement of the results indicators outlined in the logical framework to serve as a guide for project implementation and as a basis against which the level of attainment of milestones and targets will be measured during reviews, results assessment and impact evaluation. Furthermore, the survey targeted both the treatment group (actual beneficiaries targeted by the intervention) and control group (households that will not benefit directly from the intervention). The results for both groups are disaggregated and comparisons are made at the inception and conclusion of the intervention to assess the change.

Despite abundant resources, South Sudan is a disaster-prone country that has experienced a range of protracted crises over the last several decades, which have resulted in population displacement and disruption of livelihoods. As per the December 2020 release of the Integrated Food Security Phase Classification (IPC) for the October to November 2020 period, more than half of South Sudan's population were severely food insecure because of ongoing violent conflict, political instability and economic crisis.

FNS-REPRO is the first programme in Eastern Africa specifically designed to foster peace and food security at scale – through a multi-year livelihood- and resilience-based approach – in some of the least stable regions where interventions are normally of a humanitarian programming nature exclusively. Its design allows FAO and its partners to set examples of building food system resilience in protracted crises.

The programme adopts an innovative area- and livelihood-based approach that looks at the multidimensional threats and risks that communities are exposed to, while identifying and utilizing opportunities for improved livelihood resilience. FNS-REPRO will promote coordination with relevant stakeholders involved in targeted areas to reach collective outcomes between multisectoral humanitarian and development interventions.

The project impact is to improve food and nutrition security and capacity of households, within their livelihoods, to withstand and adapt to shocks. The project outcome is that resilient livelihoods and food systems contribute to sustainable localized peace. This will be achieved through improved inclusive access to and management of local natural resources; improved livelihood and income opportunities along selected value chains; enhanced knowledge, skills and capacity of local communities around nutrition-sensitive livelihood support; and established and implemented learning mechanisms that reinforce field activities and facilitate improved policy and practice on food system resilience.

1.1 OBJECTIVES OF THE FNS-REPRO BASELINE SURVEY

The purpose of the assessment is to conduct a baseline measurement of the results indicators listed in the logical framework. It is a first step in the impact-evaluation methodology designed to evaluate this initiative. Mid- and end-term surveys for monitoring the resilience capacity of households and the extent to which the project will be achieving its intended results (outcome and outputs) among the target beneficiaries will follow. The assessment will also contribute to an increased understanding of the impact of the project on the livelihoods of communities within and beyond project areas. Additionally, the baseline survey results will be used to assess if the Theory of Change (ToC), especially assumptions on which it has been developed, the context, targeting strategies, opportunities for partnership, learning agenda and plans are still valid or if they would require adjustment within an adaptive management framework.

2 BASELINE METHODOLOGY

The baseline survey used the RIMA model developed by FAO. This methodology systematically explores the relationship between selected household-level variables of resilience to construct the Resilience Capacity Index (RCI) based on the four pillars of resilience (assets, social safety nets, adaptive capacity and access to basic services) and well-being outcome (food security indicators). The RCI measures a household's capacity to withstand stresses and shocks that have long-lasting effects. The RCI provides a useful baseline to inform or validate targeting decisions. Furthermore, it can be used as a ranking tool to identify households that are most at risk and identify the specific weaknesses that increase vulnerability. In addition, the methodology explains how much each pillar contributes to resilience capacity and how each observed variable contributes to its pillar. Through this information, the theory of change, targeting and implementation strategy can be examined and selected indicators of the project including food consumption score, household dietary diversity, coping strategy and RCI can be calculated.

Data collection was conducted for both 'treatment (intervention)' and 'comparison' groups, which were the targeted beneficiaries for the project interventions targeting the livelihoods in the selected areas of Torit, Magwi, Yambio and Nzara.

2.1 SAMPLING STRATEGY

The Primary Sampling Units (PSU) were the Payams, while the Secondary Sampling Units (SSU) were the villages from which around 600 households were derived for the survey. The households were then classified by intervention status – those that receive full intervention/beneficiaries and those that do not receive interventions. The intervention groups were sampled randomly from the beneficiary lists derived from the project's implementation locations, while the non-intervention groups were randomly sampled from different communities with similar characteristics as the treatment groups to minimize spillover of the benefits. Table 1 shows the distribution of sampled households by location and sample type.

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Table 1: Sample size

County	Sampling type		Sample size
	Control	Treatment	Total number of households interviewed
Magwi	27	158	185
Nzara	44	77	136
Torit	44	77	121
Yambio	25	135	160
Overall	**140**	**447**	**602**

2.2 MAIN LIMITATIONS

The team faced some challenges during and after the data collection process. The data collection process, including training, had to be postponed several times due to restrictions on travel and gatherings related to COVID-19. It is usually recommended to have a data validation workshop with the enumerators immediately after data collection is finalized to check on any inconsistencies in the dataset. This data validation exercise was not undertaken as during the time of data collection and after data collection was concluded, physical meetings were not allowed during the COVID-19 pandemic and movement curfews had been imposed. However, the data analysts held virtual meetings with the data collection supervisors and FAO field officers and made clarifications in data that seemed inconsistent.

3 BASELINE RESULTS

3.1 BASIC DESCRIPTIVE STATISTICS

DEMOGRAPHICS

i Household size

The average household size is eight members, generally comprised of four females and four males. The distribution is the same for both the treatment and control groups as shown in Table 2. A similar distribution is observed when comparing male-headed households and female-headed households.

Table 2: **Household size**

Sample type	Members female	Members male	Total household size
Control	3.654	3.898	7.551
Treatment	3.705	4.118	7.823
Overall	**3.694**	**4.071**	**7.766**

ii Dependency ratio

The dependency ratio is the number of dependants in a population divided by the number of working-age people. Dependants are defined as those aged zero to 14 and those aged 65 and older. Working age is from 15 to 64 years. The ratio describes how much pressure an economy faces in supporting its non-productive population. The higher the ratio, the greater the burden carried by working-age people. From the sampled households, the median age dependency ratio is estimated at 166, suggesting that for every 100 productive/working community members there are 166 dependants. Female-headed households have a higher dependency ratio (200) than male-headed households (150). There is no difference between the dependency ratio of the beneficiary households compared with the comparison households. Both have a median ratio of 100.

iii Average level of education in years

Nearly 35 percent of the respondents did not complete primary education, 29 percent have never been to school, while 10 percent, 9 percent and 4 percent completed primary, secondary or higher than secondary level education respectively. While both male- and female-headed households seem to have the same proportion of respondents who have not completed primary education, a third (39 percent) of female respondents have never been to school compared with male respondents (20 percent). A slightly higher number (15 percent) of male household heads did not complete secondary education compared with female household heads (10 percent), while 13 percent, 11 percent and 5 percent of males completed primary, secondary and higher level than secondary education respectively. Comparing this with female household heads who have completed all three levels of education, there is a slight variation with 6 percent, 7 percent and 3 percent of female respondents completing primary, secondary and tertiary level education (Table 3).

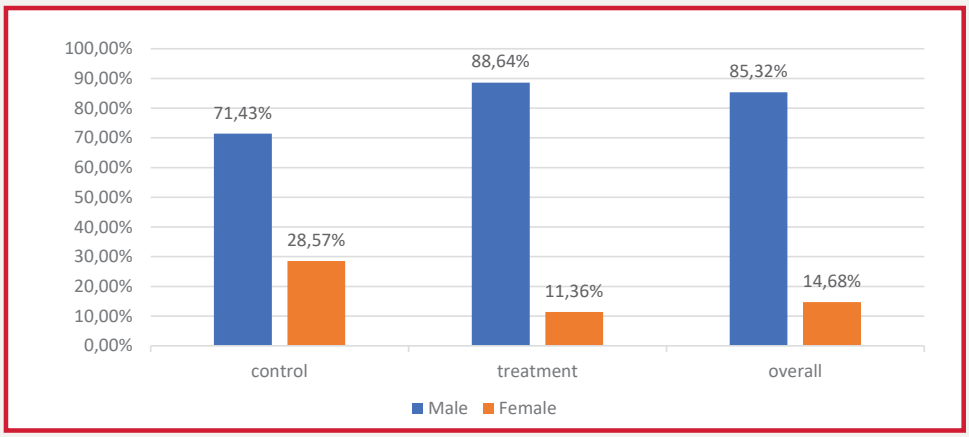
Table 3: Highest formal educational level of the household head

What is the highest formal educational level of the household head?	County					Gender		
	Magwi %	Nzara %	Torit %	Yambio %	Overall %	Female %	Male %	Overall %
Primary incomplete	26	54	35	27	35	36	35	35
None/never been to school	20	21	38	40	29	39	20	29
Secondary school incomplete	20	10	11	9	13	10	15	13
Primary complete	9	5	8	17	10	6	13	10
Secondary school complete	16	8	7	4	9	7	11	9
Higher than secondary	9	2	2	3	4	3	5	4
Overall					**100**			**100**

iv Gender of household head and marital status

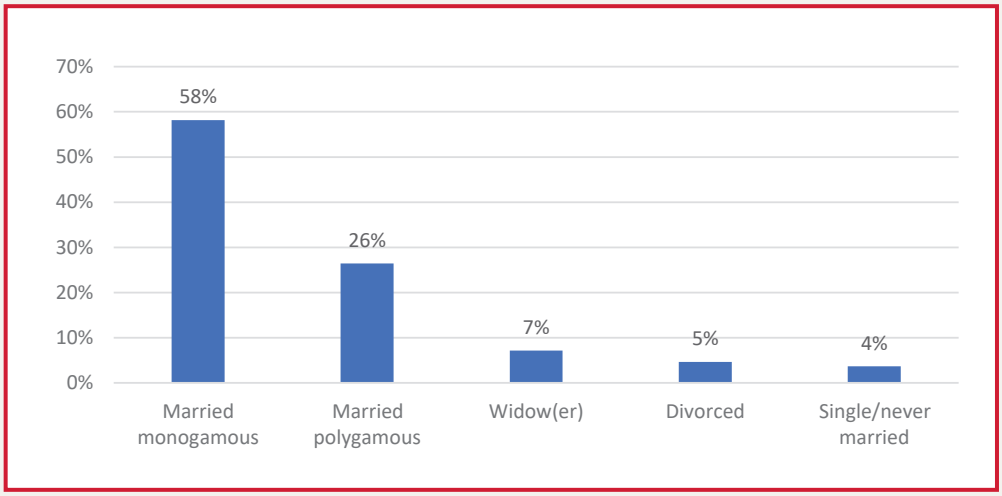
Most of the sampled households (85 percent) were male-headed. There was no significant variation in the gender of the household head across the treatment (89 percent male, 11 percent female) and control (71 percent male, 29 percent female) groups.

Figure 1: Gender of household head



The marital status shows that more than half of the household heads (58 percent) are married and monogamous, 26 percent are married and polygamous, while 16 percent are widow(er)s, divorced or single as illustrated in Figure 2.

Figure 2: Gender and marital status of household head

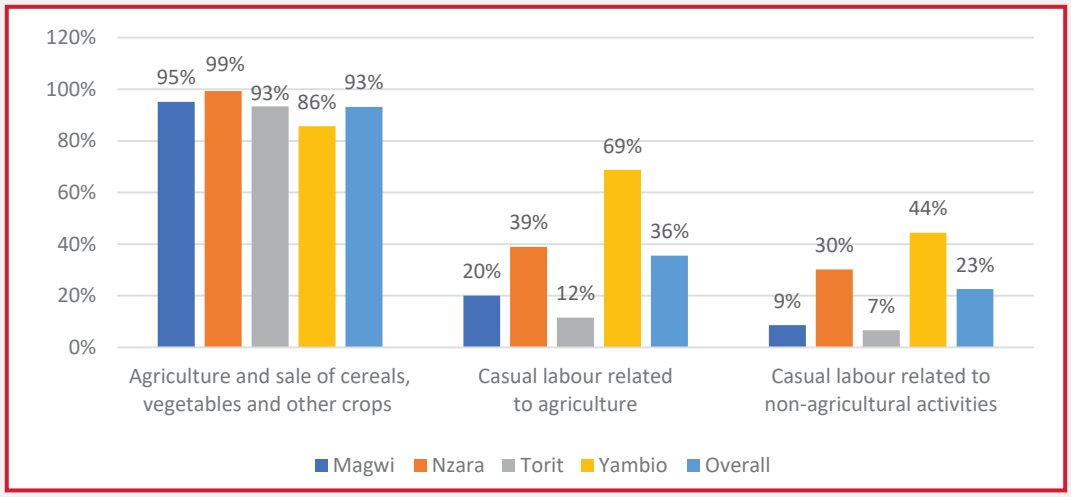


3.2 LIVELIHOOD

3.2.1 MAIN SOURCE(S) OF INCOME

The main sources of household income are sale of agricultural produce and casual labour related to both agriculture and non-agriculture. Disaggregation by counties indicates that more than 90 percent of the households in the four counties reported sale of agricultural produce as their main source of income, 35 percent reported casual labour related to agriculture as a source of household income, while 22 percent reported casual labour related to non-agricultural activities to be a source of household income.

Figure 3: Main livelihood activities



3.2.2 ASSETS AND ACCESS TO BASIC SERVICES

i) Human capital

The study looked at the household's human capital and the knowledge, skills, training and education available to the household. The highest formal education levels for the household head are completion of primary level (10.13 percent), completion of secondary level (9 percent) and completion of tertiary level (4 percent), while three-quarters (77 percent) of the household heads had not been to school or did not complete both primary and secondary education.

Further, the surveyed households reported having some knowledge of improved seed varieties such as high-yielding, high-nutrient content; drought-tolerant seeds (83 percent); cultural practices such as spacing, seedling production and transplantation; and mulching (21 percent). They reported receiving training in good agricultural practices (55 percent), seed production and multiplication (27 percent), natural resource management (14 percent) and participatory land and natural resource management (10.4 percent).

More than half (55 percent) of the respondents received training in good agricultural practices (GAP) in the 12 months preceding the survey. Figure 4 shows the distribution of the GAP-specific trainings received. The most prevalent topics covered in the GAP trainings include land preparation (88 percent), pest and disease control (57 percent), weeding (53 percent), harvesting (39 percent) and seed production (33 percent).

ii) Social capital

The baseline further explored the various social networks and assets that are available to the households in the cattle camps which they can rely on in times of difficulty to prevent them from depleting their assets through the adoption of damaging coping strategies.

Figure 4: GAP trainings received

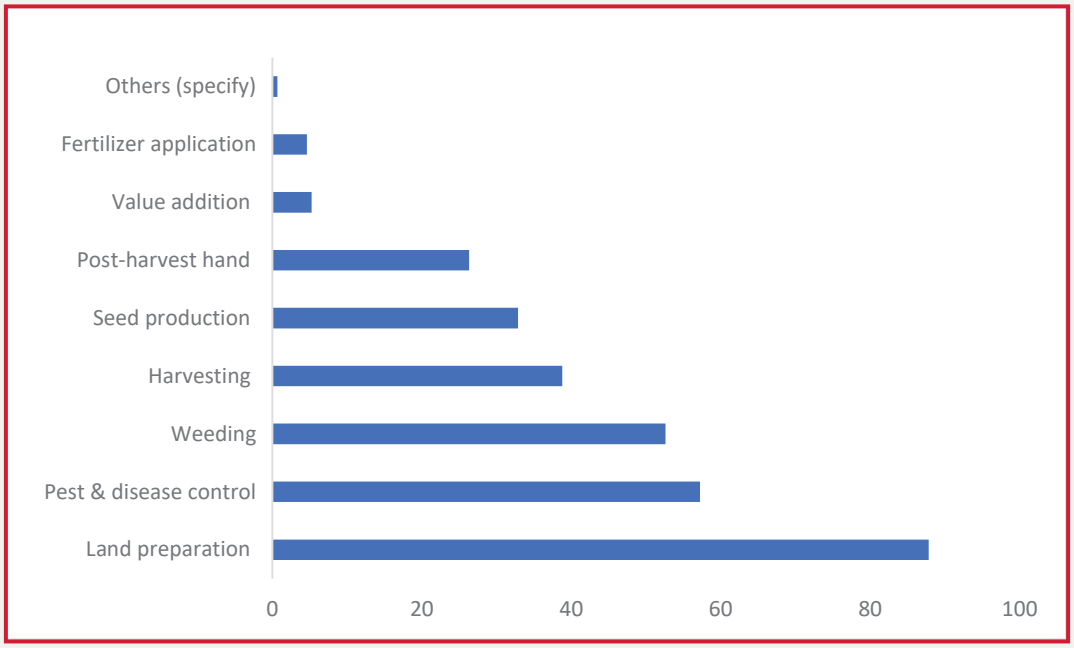
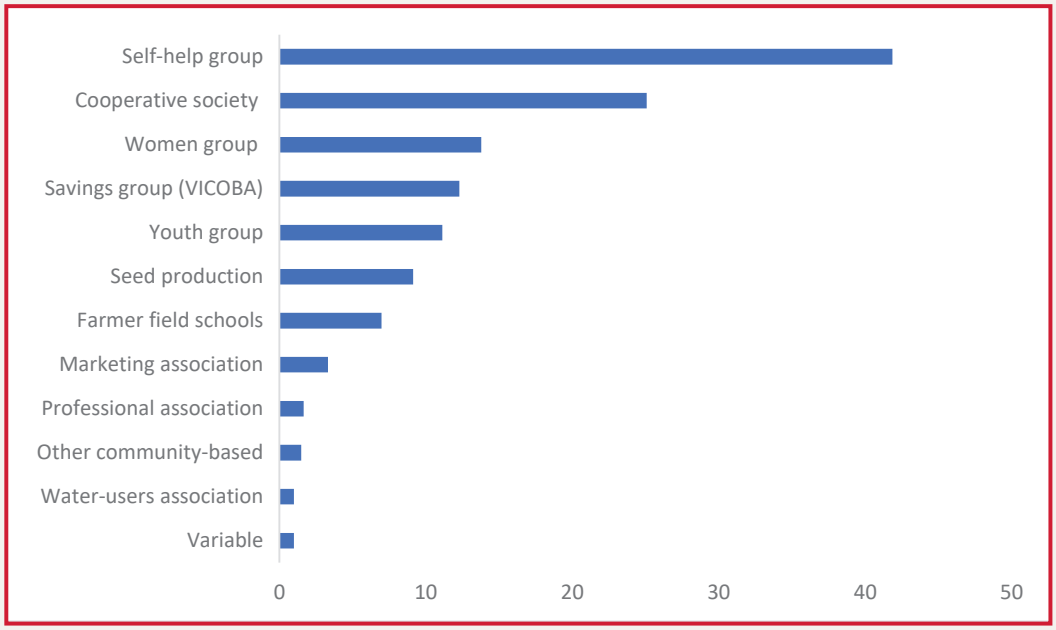


Figure 5: Membership of social groups



As indicated in Figure 5, self-help groups (42 percent), cooperative society (25 percent), women groups (13 percent) and savings groups (12 percent) are among the main networks and groups of which the households are members and on which they can rely in terms of need. Moreover, they have at least one relative, friend or family member on whom they can rely in times of need.

iii) Natural capital

The majority (98.1 percent) of the households have access to land for the cultivation of crops. The average size of land owned is approximately one hectare. The households cultivated an average of three crops in the last season. Maize, cassava and groundnuts are the most frequently cultivated crops and are reported to be used mainly as a source of income and food. Some of the challenges attributed to low cultivation include inadequate quantity of seeds, tools and labour.

Most of the households (89 percent) planted maize, with Nzara and Yambio leading with 96 and 93 percent respectively. Cassava is mostly cultivated in Yambio and Nzara, while sorghum, local vegetables, sesame and green grams are the least cultivated crops in all the areas surveyed. Cultivation of maize, cassava and groundnut in sufficient quantities suggests availability of the seeds in the localities of implementation, preference of the seeds by the locals or suitability of the seeds to the context.

Table 4: Main crops planted last season

Counties	Maize %	Cassava %	Groundnut %	Sorghum %	Local vegetable seeds %	Sesame %	Green grams %
Magwi	88	57	35	28	26	37	38
Nzara	96	84	99	10	17	16	6
Torit	79	23	22	74	31	8	1
Yambio	93	89	96	11	21	24	29
Overall	**89**	**64**	**62**	**30**	**24**	**23**	**21**

The main sources of seeds relied on by the households are own seeds from previous harvests (69 percent), seeds procured in local markets (50 percent), seed assistance from humanitarian agencies including FAO (34 percent) and seeds obtained from social networks (5 percent) such as relatives, friends or neighbours. The seeds are stored in traditional granaries (30 percent), gunny bags (42 percent) or hanging over the fireplace (12 percent). Those who purchase seeds reported sourcing them from within the Bomas (66 percent) or from nearby Bomas within the Payam (24 percent). Over 80 percent of households from Nzara (83 percent) and Yambio (80 percent) reported producing their own seeds, while 50 percent of the respondents from Magwi and Torit reported sourcing their seeds from the local market. From the above findings it is evident that seed production is high in Western Equatoria compared with Eastern Equatoria. Local markets can be accessed for the supply of local seeds in both Eastern (53 percent) and Western Equatoria (45 percent).

Table 5: Main sources of seeds

County	Own seed %	Local market %	Seed aid (NGO/ FAO/RRC) %	Social network (relatives/ neighbours/friends) %
Magwi	65	61	69	7
Nzara	83	43	10	3
Torit	46	45	45	3
Yambio	80	46	6	6
Overall	**69**	**50**	**34**	**5**

iv) Physical capital

Physical capital, including assets, is a key element of livelihoods, enabling households to produce consumable or tradable goods as well as guarantee comfort in life. Moreover, access to assets increases the household's ability to manage and mitigate against assorted shocks (including drought and conflict) as well as smoothing consumption during such periods. Furthermore, access to assets can help households to handle income uncertainties and escape poverty. In this section, two kinds of assets are discussed that are important in the survey area – livestock and productive tools.

Livestock ownership is an important indicator of wealth as well as social status in South Sudan and all households interviewed during the survey reported owning livestock. Half of the respondent households reported ownership of five types of livestock (cow, ox, sheep, goats and chicken).

In terms of household assets, the most frequently owned household assets were chairs, beds and mosquito nets, as illustrated in Figure 6.

The survey revealed that almost all the households owned at least one farm tool/asset, with pangas/hoes (98 percent), axes (58 percent) and slashers (50 percent) being owned the most. Figure 7 shows household ownership of the top six productive assets.

v) Financial capital

Access to credit plays an important role in improving the household's daily productivity, well-being and increase in knowledge and provides an avenue to escape from poverty. Approximately 30 percent of households reported that they have accessed some form of credit in the three months preceding the survey. This number was higher among the treatment group (34 percent) than among the comparison group (25 percent).

Figure 6: Ownership of household assets

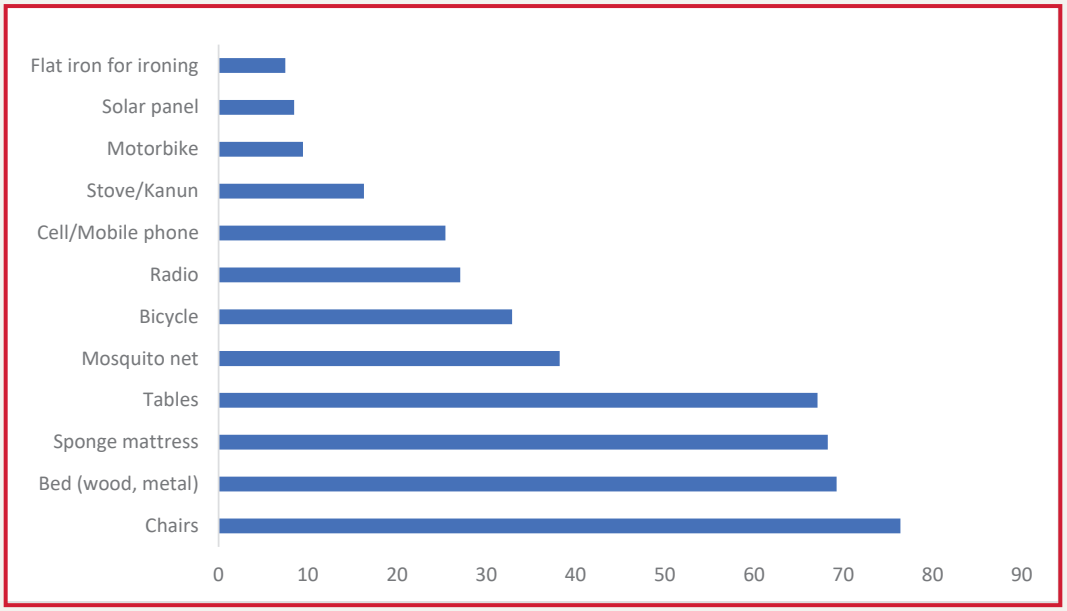
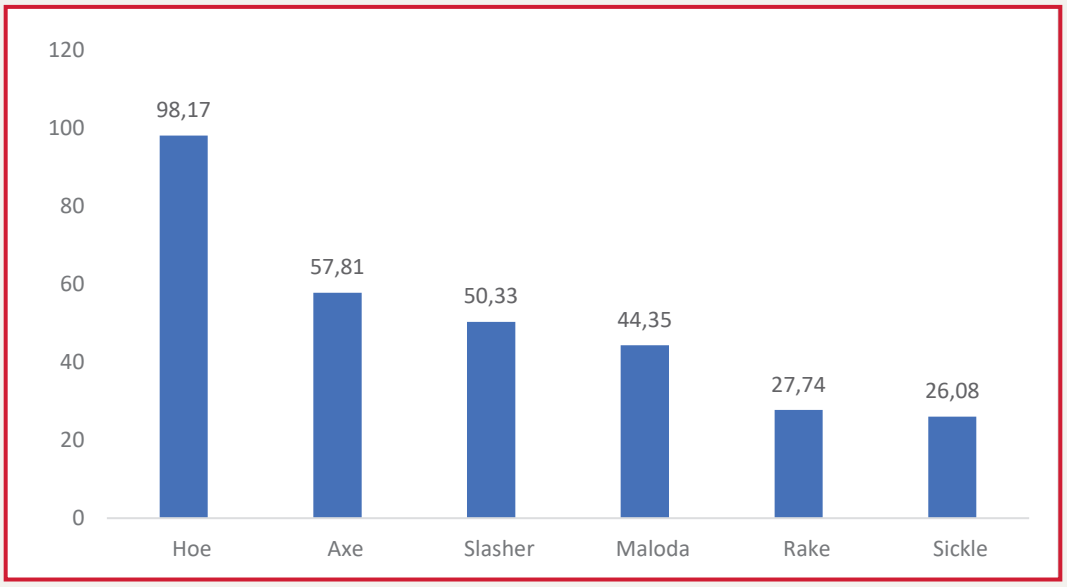


Figure 7: Ownership of productive assets



The three main purposes for seeking credit were the purchase of food (33 percent), access to health care (29 percent) and payment of tuition fees (9 percent). Given that most of the credit is used for daily food consumption and health care needs, the households are likely to sink into deeper levels of poverty and reduce their creditworthiness in their social circles. The sources of the accessed credit were mainly friends, neighbours and relatives (82 percent) and local cooperatives/savings groups (16 percent), an indication of limited access to formal financial services and especially credit.

The assessment explored the types of formal transfers (such as relief food, food for work, cash assistance, livestock support and services, assistance with seeds and tools, beehive support, safety net programmes and fishing support) received in the last 12 months by members of the respondent households from non-governmental organizations (NGOs), United Nations (UN) agencies, civil organizations or government. About 14 percent of the households received assistance from the government, NGO and/or UN in the form of cash transfer(s) (including unconditional cash transfers, cash for work and pension). The average amount of formal in-kind transfers (such as relief food, food vouchers, input subsidies, fuel subsidies and asset transfers) in the last 12 months comes to approximately 14 000 SSP (South Sudanese Pounds).

3.2.3 ACCESS TO BASIC SERVICES VARIABLES

i) Water, hygiene and sanitation

About 40 percent of the surveyed households reported having access to improved water sources. The main sources of drinking water were shallow well/borehole (39.87 percent) and river/stream (39.53 percent). The time taken to collect water (walking from household to main drinking water collection point, waiting there, filling the container and returning home) was estimated at 30 minutes. Approximately two-thirds of the households use covered pit latrines (43 percent use private covered pit latrines and 20 percent use shared covered pit latrines), while 17 percent of the households do open defecation into a bush or stream and 12 percent bury their faeces.

ii) Distance to basic services

The assessment explored access to basic services by asking the respondents for the distance in terms of the minutes it takes a person in the survey area to reach the place where selected services are provided. Table 6 presents the average distance to the selected facility in terms of the time it takes to walk there (one way) in minutes.

Table 6: Average distance to basic services

Basic service/facility	Average distance in minutes		
	Overall	Beneficiaries	Non-Beneficiaries
Primary school	29.6	31.9	24.7
Secondary school	37.8	44.6	23.6
Public/private health facility [smaller and less adequately equipped than a hospital]	35.3	38.1	29.7
Hospital	46.7	52.4	34.9
Crop market	29.2	29.5	28.7
Livestock market	27.2	30.2	20.8
Petty market	24.2	26.7	19.0
Veterinary clinic	30.8	35.7	20.8
Agric/extension services office	28.8	31.8	22.6
Farmer field school training or demonstration plot/ground	24.6	26.9	19.6
Public means of transport	33.7	31.0	39.5
Nearest local government office	41.9	41.2	43.2

3.3 SHOCKS AND COPING STRATEGIES

South Sudan is highly prone to shocks – from economic downturns and conflict-driven crises to natural hazards such as floods, drought and food chain crises owing to outbreaks of crop and animal pests and diseases. The cumulative effect of these shocks, coupled with structural risk factors, exacerbate prevailing food insecurity and undermine agriculture-based livelihoods. Table 7 shows the shocks experienced by households in the 12 months preceding the survey.

Table 7: Relevant shocks reported by the household

County	Poor harvest /crop failure %	Loss / death of live-stock %	Serious illness or accident of household members %	Unem-ployment /shortage of money %	Unusually high food prices (for consumers) %	Death of working household member/ head of household/ spouse %	Floods %	Drought %
Magwi	42	40	31	29	37	9	4	3
Nzara	26	10	13	29	19	20	4	34
Torit	43	7	30	29	11	14	45	10
Yambio	53	74	44	18	20	24	18	15
Overall	**41**	**36**	**30**	**26**	**23**	**16**	**16**	**14**

The most prevalent shocks reported by the households include poor harvest or crop failure (41 percent), loss or death of livestock (36 percent), serious illness or accident of household members (30 percent) and unemployment (26 percent). On average, 42 percent of the households in both Magwi and Torit reported poor harvest as a shock affecting crop production. Similarly, 39 percent of the households in Nzara and Yambio reported poor harvest as a shock. In terms of climate shocks, Torit had the highest (45 percent) incidences of flooding, while Yambio had 18 percent. Additionally, Nzara had higher incidences of drought (34 percent) compared with Yambio at 15 percent.

Approximately 89 percent of the households in the survey area reported that in the past seven days there had been times when they did not have enough food or money to buy food. To ensure food availability, households applied various coping strategies to avert a shortage of food in their households. Of the households experiencing a shortage of food or money to buy food, each household on average relied on less preferred and less expensive food for two days out of the last seven. They also resorted to limiting portion sizes during mealtimes and reducing meal frequencies for 1.9 and 1.7 days respectively.

The average Reduced Coping Strategy Index (rCSI) in the study area is 11, measured on a scale of 0 to 56. This indicates that the households are still able to afford expenditure on essential food without engaging in severe coping strategies. The rCSI developed by CARE, an international humanitarian organization fighting global poverty and world hunger by working alongside women and girls, is an experience-based indicator collecting information on household use and frequency of five different food-based coping strategies over the past seven days. It is thought to be most useful in early-onset crises when households change their food consumption patterns to respond to shocks.

Approximately 10 percent of the households reported that they had received assorted assistance from various government organizations or partners in the last three months. The main forms of assistance included agricultural inputs (79 percent), free health care (30 percent) and training in crop production and management (15 percent). These are reflected in Table 8.

Table 8: Assistance from the government/NGO/UN in the last three months

Did the household receive any of the following forms of assistance from the government/NGO/UN within the last three months?	%
Agricultural inputs including seeds, fertilizers and other farming inputs	78.9
Free health care	30.7
Training in crop production and management	16.9
Free vaccination of children	14.8
Cash transfer (e.g. unconditional cash transfers, cash for work, pensions)	13.1
Livestock vaccinations	9.5
Beekeeping inputs such as hives	5.8
Extension services	5.8
Free food ration	5.5
Animal feeds including mineral blocks and range cubes	5.2
Food subsidies	5.3
Livestock treatment	4.5
Training in livestock production and management	3.5
Live animals	1.7
Water subsidies for home and livestock feeding	1.5
Maternity waiting home	1.5
Loans for agricultural inputs	1.2
Marketing advice and services	0.8
Fodder seeds	0.7

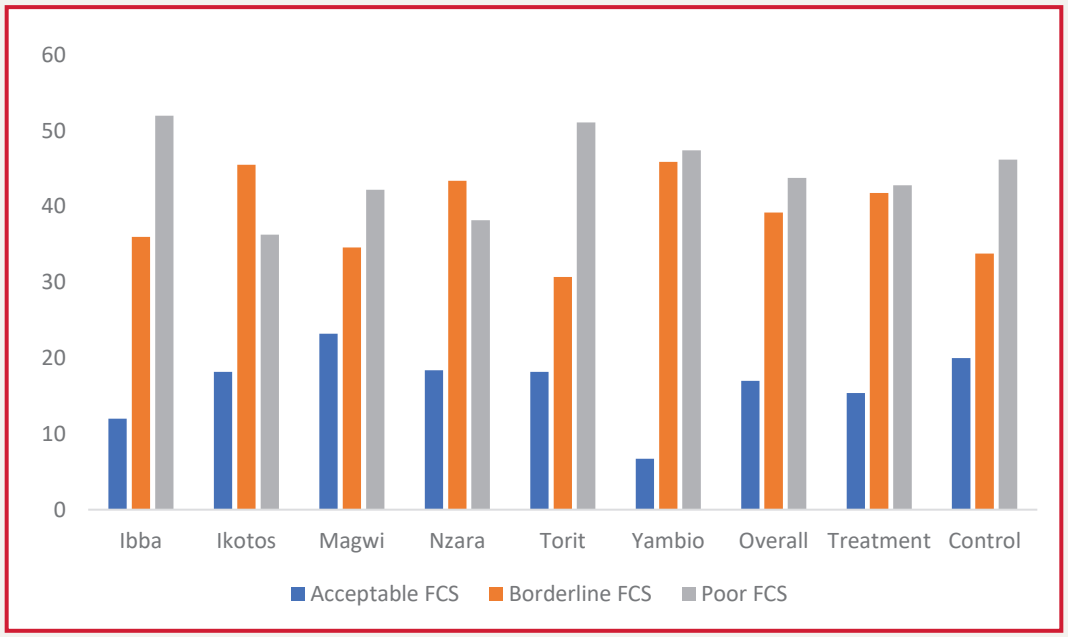
3.4 FOOD SECURITY/NUTRITION

Household food security exists when all the people living in the household have physical, social and economic access to sufficient, safe and nutritious food at all times that meets their dietary needs and food preferences for an active and healthy life (World Food Summit Declaration, 1996). The assessment used the Integrated Phase Classification (IPC), Food Consumption Score (FCS), Household Dietary Diversity Score (HDDS) and the Food Insecurity Experience Scale (FIES) as some of the indicators to measure the food security status across the project areas.

i) Food Consumption Score

FCS is a composite score based on dietary diversity, food frequency and the relative nutritional importance of different food groups. It is calculated using the frequency of consumption of different food groups consumed by a household during the seven days before the survey.

Figure 8: FCS by county



Scores are clustered into three groups: poor, borderline or acceptable food consumption. FCS is useful for categorizing and tracking households' food security across time, as well as for programme monitoring and evaluation and population-level targeting. As a standardized measure, it can also be useful in comparing households in different locations, as well as tracking cyclical changes in household diet if collected repeatedly across seasons or years.

Overall, the food security status as measured by the FCS showed that 17 percent of the households had acceptable food consumption, 40 percent had borderline consumption, while the rest were in the poor food consumption category. Figure 8 shows this distribution by the different categories.

ii) Household Dietary Diversity Score

HDDS is a qualitative measure of food consumption that reflects household access to a variety of foods. It consists of a simple count of food groups that a household has consumed over the preceding 24 hours and is meant to reflect, in a snapshot form, the economic ability of a household to access a variety of foods. Studies have shown that an increase in dietary diversity is associated with socio-economic status and household food security (household energy availability) (Hoddinot and Yohannes, 2002; Hatloy *et al.*, 2000).

The respondents were asked to indicate the different food groups consumed by the household members during the 24 hours prior to the survey. The average HDDS across the project areas was 6. This means that over the last 24 hours, the households ate about six different kinds of food (out of the 12 food groups). The HDDS for the control group was slightly lower than that of the treatment group, at 7 and 6 respectively. The disaggregation by county is illustrated in Table 9.

Table 9: Average HDDS by county

County	Average HDDS
Ibba	6.2
Ikotos	6.3
Magwi	6.3
Nzara	5.6
Torit	5.0
Yambio	8.6
Overall	**6.4**

iii) Household Food Insecurity Experience Scale

FIES is a measure of household food insecurity based on whether the household experienced certain aspects of food insecurity or not. The FIES module is made up of eight Yes/No questions typically asked for the reference period of 12 months. Table 10 presents the eight questions together with their raw score for the current study.

Table 10: Responses to FIES raw questions

During the last 12 months, was there a time when, because of lack of money or other resources...	Percentage of households (%)
1. you were worried you would not have enough food to eat?	78
2. you were unable to eat healthy and nutritious food?	77
3. you ate only a few kinds of food?	79
4. you had to skip a meal?	69
5. you ate less than you thought you should?	78
6. your household ran out of food?	71
7. you were hungry but did not eat?	65
8. you went without eating for a whole day?	55

Figure 9 shows the raw score for the eight Yes/No (binary) questions. The raw score represents the summation of the eight scores. For example, approximately 250 households reported that they had all eight food insecurity experiences, while approximately 100 households reported they had seven food insecurity experiences. This is indicative of high food insecurity in the study areas.

Based on the FIES global reference scale, South Sudan data were calibrated allowing for production of prevalence of food insecurity. The estimates of moderate and severe food insecurity were computed for both beneficiary and non-beneficiary groups of the sample as presented in Table 11.

Figure 9: **FIES questions raw scores**

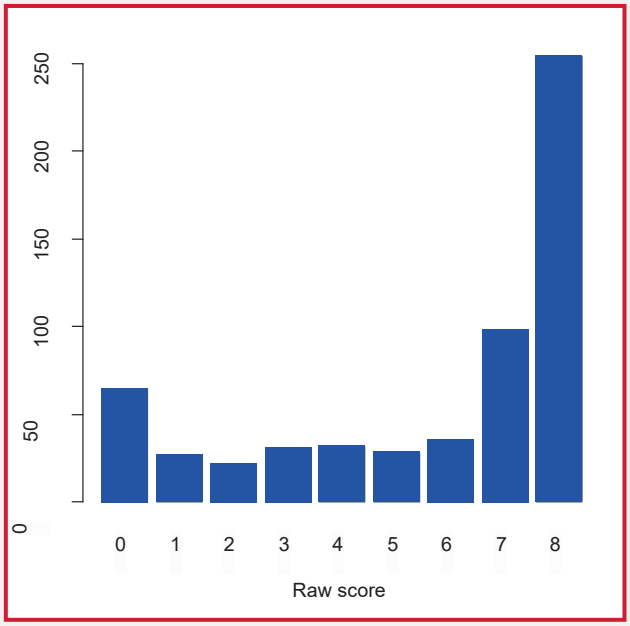


Table 11: **FIES prevalence by beneficiary type**

Food insecurity prevalence	Beneficiaries (%)	Non-beneficiaries (%)	Overall (%)
Severe food insecurity	45	48	46
Moderately food insecure	72	78	74

3.5 RESILIENCE

This section presents the analysis of both the resilience capacity and resilience structure of the households surveyed. It uses RIMA (Resilience Index Measurement and Analysis) methodology developed by FAO, which systematically explores the relationship between a core set of context-specific variables of resilience to construct the Resilience Capacity Index (RCI) based on the four pillars of resilience – assets, social safety nets, adaptive capacity and access to basic services. The RCI measures a household's capacity to withstand stresses and shocks that have long-lasting effects.

The RCI provides a useful baseline to (a) inform/support targeting decisions, as it can be used as a ranking tool to identify households that are most at risk; (b) identify the specific weaknesses (or negative coping mechanisms) that increase vulnerability; (c) explain how much each pillar contributes to resilience capacity and how each observed variable contributes to its pillar; and (d) assess the impact of the project on household resilience. It is with this information that the theory of change, targeting and implementation strategy can be examined to contribute to adaptive management and the indicators of the project can be assessed.

Table 12 presents the related variables for each pillar used in the analysis, which depicts the resilience capacity of the households and evaluates the relative contributions of the variables and dimensions.

Table 12: Definitions of each pillar of resilience and the related variables

Pillars	Variables used in the analysis
ABS (Access to Basic Services)	Closeness to basic services (education, health, water, markets, extension services); access to improved cooking energy; access to improved sanitation; and access to improved water.
AST (Assets)	Agricultural wealth (tools and inputs); cultivated land value per capita; tropical livestock units (TLU) per capita; household (non-productive assets) wealth index.
SSN (Social Safety Nets)	Access to credit; access to formal and informal transfers; participation in associations; borrowing frequency.
AC (Adaptive Capacity)	Literacy level of household head; number of income sources; participation in training; dependency ratio; and number of crops cultivated.

i) Resilience Capacity Index

The RIMA analysis indicated that the mean RCI of households surveyed during the baseline assessment was 35, with no significant variation between the treatment (35.3) and non-beneficiary/control (35.2) groups. The female-headed households have a lower resilience capacity (32.6) than the male-headed households (36.7). Figure 10 shows the difference in RCI between the categories.

Figure 10: RCI by gender and sample type

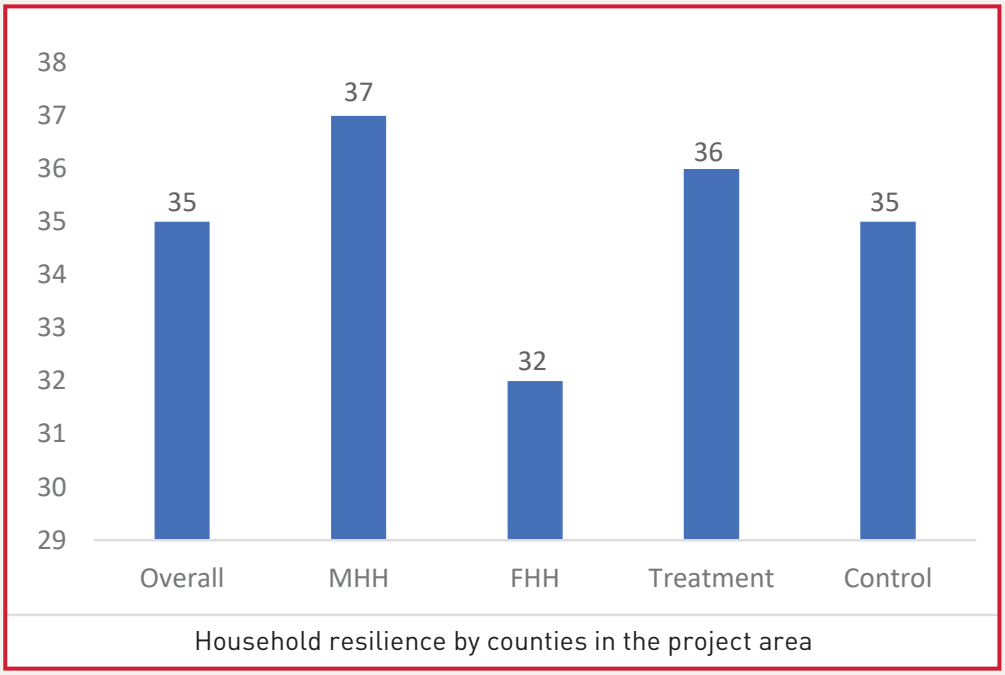
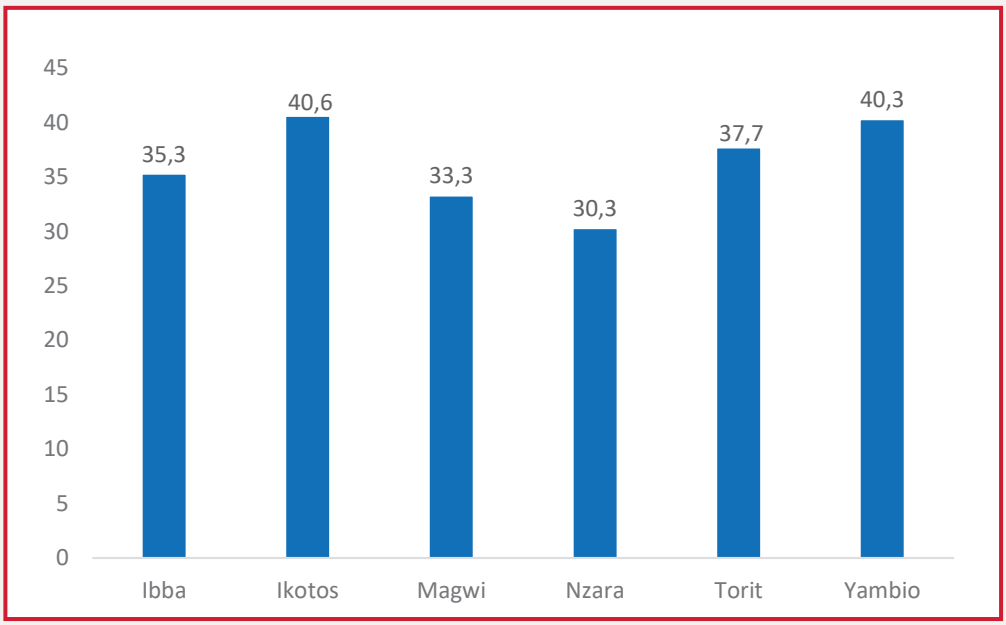


Figure 11 shows the spatial variation of RCI by county administrative units.

Figure 11: RCI by county

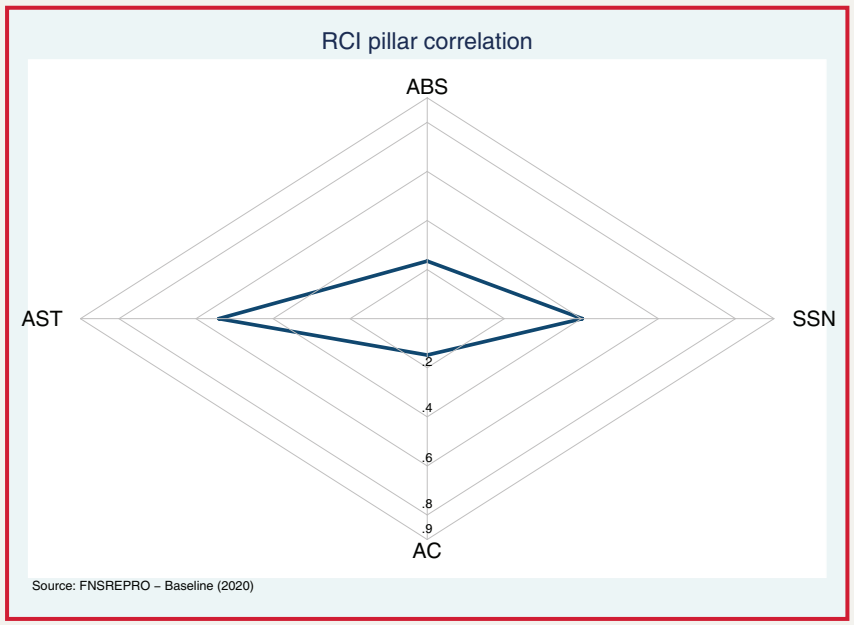


Yambio (RCI = 40), Ikotos (RCI = 40) and Torit (RCI = 38) are the counties with the highest resilience capacity. Magwi (RCI = 33) and Nzara (RCI = 30) have the lowest resilience capacity in comparison with the other counties.

ii) Contribution of different pillars

The overall relationship between the RCI and the four pillars of resilience is illustrated in Figure 12. AC and AST pillars contributed most to the household resilience capacity in the survey area.

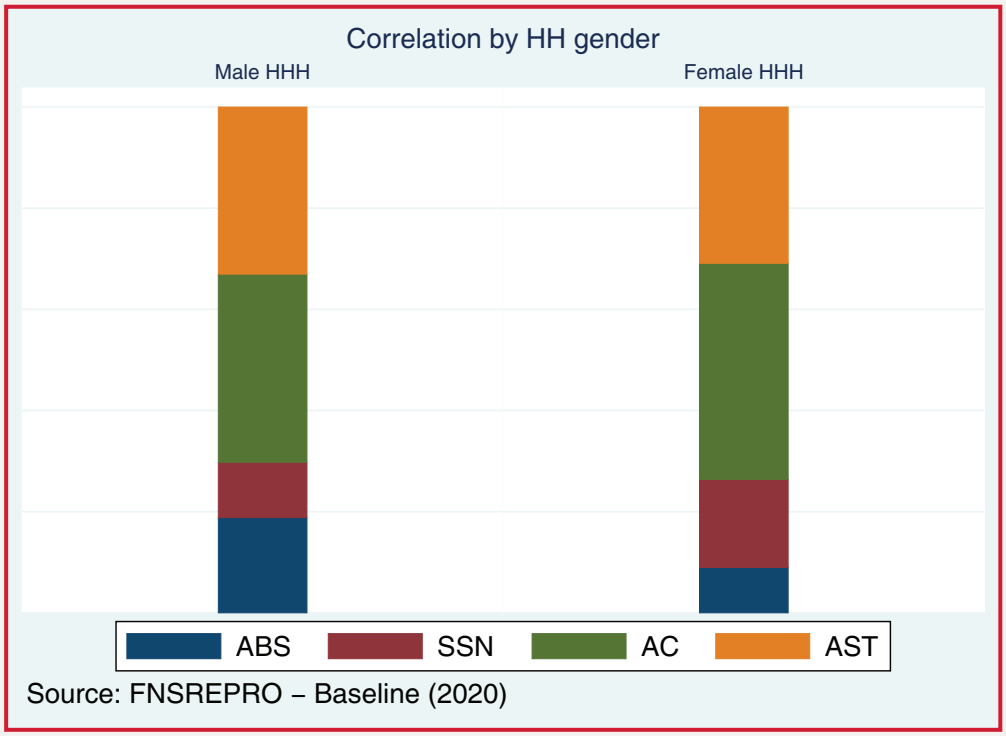
Figure 12: RCI pillars correlation, entire sample



Unpacking the pillars shows that participation in multiple sources of income and cultivation of multiple crops play a key role in adaptive capacity, while the size of land cultivated and ownership of agricultural assets are the key drivers of the assets pillar.

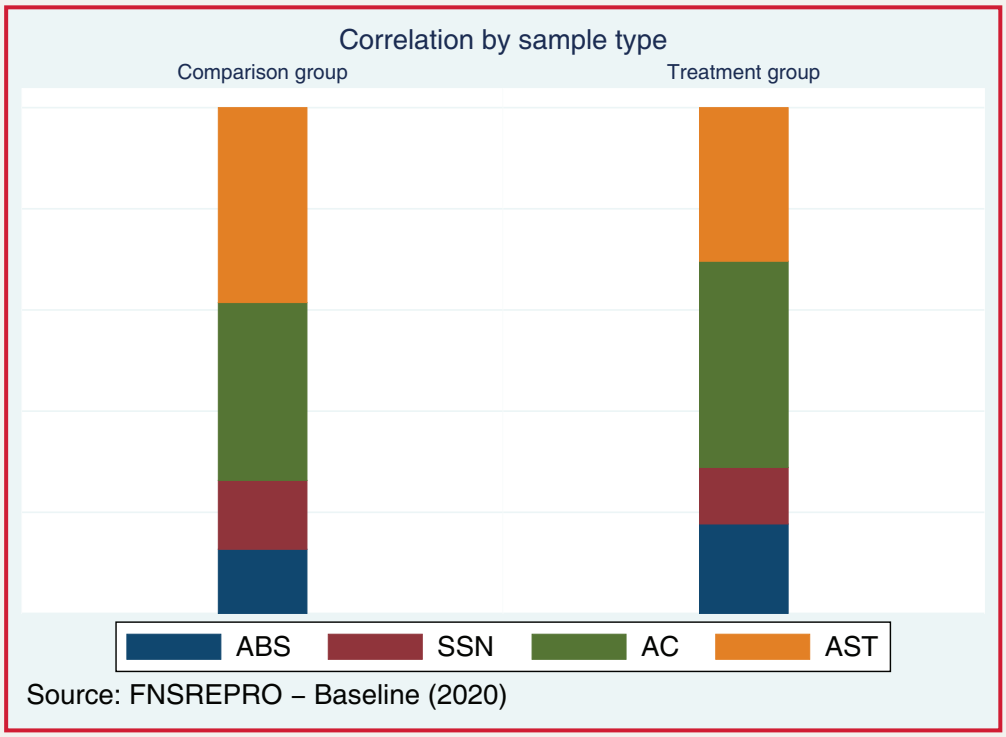
While AC is the main driver of resilience for both household groups, its contribution is slightly higher for the female-headed households than for male-headed households, while the contribution of the Assets pillar is more pronounced for the male-headed households than for their female-headed counterparts as illustrated in Figure 13. Additionally, the contribution of SSN for the female-headed households' resilience capacity is more than that of the male-headed households. These differences in the resilience structure matrix for male-headed households versus female-headed households point to the need to consider gender sensitivity in the interventions so that the unique needs of the household types are adequately captured while working towards building their resilience.

Figure 13: RCI correlation by gender of household head



Further analysis of the resilience structure of beneficiaries and non-beneficiaries showed that for the beneficiaries, the contribution of adaptive capacity is higher than for the comparison group. The differences in the resilience structure matrix are illustrated in Figure 14. The key driver of resilience capacity for the comparison group is assets.

Figure 14: **RCI correlation by sample type**



iii) Determinants of household resilience food insecurity

Determinants of household food security status were evaluated through a regression analysis. The results are presented in Table 14 (see Annex). Two food security status indicators were used as dependent variables in this analysis – food consumption score and household dietary diversity score.

Asset ownership measured by the household non-productive assets and agricultural inputs, as well as transfers and the number of associations the households can rely on in times of need, were positively and significantly associated with either of the food security indicators.

iv) Effect of shocks on Resilience Capacity Index

Table 15 (see Annex) presents the effect of shocks on the estimated RCI in the survey area while controlling for household characteristics. The main shocks in the study area that had a significant negative effect on the resilience of households, were unusually high prices for fuel, transport and other non-food items (for consumers).

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4 CONCLUSION

The assessment generated a rich, quantitative dataset with a comparison between independent treatment and control samples, which will provide a robust measurement of change in beneficiary welfare that could be attributed to the project interventions. The similarities between the beneficiary and non-beneficiary households in their basic profiles suggest that the assumptions governing the sampling, i.e. that the two populations are currently equivalent in their structure and characteristics, are providing a good starting point for measuring the impact of the project later on. Moreover, the assumptions (in the Theory of Change) have been confirmed by the findings of this assessment.

Access to seed is crucial in the diversification of food and livelihood sources, which also contributes to mitigating the negative effects of shocks on a household.

Livelihood diversification enables a household to generate income through variant sources and aids in solving the household's reliance on one source of income. From the survey results, households reported the sale of agricultural produce as well as casual labour related to agriculture and non-agriculture to be main sources of income. This validates the targeting criteria of the project in terms of focusing on seeds and agriculture.

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5 DISCUSSION OF LEARNING AGENDA QUESTIONS

The RIMA baseline analysis is one of the main data sets informing the learning agenda (output 4) of FNS-REPRO, which is aimed at establishing and implementing learning mechanisms to inform policy and practice, including adaptive management of FNS-REPRO. In FNS-REPRO's Monitoring, Evaluation, Accountability and Learning (MEAL) framework, all information is collected and analysed to formulate answers to FNS-REPRO's learning questions, which have been contextualized for each FNS-REPRO country. RIMA, among other data sets, forms one of the main information sources, fuelling the learning agenda and the MEAL framework.

Key learning questions will be addressed from the analysis of RIMA, combined with the analysis of other studies and trajectories which have already taken place within the project such as context analysis, food/seed system resilience assessments, special studies, learning journeys and communities of practice (all under output 4), and the beneficiary and benefits mapping from the target sites.

The objective of the learning agenda of FNS-REPRO is threefold:

a) *Improving project implementation*: Evidence-based information supporting programme management with insights to be used towards achieving the objectives described in the monitoring and evaluation databases.

b) *Observatory*: To develop new policy/practice insights and perspectives about food system resilience programming in areas of protracted conflict, for the benefit of target beneficiaries and partners.

c) *Building capacity*: In order to build the capacity of FNS-REPRO staff and partners (including donors, government, UN organizations, NGOs, the private sector and knowledge institutes) by offering an ongoing facility for reflection and sense-making. This will enable a learning process among partners as to what works best and which practices need amplification as the implementation progresses.

The learning agenda forms part of improving the implementation specific to the context, based on evidence derived from the field and co-created with local actors and partners. Moreover, the learning agenda enables adaptive and flexible programming by identifying critical food system resilience factors on an iterative basis.

Please note that this is a baseline report. Similar surveys will be carried out at mid-term and end-term. Analysis will be carried out over time and by beneficiary type. In order to measure the impact of the FNS-REPRO, the baseline data will be combined with midline or endline data to establish the changes in the key indicators of interest. Attribution of the changes to the FNS-REPRO will be established by use of econometric models for impact evaluation.

IMPACT-LEVEL LEARNING QUESTIONS

LQ I1. ***To what extent are households better able to withstand and recover from shocks and stressors as a result of FNS-REPRO? (project and country level)***

Relevant RIMA indicators include household income and resilience capacity index, disaggregated by beneficiary and non-beneficiary households.

Variable	Overall	Beneficiary	Non-beneficiary	Male-headed households	Female-headed households
RCI	35.16	35.26	34.96	36.68	31.98
Wealth Index	0.45	0.47	0.41	0.48	0.39

Income/shocks

The three main sources of household income are agriculture and sale of cereals, vegetables and other crops (93 percent), casual labour related to agriculture (36 percent) and casual labour related to non-agricultural activities (22 percent).

The most prevalent shocks reported by the households include poor harvest or crop failure (41 percent), loss or death of livestock (36 percent), serious illness or accident of household members (30 percent) and unemployment (26 percent). On average, 42 percent of the households in both Magwi and Torit reported poor harvest as a shock affecting crop production. Similarly, 39 percent of the households in Nzara and Yambio reported the same issue. In terms of climate shocks, Torit had the highest (45 percent) incidences of flooding, while Yambio had 18 percent. Additionally, Nzara had higher incidences of drought (34 percent) compared with Yambio (15 percent).

Resilience Capacity Index

The RIMA analysis indicated that the mean RCI of households surveyed during the baseline assessment was 35, with no significant variation between the treatment (35.3) and non-beneficiary/control (35.2) groups. The female-headed households have a lower resilience capacity (31.98) than the male-headed households (36.68). Yambio (RCI = 40), Ikotos (RCI = 40) and Torit (RCI = 38) are the counties with the highest resilience capacity. Magwi (RCI = 33) and Nzara (RCI = 30) have the lowest resilience capacity compared with the other counties.

In order to understand the extent to which the FNS-REPRO has influenced all the aforementioned indicators, a midline or endline dataset is required so that the change in these indicators can be estimated and attributed to the current project.

LQ I3. ***Is a value-chain approach an effective catalyst for building resilient communities and who benefits or not?***

The question cannot be answered at baseline as no value chain approach has yet been applied by FNS-REPRO.

LQ I4. ***To what extent is there improved food and income security as a result of FNS-REPRO?***

Relevant RIMA-based survey indicators include food security indicators such as Household Dietary Diversity Score (HDDS), Food Consumption Score (FCS) and Food Insecurity Experience Scale (FIES), disaggregated by beneficiary type. Household income is derived from various sources.

HOUSEHOLD DIETARY DIVERSITY SCORE

The average HDDS across the project areas was 6.465, with a lower HDDS for male-headed households (6.21) than for female-headed households (7.01). This means that over the preceding 24 hours, the households ate about six different kinds of food (out of the 12 food groups). The HDDS for the control group was slightly lower than that of the treatment group at 5.72 and 6.82 respectively. Outliers are in Torit and Nzara, while Yambio is doing relatively better.

The table for HDDS shows that most people eat carbohydrates daily, especially cereals/grains. About 50 percent eat roots and tubers daily. More plant-based than animal-based protein sources are consumed and milk and milk products, eggs and meat especially are not eaten daily. Fruits are eaten less frequently than vegetables, but vegetables are eaten daily by about three-quarters of the households. The diet is not balanced, being mainly starch-based with only a few vegetables and fruits. For most food groups, the control group eats less daily than the target group and especially for legumes and nuts the difference is considerable. Only oils and fats are consumed by more people in the control group than in the target group.

Food group	% of households consuming the food in the last 24 hours preceding the survey				
	Overall (n=602) (%)	MHH (n=408) (%)	FHH (n=194) (%)	Target group (n=407) (%)	Control group (n=195) (%)
Maize, sorghum, rice, millet, any other cereal/grain	84.22	83.09	86.60	87.71	76.92
Potato, yam, white sweet potato, all wild roots including water lilies and all other roots and tubers	52.49	51.23	55.15	58.48	40.00
Legumes/nuts: beans, cowpeas, peanuts/groundnuts and groundnut paste, lentils, soy, pigeon pea, wild nuts and all other nuts	62.13	59.80	67.01	71.99	41.54
Milk and other dairy products: milk – fresh or sour, yoghurt, cheese, all other dairy products	22.09	17.89	30.93	23.83	18.46
Flesh meat: beef, lamb, goat, rabbit, chicken, duck, other birds	39.87	36.27	47.42	44.47	30.26
Eggs	23.59	19.36	32.47	28.99	12.31
Organ meat: liver, kidney, heart and/or all other organ meats	22.09	18.14	30.41	25.06	15.90
Fish/shellfish: fish, including canned tuna and/or other seafood	33.06	28.92	41.75	34.40	30.26
Vegetables rich in vitamin A: carrot, orange sweet potatoes, red pepper, pumpkin, any other orange vegetable and okra	62.96	61.27	66.49	64.86	58.97

Food group	% of households consuming the food in the last 24 hours preceding the survey				
	Overall (n=602) (%)	MHH (n=408) (%)	FHH (n=194) (%)	Target group (n=407) (%)	Control group (n=195) (%)
Dark green leafy vegetables: sukuma, spinach, broccoli, amaranth and/or other dark green leaves, cassava leaves, dark green and leafy wild foods	74.42	73.53	76.29	78.38	66.15
Other vegetables: okra, tomatoes, onions, cabbages	76.41	75.74	77.84	79.12	70.77
Fruits rich in vitamin A: oranges, peaches, papaya, mango, watermelon, tangerine, guava, passion fruit	41.86	37.50	51.03	44.72	35.90
Other fruits: banana, pineapple, avocado, apple, etc.	49.83	47.55	54.64	52.33	44.62
Oil/fat/butter: vegetable oil, palm oil, shea butter, margarine, other fats/oil	73.42	72.55	75.26	70.27	80.00
Sugar and sugar products: sugar, sugar cane, honey, jam, cakes, candy, cookies, pastries, cakes and sugary drinks	42.19	39.95	46.91	46.19	33.85
Condiments/spices: Tea, coffee, cocoa, salt, garlic, spices, yeast, baking powder, tomato sauce, as well as a small amount of milk in tea and coffee	59.14	59.56	58.25	59.46	58.46

The table on the next page gives relevant information on the different foodstuffs eaten by male- and female-headed households. Cereals are the most frequently eaten foodstuffs, but not every day – 4.4 days in the past seven days and more by male-headed households (4.6) than by female-headed households (4.1). Roots and tubers are most likely eaten on the other days to fulfil the need for carbohydrates (1.6), again more by male-headed households (1.7) than by female-headed households (1.4). Otherwise, the difference between male- and female-headed households is small. Vegetables and fruits rich in vitamin A are not consumed daily (2.2 and 1.2 respectively). The same applies for dark green leafy vegetables (rich in iron: 2.8) and other vegetables (2.7), but vegetables are not eaten daily. Protein-rich foods are also not eaten every day – plant-based protein in legumes or nuts is eaten most frequently (2.1/7 days), while animal-based protein is eaten less than one day for each of the different food types (milk and milk products, eggs, fish, flesh meat and organ meat). In total, protein is eaten on a maximum of 2.1 days a week. Neither male- nor female-headed households are consuming balanced diets daily as their diet is mostly starch-based, with vegetables on some days only.

There is room for improvement in the diversity of foods eaten, especially in terms of protein, vegetables and fruits.

Variable	Overall	FHH	MHH
Days eaten (MAIZE, SORGHUM, RICE, MILLET, ANY OTHER CEREAL/ GRAIN) or food made of CEREALS/GRAINS in the past seven days:	4.4	4.1	4.6
Days eaten (POTATO, YAM, WHITE SWEET POTATO, ALL WILD ROOTS including WATER LILIES and ALL OTHER ROOTS AND TUBERS) or food made of ROOTS/TUBERS in the past seven days:	1.6	1.4	1.7
Days eaten (LEGUMES/NUTS: BEANS, COWPEAS, PEANUTS/ GROUNDNUTS and GROUNDNUT PASTE, LENTILS, NUT, SOY, PIGEON PEA, WILD NUTS and ALL OTHER NUTS or food made of LEGUMES/NUTS in the past seven days:	2.1	2.0	2.1
Days eaten (MILK and OTHER DAIRY PRODUCTS: MILK FRESH OR SOUR, YOGHURT, CHEESE, ALL OTHER DAIRY PRODUCTS) or food made of MILK/MILK PRODUCTS in the past seven days:	0.5	0.6	0.5
Days eaten (FLESH MEAT: BEEF, LAMB, GOAT, RABBIT, CHICKEN, DUCK, OTHER BIRDS) or food made of MEAT in the past seven days:	0.8	0.8	0.8
Days eaten (EGGS) or food made of EGGS in the past seven days:	0.5	0.6	0.4
Days eaten (ORGAN MEAT: LIVER, KIDNEY, HEART AND/OR ALL OTHER ORGAN MEATS) or food made of ORGAN MEAT in the past seven days:	0.5	0.5	0.5
Days eaten (FISH/SHELLFISH: FISH INCLUDING CANNED TUNA and/ or OTHER SEAFOOD) or food made of FISH in the past seven days:	0.8	0.9	0.7
Days eaten (VEGETABLES RICH IN VITAMIN A: CARROTS, ORANGE SWEET POTATOES, RED PEPPER, PUMPKIN, ANY OTHER ORANGE VEGETABLE and OKRA) or food made of it in the past seven days:	2.2	2.1	2.2
Days eaten (DARK GREEN LEAFY VEGETABLES: SUKUMA, SPINACH, BROCCOLI, AMARANTH and/or OTHER DARK GREEN LEAVES, CASSAVA, DARK GREEN AND LEAFY WILD FOODS) or food made of it in the past seven days:	2.8	2.7	2.8
Days eaten (OTHER VEGETABLES: OKRA, TOMATOES, ONIONS, CABBAGES, etc.) or food made of it in the past seven days:	2.7	2.7	2.8
Days eaten (FRUITS RICH IN VITAMIN A: ORANGES, PEACHES, PAPAYA, MANGO, WATERMELON, TANGERINE, GUAVA, PASSION FRUIT and all other FRUITS RICH IN VITAMIN A) or food made of it in the past seven days:	1.2	1.3	1.2
Days eaten (OTHER FRUITS: BANANA, PINEAPPLE, AVOCADO, APPLES, etc.) or food made of it in the past seven days:	1.4	1.3	1.5
Days eaten (OIL/FAT/BUTTER: VEGETABLE OIL, PALM OIL, SHEA BUTTER, MARGARINE, OTHER FATS/OIL) or food made of it in the past seven days:	3.1	2.9	3.3
Days eaten (SUGAR and SUGAR PRODUCTS: SUGAR, SUGAR CANE, HONEY, JAM, CAKES, CANDY, COOKIES, PASTRIES, CAKES AND OTHER SWEET [SUGARY DRINKS]) or food made of it in the past seven days:	1.6	1.5	1.6
Days eaten (CONDIMENTS/SPICES: TEA, COFFEE, COCOA, SALT, GARLIC, SPICES, YEAST, BAKING POWDER, TOMATO SAUCE, INCLUDING SMALL AMOUNT OF MILK IN TEA AND COFFEE) or food made of it in the past seven days:	2.6	2.2	2.8

Food Consumption Score

Variable	Overall	Beneficiary	Non-Beneficiary	MHH	FHH
FCS	31.25	31.43	30.87	31.51	30.71

The food security status as measured by the FCS showed that 17 percent of the households had acceptable food consumption and 40 percent had borderline food consumption, while the rest were classified in the poor food consumption category. The FCS for male-headed households was slightly higher (31.51) than for female-headed households (30.71).

While Yambio was performing relatively better in terms of HDDS, there are only a few counties with an acceptable FCS. Across the board there is much room for improvement in all the counties.

Food Insecurity Experience Scale

Based on the FIES global reference scale, South Sudan data were calibrated to allow for production of prevalence of food insecurity. Some 45 percent of beneficiaries felt severely food insecure, compared with 48 percent of non-beneficiaries. About three-quarters (74 percent) felt moderately food insecure (72 percent for beneficiaries and 78 percent for non-beneficiaries). These differences between beneficiaries and non-beneficiaries are not statistically different.

Across the board there is much room for improvement in all the counties in terms of food and nutrition security.

Income

The three main sources of household income are agriculture and sale of cereals, vegetables and other crops (93 percent), casual labour related to agriculture (36 percent) and casual labour related to non-agricultural activities (22 percent).

LQ I5. ***What are the positive and negative (expected and unexpected) effects of FNS-REPRO on households and communities (e.g. income, social cohesion, stability, triple nexus [development, humanitarian aid, conflict], etc.)?***

Country situation: Despite abundant resources, South Sudan is a disaster-prone country that has been subject to a range of protracted crises over the last several decades, which have resulted in population displacement and disruption of livelihoods. As per the December 2020 release of the IPC for the period October to November 2020, more than half of South Sudan's population are currently severely food insecure because of ongoing violent conflict, political instability and economic crisis.

In the analysis of determinants of food insecurity, wealth index, access to transfers, participation in association groups and number of income sources were found to be significant drivers. The main shocks that undermine food security in the study area are crop failure and poor harvests, livestock diseases and mortalities, serious illness and death of household heads and unemployment and shortage of food within the household. High prices for non-food items were also identified to undermine resilience among the households.

OUTCOME-LEVEL LEARNING QUESTIONS

LQ O2.4. ***What is the contribution of improved income to improved FNS and resilience status?***

Relevant indicators: income, resilience index, FNS data.

Income

Data on income are not currently available. The extent to which income is improved by FNS-REPRO and how this relates to improved FNS and resilience is to be determined at mid- and end-term after another set of data has been collected from the same households (panel data).

LQ O3.1. ***What is the role of FNS-REPRO and other factors in stimulating healthy diets in targeted communities?***

Relevant indicators: HDDS, FCS.

The role of FNS-REPRO and other factors in stimulating healthy diets by targeted communities is yet to be determined, but wealth index, access to transfers, participation in association groups and number of income sources were currently found to be significant drivers of food insecurity. The main shocks that undermine food security in the study area are crop failure and poor harvests, livestock diseases and mortalities, serious illness and death of household heads and unemployment and shortage of food within the household. High prices for non-food items were also identified to undermine resilience among the households and thus their ability to eat healthy diets.

LQ O3.3. ***What role does FNS-REPRO play in reducing gender disparities?***

Based on this RIMA study, there are currently significant differences between male- and female-headed households in terms of:

- Resilience: Male-headed households (RCI=36.7) are more resilient than female-headed households (RCI=32.6).
- HDDS: Male-headed households (HDDS=6.21) have a lower HDDS than female-headed households (HDDS=7.01).
- FCS: Male-headed households (FCS=31.51) have a slightly higher FCS than female-headed households (FCS=30.71).

The above-mentioned RIMA information will have to be analysed in combination with data from other sources to make sense of available information that can answer the learning questions. Some of this sensemaking takes place in the communities of practice and some during the annual sensemaking events that are held prior to the annual review and planning meetings of FNS-REPRO at country and regional levels. The sensemaking of available documentation on the different learning questions can inform policy and practice of FNS-REPRO and other stakeholders.

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ANNEX

Table 13: Determinants of food security

VARIABLES	FCS	HDDS
Wealth index	9.821*** (2.537)	1.271** (0.585)
Agricultural assets index	3.427 (4.721)	0.001 (1.090)
Per capita TLU	2.382 (1.792)	0.495 (0.414)
Per capita cultivated land	0.126 (0.330)	0.119 (0.076)
Transfers	-1.622 (1.717)	0.666* (0.396)
Number of associations	1.039* (0.558)	0.560*** (0.129)
Closeness index	-4.400 (7.208)	-3.284** (1.664)
Safe water	-0.287 (1.064)	-0.472 (0.246)
Improved cooking energy	2.904 (2.141)	0.600 (0.494)
Education of household heads	0.102 (0.379)	0.102 (0.088)
Number of income sources	0.904* (0.501)	0.004 (0.116)
Dependency ratio	19.52 (53.92)	6.889 (12.45)
1.hhsex	1.423 (1.126)	0.995*** (0.260)
hhsizesq	-0.002 (0.006	-7.28e-05 (0.001)
Constant	19.52*** (3.611)	5.518*** (0.834)
Observations	602	602
R-squared	0.139	0.286

Table 14: Effects of shocks on RCI

VARIABLES	RCI
Female-headed household	-4.306*** (1.278)
Control for county	Yes
Control for livelihood	Yes
Hhsize sq	-0.035*** (0.008)
Shock: Reduced income	3.339** (1.511)
Shock: Death of working member	2.869** (1.246)
Shock: Unusually high prices of non-food items	-4.796*** (1.387)
Shock: Disease outbreaks	8.380*** (1.356)
Shock: Livestock diseases outbreaks	-1.865 (1.468)
Constant	34.56*** (3.241)
Observations	602
R-squared	0.184

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

Table 15: Summary statistics disaggregated by beneficiary type and gender of household head

Variable	Overall	Beneficiary	Non-Beneficiary	Male-headed household	Female-headed household
RCI	35.16	35.26	34.96	36.68	31.98
FCS	31.25	31.43	30.87	31.51	30.71
HDDS	6.47	6.82	5.72	6.21	7.01
Wealth index	0.45	0.47	0.41	0.48	0.39
Agricultural assets index	0.26	0.26	0.26	0.28	0.23
Per capita TLU	0.08	0.07	0.09	0.08	0.06
Cultivated land	1.01	1.13	0.75	1.18	0.64
Transfers received	0.89	0.93	0.81	0.89	0.89
Number of associations to rely on	1.28	1.38	1.06	1.28	1.27
Closeness index	0.08	0.07	0.10	0.08	0.08
Safe water	0.41	0.44	0.36	0.38	0.48
Improved cooking energy	0.06	0.04	0.09	0.06	0.05
Education of household head	2.52	2.59	2.37	2.87	1.79
Sources of income	2.39	2.43	2.31	2.46	2.24
Dependency ratio	0.76	0.75	0.77	0.76	0.74

This document forms part of a series of FNS-REPRO resilience baseline analyses prepared by the Food and Agriculture Organization of the United Nations (FAO) in South Sudan and the FAO Resilience Team for Eastern Africa.

The series provides programming and policy guidance to FNS-REPRO actors, policy-makers, practitioners, United Nations agencies, non-governmental organizations and other stakeholders by identifying the key factors that contribute to the resilience of households in food insecure countries and regions.

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Ministry of Foreign Affairs

Contact:

FAO Representation in South Sudan
FAO-South-Sudan@fao.org
Juba, South Sudan

Resilience Team for Eastern Africa
SFE-RTEA@fao.org
Nairobi, Kenya

Office of Emergencies and Resilience
OER-Director@fao.org
Rome, Italy

Food and Agriculture Organization of the United Nations

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