Impact Evaluation for Resilience Learning in South Sudan

WFP World Food Programme

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Baseline report

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Acknowledgements

The work described in this report is the result of a collaboration between the World Food Programme (WFP), the United Nations Children's Fund (UNICEF), and the World Bank's Development Impact Evaluation (DIME) department. The study has been pre-registered in the American Economic Association's randomized controlled trials (AEA RCT) registry.[1]

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The study received human subjects research approval from Solutions Institutional Review Board (IRB) and local IRBs.

Disclaimer

1 https://www.socialscienceregistry.org/trials/6851

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OVERVIEW

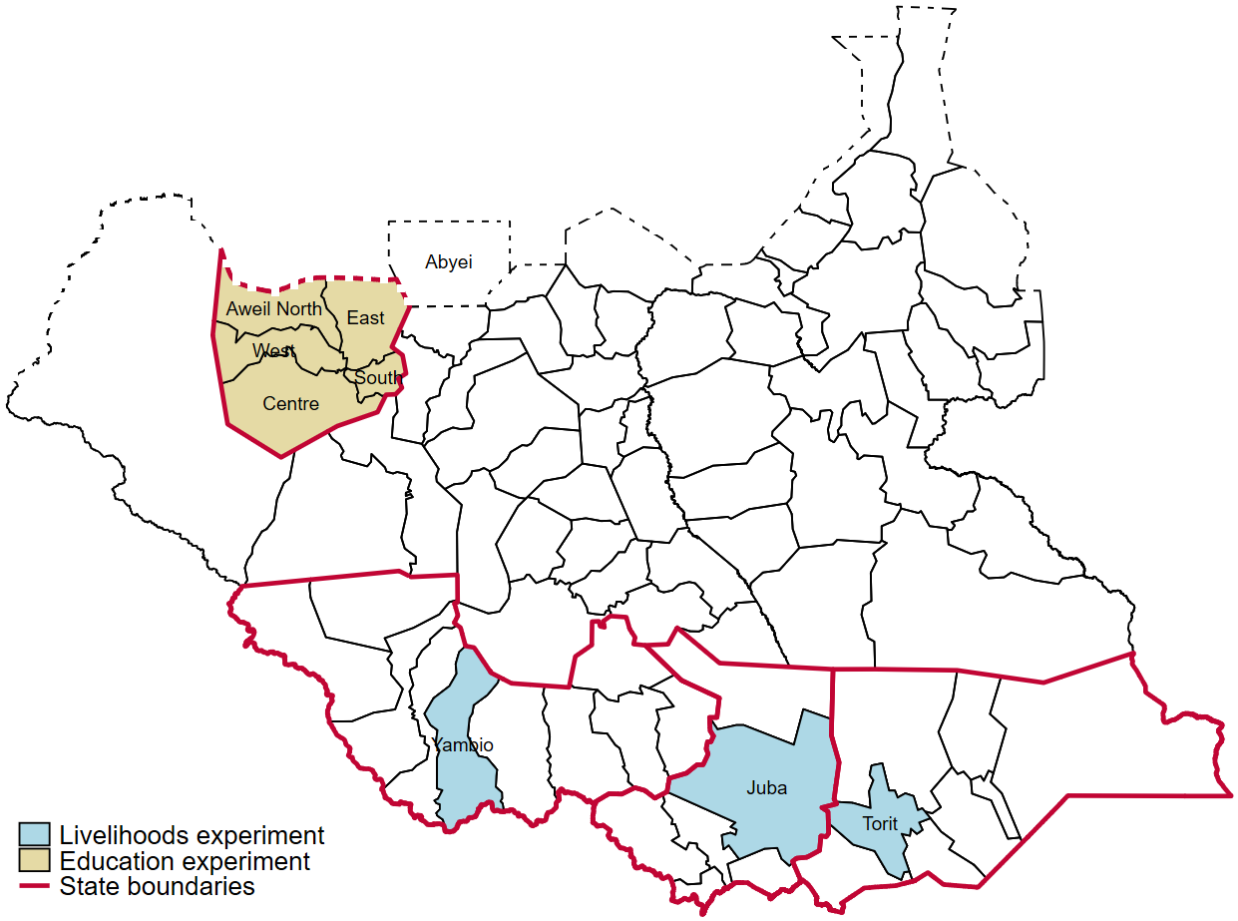
1. This report presents the preliminary analysis of the data obtained from the baseline survey conducted in the Juba and Yambio Counties, and Northern Bahr el Ghazal (NBeG) State of South Sudan. The baseline survey was conducted between July and August 2021 as part of the impact evaluation of the United Nations Children's Fund (UNICEF) and World Food Programme (WFP) joint resilience programme.[2] The detailed inception report of the impact evaluation – *South Sudan, Resilience Learning: Impact evaluation* – can be found on the WFP website at: South Sudan, Resilience Learning: Impact evaluation | World Food Programme (wfp.org) .
2. This section of the report provides an overview of the programme, impact evaluation and key insights from the baseline study. Section 2 of the report gives details of the impact evaluation design, baseline statistics, and project lessons and conclusions. The Appendix includes tables and figures that outline the demographics and findings from the studies with households in Aweil counties, Juba and Yambio.

PROGRAMME SUMMARY

3. The WFP Interim Country Strategic Plan (2018–2021) and the UNICEF Strategic Plan (2018–2021) were intended to directly contribute to the goals outlined in South Sudan's National Development Strategy and the United Nations Cooperation Framework (2019–2021). Cooperation by WFP and UNICEF in South Sudan contributes to the four agreed outcomes of the Cooperation Framework: building peace and good governance; strengthening food security and recovering livelihoods; strengthening social services; and empowering women and young people.
4. In Juba, Yambio and Torit, the evaluation was able to use an experimental design to examine questions related to the livelihoods component of the joint resilience programme. Thus, these counties may be referred to as "livelihoods locations" in the body of this report. Similarly, in the Aweil counties, the evaluation examines questions related to school-based interventions. Therefore, these counties may be referred to as "education locations".
5. In this regard, WFP and UNICEF are working to promote an integrated approach to resilience building through a joint programme. Under this programme, communities and households are provided with sustained support in the form of a bundle of activities over four years. This approach aims to strengthen the ability of beneficiaries to withstand shocks. Programme activities are aimed at: (1) meeting immediate food needs; (2) increasing agricultural production; (3) promoting livelihoods support and diversification; and (4) developing and increasing demand for services and building environments that foster resilience. The two agencies are working jointly to increase their individual impacts and utilize their complementary skills and networks. The joint resilience programme in South Sudan consists of a range of activities – for example, access to water and sanitation, hygiene (WASH), nutrition interventions, cash transfers or food for community assets creation, education programming, skills development, and agricultural production.

[2] Baseline data collection for Phase 2 of the impact evaluation was conducted between April and May 2022.

Figure 1: Counties and states where experiments are implemented in phase 1



Note: The map was prepared by the IE team. The project counties overlap with the data collection counties: Juba, Yambio, Torit, and Aweil Counties. The final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. The final status of the Abyei area is not yet determined.

6. Several counties from four states are covered by the joint resilience programme in South Sudan. The impact evaluation covers these counties, too, but collects data from fewer locations (i.e., villages) than the breadth of the project's programmatic targeting (i.e., total number of targeted villages). Briefly, these are the counties (and states) where programme activities are implemented: Juba (Central Equatoria State), Yambio (Western Equatoria State), Torit (Eastern Equatoria State) as well as Aweil Centre, Aweil West, Aweil East, Aweil North, and Aweil South, henceforth Aweil counties (NBeG State). From largest to smallest, the administrative units in South Sudan are states, counties, payams, bomas and villages.

7. The main body of this report summarizes the baseline data collected from (1) households in 41 villages in Juba and Yambio, and (2) households that have children going to 30 selected schools in the Aweil counties of NBeG.[3] Then, in Appendix A.6 and Appendix A.7, the report presents the baseline data collected from 51 villages in Aweil West and Centre.

WINDOW SUMMARY

8. The concept of resilience has gained attention because it recognizes the importance of addressing shorter-term humanitarian needs while also supporting communities to face future crises induced by climate change, conflict, and other factors. Many institutions, including UNICEF, WFP, and the World Bank, have increasingly used the concept as a basis for their programming, recognizing that climate change and extreme weather

[3] As it will be described in future sections, baseline data collection was not possible in Torit due to security threats. However, the survey firm did manage to reach and interview households in the county during subsequent waves of high-frequency data collection.

events are exacerbating food insecurity or increasing the likelihood and severity of shocks associated with food crises. To strengthen resilience, organizations employ an integrated approach to programming, where multiple forms of support are provided to the same community over many years.

9. Rigorous evidence on how these interventions contribute to resilience is needed to improve programme targeting and design to address the root causes of food insecurity and malnutrition while meeting immediate food needs. The Climate and Resilience Impact Evaluation Window aims to support programmes to generate this evidence. The South Sudan impact evaluation contributes to the window that was jointly developed by the WFP Office of Evaluation, Asset Creation, Livelihoods and Resilience Unit, and the Climate and Disaster Risk Reduction Unit, as well as the Development Impact Evaluation (DIME) department at the World Bank.

10. The first pre-analysis plan for the window describes policy experiments to estimate how resilience is affected by varying livelihoods, education, health, and complementary activities. Within the window, resilience is assessed using a two-pronged approach, measuring: 1) changes in key well-being outcomes and capacities at baseline and endline; and 2) food security, shocks and coping strategies every two months to detect changes across seasons, shocks and stressors.

11. The window aims to increase the predictive power of evidence generated across contexts to improve resilience programming. The ambition is to learn what works (and what does not) in a way that contributes to the global evidence base. The window currently has evaluations ongoing in four countries: Mali, Niger, Rwanda, and South Sudan.

IMPACT EVALUATION QUESTIONS

12. The impact evaluation in South Sudan will test the hypothesis that supporting communities through multiple activities focusing on various areas – such as education, health, food security and nutrition – improves household resilience when faced with shocks and stressors. The evaluation constitutes a gradual approach to building a learning agenda that is suitable for the context of South Sudan and aligned with the implementation plans of WFP and UNICEF. Experimental and quasi-experimental designs are used to answer the following main questions:

    1) What is the impact of livelihoods programmes on household resilience?
    2) What is the added value of asset activities beyond the impact of transfers alone?
    3) Can de-linking the timing of transfers from asset activities further improve outcomes?
    4) What is the impact of the UNICEF education package?
    5) Does integrated education and health programming, and school feeding and nutrition programming lead to better resilience outcomes when implemented jointly?
    6) How do community nutrition volunteers and better access to nutrition facilities relate to child-level outcomes?
    7) How has improved access to WASH facilities contributed to better health outcomes?

13. The focus will be on documenting the impacts of the various interventions on household resilience and well-being, as measured by outcomes related to education, health, food security, nutrition, financial outcomes, assets, and livelihood opportunities. The evaluation will also assess how the resilience programme impacts the ability of households to mitigate the effects of shocks. This will be mainly achieved by monitoring food consumption, coping strategies, shocks, and stressors every two months for at least one year.

BASELINE SURVEY PROCESS

14. As outlined in the Inception Report, the evaluation is taking place between 2021 and 2023. In 2021, 41 villages and 30 schools were included in the impact evaluation. Later, the evaluation leveraged the 2022 expansion of activities to include an additional 51 villages in the design. The impact evaluation design relies on two quantitative components, cluster randomized controlled trials (RCTs) and heterogeneity analysis, which are complemented by qualitative analysis.

15. Baseline data was collected from 1,622 households, including 1,172 households from 41 villages in Juba and Yambio counties, and 450 households with children enrolled in 30 schools in the Aweil counties. Baseline field activities took place in Juba and Yambio between 1 July and 9 September, and in the Aweil counties between 22 August and 21 September 2021. All data was collected using computer-assisted personal interviewing (CAPI) techniques, using Android tablets running the SurveyCTO data collection software. The targeted respondent was the household head. However, to measure the dynamics of intra-household decision making and resource allocation, some components of the questionnaire were directed at female respondents of reproductive age– (for example, dietary diversity) or on behalf of their children (vaccination information, diet, and health) — in case the household head was male.

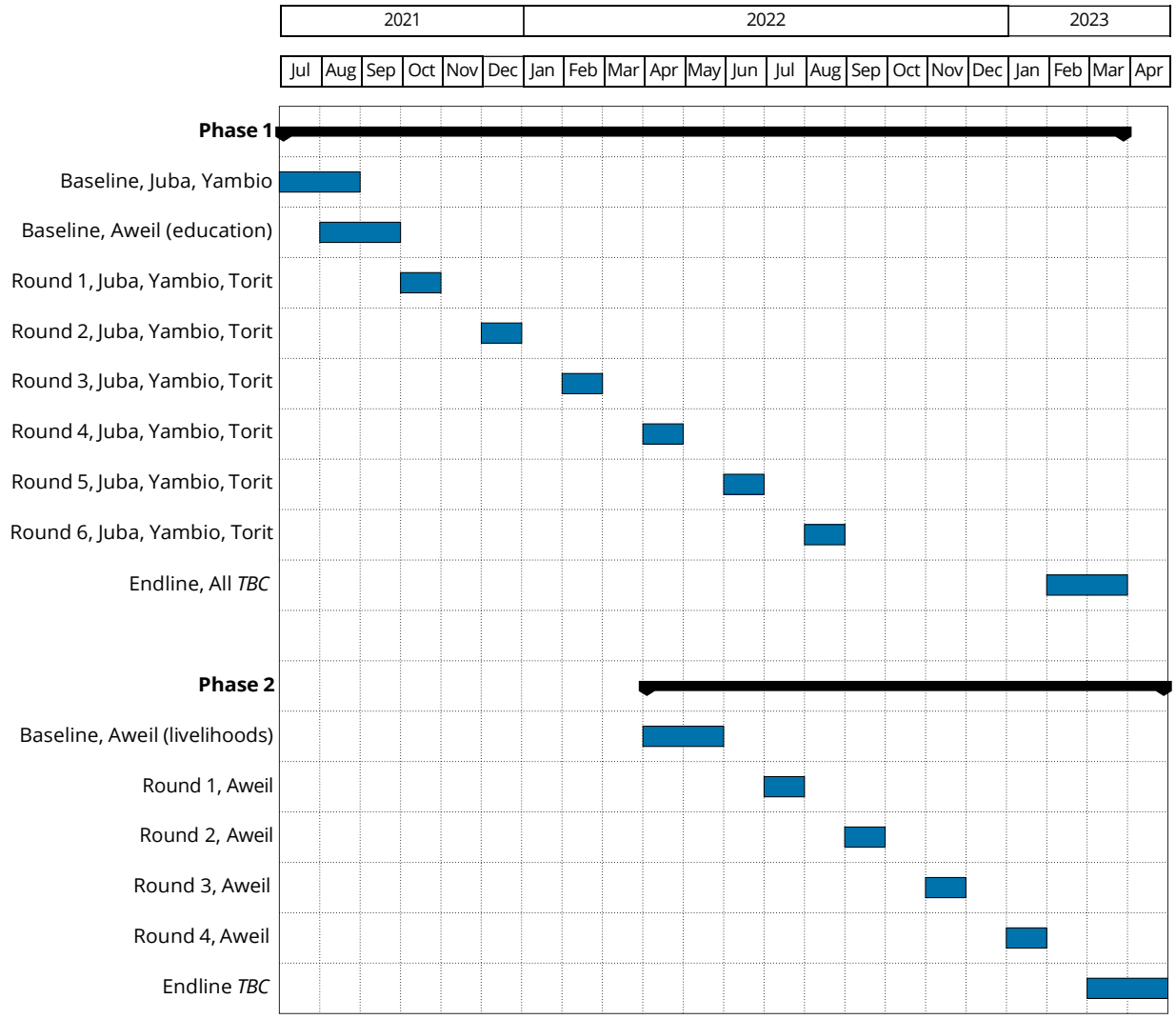
16. The data collected at baseline is important as it holds information about the pre-programme situation at the household and village level and serves as a point of reference for the impact evaluation. Baseline data can be used to explore the heterogeneity of programme impacts, which is useful if one expects that programme impacts are particularly strong for households that share certain baseline characteristics. In addition, baseline data is also used to verify that key indicators, which can potentially affect the main outcomes of interest, are balanced. This means that they have similar averages across treatment and control sites. Baseline balance checks reveal whether the randomization process was successful in achieving samples of households that are comparable except for their access to the interventions of interest. Finally, baseline data is useful in the context of experiments as it can account for differences across treatment arms that can arise randomly.
17. The quality of the data submitted by enumerators was checked daily by the survey firm and the impact evaluation team. For 15 percent of interviews, quality controllers were sent to the interviewed households to check whether the answers provided to key questions matched the data collected by enumerators.

DATA COVERAGE AND INTERPRETATION

18. It is important to consider the sample of survey respondents when drawing conclusions about the results contained in this report.
19. First, the counties and states that are included in the analysis are not representative of all counties and states in South Sudan. Specifically, the sampled areas are conducive to resilience programming as opposed to emergency interventions. This may set apart the impact evaluation counties and states from other counties and states in South Sudan regarding key aspects that are summarized in this report.
20. Second, the data summarized in this report describe county and state populations who are eligible to receive WFP and/or UNICEF support. Therefore, these households meet certain vulnerability criteria which may or may not fit county or state populations overall. The data should not be interpreted as being representative of the sampled counties or states.
21. Third, the sampling frames used to collect data in the livelihoods sites – Juba, Yambio (phase 1), Aweil West and Centre (phase 2) – are different to those used in the education sites of the state of NBeG. The latter include Aweil West and Centre as well as Aweil South, North and East. For the livelihoods sites, the evaluation team used village-level lists of households eligible to receive programme support from WFP. For the education sites, the evaluation relied on school-level enrolment lists to select households with children attending school. Consequently, readers should be careful when comparing the livelihoods sites and the education sites.
22. Fourth, readers must also note that, even within the livelihoods sites, the sample size for the county-specific statistics presented in the appendix varies to the extent that some of these statistics are more accurate than others. For instance, the sample size in the livelihoods locations in Juba and Aweil Centre are 11 and 12, respectively. These samples are significantly smaller than the locations in Yambio, 22 villages, and Aweil West, 39 villages. The number of interviewed households per village is also important, as Juba and Yambio have larger village-level samples. Aweil Centre has the smallest household sample, followed by Juba, Aweil West and Yambio. Consequently, the averages of the summarized indicators are relatively better estimated for the Yambio and Aweil West counties than they are for Juba or Aweil Centre.
23. Finally, unless otherwise stated, all summary statistics are aggregated across treatment and control groups for the presentation of baseline data. There is no reason why households would be different across treatment arms at baseline as treatment was randomized.

DATA COLLECTION TIMELINE

Figure 2: Data collection timeline



24. Section 2 of this report describes the data collected at baseline from Juba and Yambio (phase 1 of the livelihoods locations) as well as from Aweil West, South, East, North and Centre (education locations). In Appendices A.6 and A.7, the report presents the summary statistics for phase 2 of the livelihoods locations in Aweil West and Centre, respectively. As described in the Gantt chart above, phase 2 was implemented nine months after the baseline for phase 1 started. This report was first created to summarize phase 1 and education data. Thus, the appendices cover phase 2.

25. The report does not summarize data from any of the high-frequency waves collected in view of the livelihoods experiment. For more information on the high-frequency data or the evaluation design overall, please consult the Impact Evaluation Inception Report or contact the study authors.

KEY INSIGHTS

26. The following key insights apply to phase 1 of the livelihoods locations and education locations.

27. **Survey respondents.** Across the surveyed counties, 30 percent of the interviewed households were led by females. Among household heads, and regardless of their gender, only 20 percent had a primary education certificate, and 35 to 38 percent could read and write.

28. **There is substantial room for school enrolment and attendance to grow, especially for children in remote areas, and for girls.** In the Aweil counties of NBeG, where the education experiment is implemented, only 71 percent of the surveyed children, 5-17 years old, were in school at baseline. Of the children attending

school, 18 percent missed at least one day during the month prior to data collection. Households report that children were not in school at the time of the survey due to the cost of education and the support they need for household chores. This observation aligns with household reports regarding their most common coping strategies. These include reducing health or education spending (40 percent of households) and withdrawing children from school (27 percent). The baseline data also provides suggestive evidence that distance to school matters. This is especially true for girls – a walk to school that takes longer than 90 minutes is correlated with a drop of 19 percent in enrolment, compared to girls who live within 30 minutes from a primary school.

29. **The main livelihoods of the surveyed households are related to agriculture and are concentrated during the main season, April to September**. The sampled households are engaged in a mix of agriculture and non-agricultural employment activities. However, the former is the predominant livelihoods strategy. In Juba and Yambio, 91 percent of households cultivated land during the 2020 rainy season and 2021 dry season. In NBeG, this percentage stood at 81. Additionally, 43 percent of all households reported rearing livestock, and roughly 32 percent reported having a small business. Finally, less than 10 percent of the adults in the interviewed households reported having been employed during the year prior to baseline data collection.

30. **All households experienced negative shocks during the year preceding baseline data collection.** The average household in Juba and Yambio was exposed to seven shocks in the past year, and in the Aweil counties, the average was five to six shocks. Droughts, floods, high food prices and crop diseases were the most reported shocks, and around 65 percent of households employed crisis coping strategies. Compounding these shocks, households have few places to seek support: on average, respondents reported that they were able to rely on no more than one family member and one friend for financial support in times of need.

31. **Households experience high levels of food insecurity.** The data suggest that a large percentage of the sampled households exhibited signs of food insecurity and inadequate diets at baseline. For instance, in Juba and Yambio, 33 percent of households had a 'poor' Food Consumption Score – considering the foods consumed during the week prior to the interview – and 26 percent were classified as having 'borderline' food consumption on the same scale. Only 11 percent of households enjoyed a diverse diet, while the dietary diversity of 39 percent of households was judged to be low, scoring between 1 and 4 on a scale from 1 to 7.

32. **Access to health services is more challenging for those living far away from clinics, but access to vaccines and essential vitamin supplements is satisfactory.** Distance to health clinics seems to negatively impact health-seeking behaviour. For instance, among households whose children were sick in the two weeks prior to baseline data collection, 83 percent of them sought treatment if they lived close to a clinic in Juba – that is, within 15 minutes. However, this statistic went down to roughly 66 percent if the household was located more than an hour away from the clinic. Importantly, for health services that are not reliant on households visiting the clinic – that is, services that are mobile owing to the work of community health workers or nutrition volunteers – the baseline analysis confirms that the location of clinics is not correlated with health-seeking behaviours. For instance, at the time of the baseline survey, coverage by the measles vaccination and vitamin A supplementation was high for households with small children regardless of the distance between their dwelling and the closest health facility.

33. **Households have limited access to a clean source of water or an improved latrine, and differences in access and type of facility are prominent across counties.** In Juba and Yambio, 47 percent of households have access to boreholes and 27 percent source their water from a protected dug well. In NBeG, the situation appears to be better, with 68 percent of households having access to a borehole and 15 percent using public taps. Regarding access to and use of latrines, the situation is reversed. NBeG has very poor access: 93 percent of households do not have access to any facility, while in Juba and Yambio, 60 percent of households have a latrine in their own compound. Half of these households have a pit latrine with a slab, while the remaining half are using latrines without a slab.

34. **There is room to improve the behaviour of households regarding hygiene practices.** Less than 25 percent of households report purifying the water they drink. They either use a water filter, boil the water, use water tablets, or add chlorine. However, in Juba and Yambio, among those who report purifying their drinking water, the majority lets the water stand and settle. Moreover, household heads reported that they wash their hands between four and five times per day, and they mostly use the cooking area for this purpose. According to the enumerators' direct observation, less than 20 percent of those reporting that they wash their hands had a working water pump, soap, detergent, ash, or mud at their designated hand-washing station.

35. Overall, the baseline report indicates that the observed populations are highly vulnerable due to their constant exposure to shocks, limited livelihood opportunities and equally limited support networks. Against the background of climate change, the households' reliance on rain-fed agriculture further exposes them to

periods of food insecurity. Then, their restricted access to health, WASH and education services compounds pre-existing vulnerabilities and increases exposure to complex challenges.

TECHNICAL REPORT

1. Introduction

36. In 2020, 155 million people faced crisis-level or worse rates of food insecurity worldwide. Among them, as many as 115 million lived in countries affected by conflict or weather extremes.[4] In 2021, in South Sudan, close to 70 percent of the population – that is, 8.3 million people – needed some form of humanitarian assistance, and close to 108,000 people faced catastrophic levels of food insecurity.[5] Conflict, forced population displacements and climate change exacerbate food insecurity.[6] However, evidence is lacking on how development outcomes are affected by these shocks, and how development programmes support populations to effectively respond to these shocks.

37. The Office of Evaluation, the Asset Creation, Livelihoods and Resilience Unit, and the Climate and Disaster Risk Reduction Unit at WFP partnered with the World Bank's Development Impact Evaluation (DIME) department to create the Climate and Resilience Impact Evaluation Window. The WFP's impact evaluation strategy for 2019–2026 focuses on delivering impact evaluations that contribute to the global evidence as well as organizational learning.

38. The WFP Evaluation Policy 2022 defines impact evaluations as those that "measure changes in development outcomes of interest for a target population that can be attributed to a specific programme or policy through a credible counterfactual". They are usually undertaken during programme implementation over a multi-year period. WFP's ability to establish a credible counterfactual for its interventions depends on logistical and financial constraints. Impact evaluations are therefore restricted to looking at a set of questions that can be answered during a programme cycle using credible counterfactual designs.

39. The Climate and Resilience Impact Evaluation Window aims to understand how WFP programmes contribute to the resilience of the supported populations. The first round of impact evaluations selected for this window aims to estimate the impacts of integrated packages of resilience activities on a household's capacity to absorb shocks (absorptive capacity), adapt to increasing environmental or economic stressors (adaptive capacity), and improve well-being in the long term (transformative capacity). Given the shorter timeframes of WFP programme funding cycles, the impact evaluations initially focus on absorptive and adaptive capacities. Long-term transformative capacities may require more time and additional data to measure.

40. The programme in South Sudan differs from the other projects that are currently part of the Climate and Resilience Impact Evaluation Window which WFP works on in partnership with UNICEF, covering cross-sectoral resilience interventions in urban and peri-urban areas of South Sudan. In stable areas of South Sudan, UNICEF works with partners to implement programmes for longer-term recovery and resilience among affected communities. UNICEF works to strengthen cross-sectoral, integrated responses at the national and sub-national levels to ultimately reach the communities that need assistance.

41. The joint project discussed in this report consists of a range of activities, including Food Assistance for Assets (FFA), nutrition support, school feeding, and health and water and sanitation, hygiene (WASH) activities. As a result, the research agenda in South Sudan incorporates elements from WFP's School-Based Programming Window and explores topics related to nutrition, water, sanitation, and hygiene. However, not all research questions are answered using experimental evidence, due to the logistical and financial constraints mentioned above.

42. Regional discussions, in-country consultations and subsequent conversations with the programme and Monitoring & Evaluation (M&E) teams have led to the adoption of a gradual approach to building an impact evaluation learning agenda that is suitable for the South Sudanese context and the programme implementation plans of UNICEF and WFP.

43. To identify the causal impact of the joint resilience programme, the impact evaluation in South Sudan has implemented clustered randomized control trials (RCTs) to study livelihoods-related research questions in

[4] https://docs.wfp.org/api/documents/WFP-0000127413/download

[5] https://docs.wfp.org/api/documents/WFP-0000131531/download

[6] https://www.wfp.org/publications/global-report-food-crises-2021

Juba, Yambio and Torit and education-specific topics in the Aweil counties of NBeG.[7] The impact evaluation also makes use of quasi-experimental evidence to explore the effects of WASH, health, and nutrition interventions in all four counties. The window collects baseline, high-frequency and endline data to generate rigorous evidence that will inform the design, targeting and implementation of UNICEF and WFP resilience programmes.

44. The impact evaluation will measure key indicators through large-scale baseline and follow-up surveys – for example, consumption, food security, nutritional status, education, WASH, financial outcomes, assets, livelihoods, and coping strategies. In addition, a subset of food security indicators will be measured through high-frequency surveys that are collected every two months during the study period. The evaluation will also directly assess how the resilience programme affects households' ability to mitigate the effects of shocks on their food security and welfare.

2. Evaluation Context

2.1. BACKGROUND AND CONTEXT

45. South Sudan gained independence in 2011. Widespread armed conflict and insecurity followed, which resulted in poor economic growth, displacement and worrying development indicators. In 2021 alone, nearly 70 percent of the population required some form of humanitarian assistance, with more than 100,000 people facing catastrophic levels of food insecurity. UNICEF estimates that 313,000 children under the age of 5 years were affected by severe acute malnutrition in South Sudan in 2021. It is further estimated that nearly one in ten children dies before the age of 5 years due to health-related complications, and only 44 percent have received the necessary immunization.

46. The population of South Sudan is highly exposed to climatic shocks such as floods and droughts. Food production has declined since 2014, hitting the lowest level in 2017. However, it has since increased slightly. In most parts of South Sudan, households have the potential to produce surplus agricultural commodities but face challenges due to weak physical access to inputs and markets, high prices for agricultural inputs, inadequate structures to mitigate climatic shocks and poor payment terms. Insecurity has prevented farmers from accessing their land during the planting and harvesting seasons. The conflict has further constrained the private sector market and, with fewer traders in the market, farmers' terms of trade have eroded.

47. COVID-19 has also presented unique challenges for the delivery of nutrition services. For instance, households limited their visits to nutrition facilities for fear of infection. The pandemic also brought about the temporary suspension of preventive activities that require the targeted populations to gather in one place at the same time. Such was the case of the vitamin A supplementation campaigns and malnutrition screening.

48. South Sudan has received substantial humanitarian assistance over the years. A range of interventions have been implemented in response to shocks and seasonal food insecurity. The collaboration between UNICEF and WFP in South Sudan brings together the expertise of UNICEF in the education, child protection, WASH, health and nutrition sectors, and the expertise of WFP in addressing acute and persevering food insecurity, as well as their logistical reach and expertise in building community assets and livelihoods.

2.2. PROGRAMME DESCRIPTION

49. Through the joint resilience programme, UNICEF and WFP are targeting four outcomes: strengthening food security and recovering livelihoods; building peace and good governance; strengthening social services; and empowering women and youth. To achieve these goals, the joint UNICEF-WFP project implements a broad package of interventions: i) livelihoods activities, including food or cash assistance for asset activities; (ii) access to education, including child protection, school feeding and other school-based support mechanisms; and (iii) water, sanitation, health, and nutrition activities. The livelihoods interventions aim to catalyse growth while the schooling and WASH/nutrition programming ensures access to basic services. By providing a full package of services, the project is expected to build the absorptive, adaptive, and transformative capacities of the targeted populations and communities.

50. The project targets the general population as well as specific groups, such as returnees who were previously displaced by conflict, extremely vulnerable children, children, and youth between 6 and 18 years old,

[7] The report develops the discussion on the livelihoods locations of phase 2 in Appendix A.4.

unvaccinated children under 1 year of age, children under 5 years of age, and pregnant and lactating women who are vulnerable to malnutrition and micro-nutrient deficiencies. Against this background, the project further targets households classified as Phase 3 on the Integrated Phase Classification which describes the severity of food emergencies.[8] The project also targets institutions via teachers, parent-teacher associations, school-management committees, social and health workers, and community nutrition volunteers to ensure the rendering of basic services such as quality education, child protection, WASH, health, and nutrition.

51. The project commitment is for four years, 2020 to 2023, and it focuses on urban and peri-urban areas of South Sudan. The choice of project locations was aligned with the work of the overarching Partnership for Recovery and Resilience (PfRR) in South Sudan. The PfRR was launched in 2018 and consists of peacebuilding, humanitarian and development partners who are committed to working together to build the resilience of individuals, communities, and institutions. The PfRR recognizes that some locations are more conducive to resilience building, and the joint UNICEF-WFP project has focused on a subset of the PfRR Candidate Partnership Areas: Juba, Torit, Yambio and Aweil counties.

52. This report gives an overview of the households' pre-programme situation in the sampled communities. The report details the research design in Section 2.2. Thereafter, baseline descriptive statistics are presented in Section 2.3, and Section 2.4 concludes and reflects on baseline insights.

3. Impact Evaluation Design and Sampling Strategy

53. The impact evaluation of the joint resilience programme in South Sudan is using experimental and quasi-experimental methods to answer the evaluation questions presented in Section 1.3.

54. The experimental method – randomized control trial (RCT) – compares treatment and control groups to provide causal evidence on the relationship between programme activities and resilience capacities, as well as well-being outcomes. The RCT uses randomized livelihoods and asset creation activities, cash-transfers, and education interventions to construct credible counterfactuals and identify the impact of the programme on resilience outcomes.

55. Meanwhile, the quasi-experimental methods use a counterfactual too; however, they require additional assumptions, especially regarding the choice of the counterfactual, to provide valid and unbiased estimates. These methods are used because not all resilience programme activities are suitable for randomized assessment. Questions related to health and nutrition interventions will therefore be examined using a heterogeneity analysis, which allows us to examine sub-groups within the treatment communities to understand the effect of activities on each sub-group. For example, the comparison of health outcomes between households at different distances from health facilities are carried out using quasi-experimental methods.

56. Qualitative data will be used to understand how the resilience programme is implemented and how the programme support is perceived by beneficiaries. The qualitative data will also be used to generate additional insights about the patterns observed based on the quantitative data. Particularly, it will help to understand the aspects of the programme that are implemented well and to identify opportunities for further improvement.

57. The design of the impact evaluation is aligned with the implementation modalities and timelines of the joint resilience programme. The impact evaluation in South Sudan is therefore comprised of: (1) an experimental livelihoods component to estimate the impact of cash and food assistance interventions; (2) an experimental education component to evaluate the impact of integrated education interventions; and (3) several quasi-experimental explorations (heterogeneity analyses) to assess the importance of having access to WASH, health and nutrition facilities, and to identify and measure the synergies that may be created by the joint UNICEF-WFP approach to education programming.

[8] Phase 3 is associated with a crisis situation, whereby households either (a) have food consumption gaps that are reflected by high or above-usual acute malnutrition, or (b) households are marginally able to meet minimum food needs, but only by depleting essential livelihood assets or through crisis-coping strategies.

58. For the experimental components, there are two primary entry points and units of randomization: villages for the livelihood's interventions, and schools for the education interventions. WFP and UNICEF have pre-selected villages and schools that meet the eligibility criteria for the joint resilience programme. The selection included a vulnerability and a technical assessment. Equally eligible villages and schools were randomly assigned to multiple comparison groups, which eliminated any systematic differences between the treatment and control groups at baseline, and thus led to a valid counterfactual.

3.1 LIVELIHOOD EXPERIMENTAL COMPONENT, PHASE 1

59. The livelihoods component of the impact evaluation aims to: (a) explore how households are coping with and without livelihoods interventions in the form of cash or food transfers; (b) estimate the added value of working on community assets over and above the receipt of transfers; and (c) determine whether giving beneficiaries the flexibility to choose when to work on assets generates additional value by encouraging more efficient employment of time. Finally, the livelihoods component is also piloting an experiment to (d) assess whether updating the village-level beneficiary lists on an annual basis increases average household resilience, as opposed to the current practice of updating lists every three years.

60. The livelihoods impact evaluation relies on three experiments. *First*, it compares newly eligible villages that were randomly assigned to three treatment arms: (i) control (villages that do not receive the programme, Group A); (ii) unconditional cash or food transfers (UCT, Group B); and (iii) food or cash transfers for work on assets (FFA, Group C).[9,10] The randomized assignment of interventions to a sub-sample of the 25 eligible villages is justified by resource constraints preventing the enrolment of all 25 eligible villages in the programme in 2021. Villages in the control group can be enrolled during future programme cycles.

61. *Second*, within the FFA arm, the evaluation compares the outcomes of a small number of households in villages (i) where the beneficiary lists are updated, and (ii) where they are not.

62. *Third and last,* the evaluation takes a sample of villages where FFA activities were present before 2021 and randomly assigns them to: (i) a business-as-usual model whereby beneficiaries work during the month and receive payments at the end of the month (Group C.1); and (ii) a de-linked model that allows beneficiaries to choose when to work on community assets, thus effectively de-linking the timing of transfers from that of the asset work (Group C.2).[11]

[9] FFA programming activities are carried out with a focus on increasing agricultural and pastoral productivity and yields, supporting economic development, and strengthening social ties between community members and villages. Assets are selected via a community-wide participatory process and are built through FFA activities. Some assets are built jointly by a set of villages. Typical examples of assets include land clearing and planting, vegetable gardening, community access road construction, water pond or dike construction, tree seedling production, restoring degraded landscapes, improving water harvesting, reducing the risk of environmental disasters, and creating community assets to secure ecosystems.

[10] FFA participants are paid USD 40.5 per month to work on assets, typically between April and September. The de-linked model may also lead to different timeframes.

[11] Further information on the evaluation methodology can be found in the Inception Report (page 14) at this link: https://www.wfp.org/publications/south-sudan-resilience-learning-impact-evaluation.

Figure 3: Livelihoods research design, phase 1

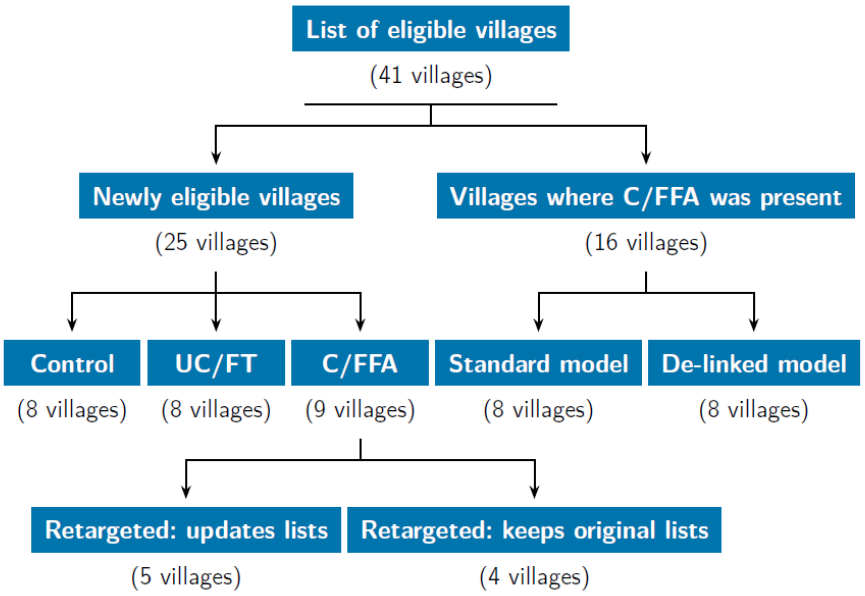


Table 1: Livelihoods baseline sample size, phase 1

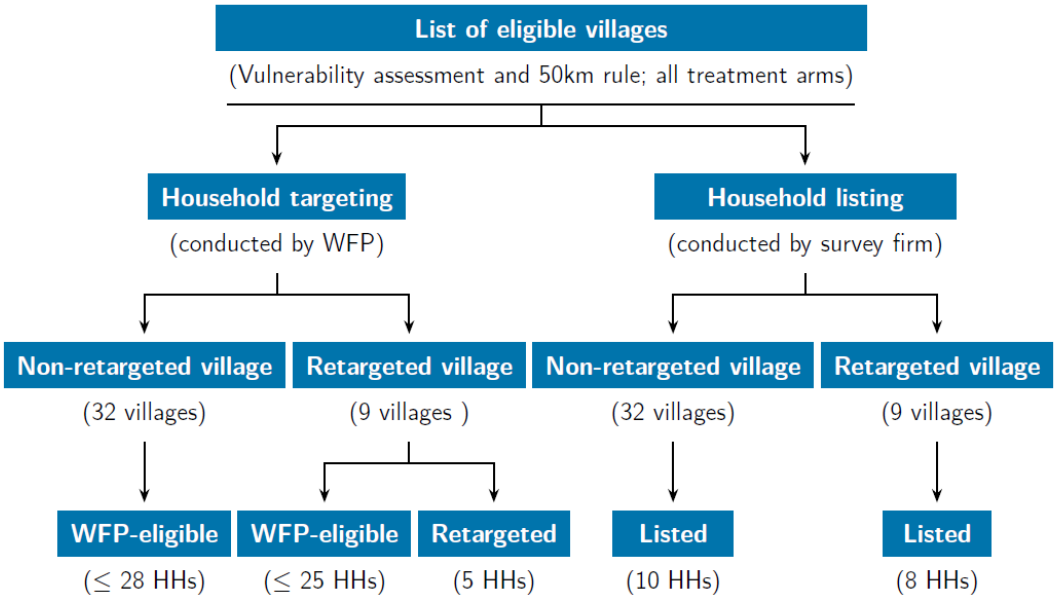
County	Villages	Targeted households	Successful households	Households not visited
Juba	11	408	405	0
Yambio	22	776	767	0
Juba (Fojulu)	1			33
Torit	7			266
Total households	**41**	**1,184**	**1,172 (99%)**	**299**

Note: Eight villages were not interviewed at baseline due to security concerns.

63. Project villages are located within 50km of county centres. Within that area, the most vulnerable bomas and villages are considered eligible to receive support. All eligible villages were randomly assigned to the various treatment arms, as indicated in Figure 3. Within eligible villages, a further randomization was performed to select interviewees from among the eligible households, as shown in Figure 4.

64. A household is considered eligible to receive the intervention if it ranks high on a vulnerability scale that includes four categories: better-off, medium well-off, poor, and very poor. Households in the very poor and poor categories are eligible to benefit from C/FFA or UC/FT. Then, a subset of these households was randomly selected to participate in interviews in each village. This amounts to 848 households (401 and 447 households in newly eligible villages and in villages where C/FFA was already present in 2021, respectively). In addition, randomly selected households from the general village population were also interviewed to obtain information that is not limited to the FFA-eligible households – this is referred to as the "household listing exercise". In this regard, 164 and 160 households in the new and pre-existing project locations were interviewed. The total is of 1,172 interviewed households in phase 1, as highlighted in Table 1.

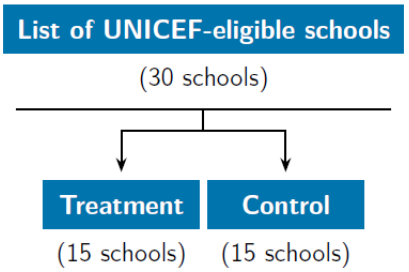
Figure 4: Village sampling frames, phase 1



3.2 EDUCATION EXPERIMENTAL COMPONENT

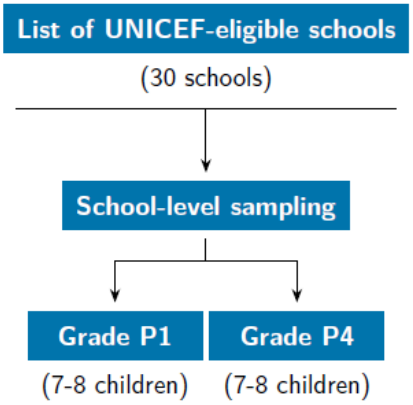
65. The UNICEF and WFP education activities aim to create safe, healthy, and productive learning spaces for children. The package of interventions implemented by UNICEF ("education interventions") includes: 1) campaigns to raise awareness on the importance of education, especially girls' education, and to establish and develop the capacity of parent-teacher associations and school management committees; 2) rehabilitation and construction of classrooms, the installation of water supplies and gender-appropriate sanitary facilities; 3) in-service training of teachers and awareness campaigns to improve the health of children via the provision of knowledge and training to teachers to screen children for basic illnesses; and 4) psychosocial support activities to children and adolescents, including case management and/or a referral mechanism for extremely vulnerable children with serious protection concerns. The school-based activities implemented by WFP ("school feeding") include school meals and de-worming treatments.

Figure 5: Education research design



66. The education component of the impact evaluation is implemented in the Aweil counties of Northern Bahr el Ghazal (NBeG) and aims to provide experimental evidence regarding the effects of education interventions. These interventions were randomized among a sample of 30 schools that were eligible to receive the support. Half of the sample was assigned to a treatment group that receives education interventions, and the other half was assigned to the control group that does not receive education interventions (see Figure 5). This component also aims to assess whether the joint implementation of education interventions and school feeding is more effective at improving outcomes, as opposed to implementing school feeding independently.

Figure 6: School sampling frames



67. Schools reopened at the beginning of May 2021 after many months of being closed due COVID-19-related measures. As children enrolled for the new academic year, enrolment lists were used as sampling frames for the evaluation. To limit the amount of time needed to digitize all school-level enrolment lists, and considering the sensitive nature of baseline timing, the impact evaluation team decided to focus on Primary 1 and Primary 4 in view of household sampling (see Figure 6).[12] Of course, P1 and P4 children served as mere entry points to their households, the majority of which included additional children of school-going age who became part of the education sample. Thus, the education sample includes children attending all grades, P1 to P8, aged between 5 and 17 years.

3.3 QUASI-EXPERIEMENTAL COMPONENT (HETEROGENEITY ANALYSIS)

68. As it is not feasible or practical to randomize all the resilience programme activities individually in South Sudan, the impact evaluation uses heterogeneity analysis to understand how the comprehensive programme correlates with targeted outcomes. The heterogeneity analysis harnesses the cluster RCT designs as a basis for identifying treatment and comparison communities. Heterogeneity analysis allows us to compare health, food security and other well-being outcomes of household groups with different characteristics or varying levels of access to services. The impact evaluation employs heterogeneity analysis to examine the following interactions and outcome areas.

3.3.1. Impact of joint programming

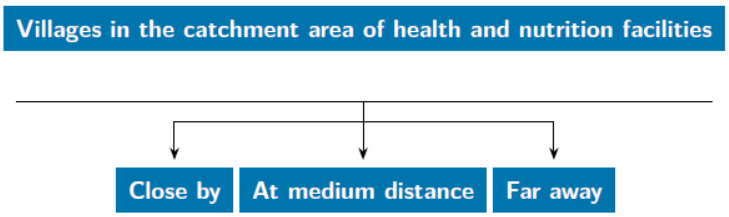
69. Within the impact evaluation villages, heterogeneity analysis will be used to examine household groups receiving different intervention packages (e.g., FFA + Education vs. FFA + Health vs. FFA + Health + Education). To enable this, the impact evaluation team will map the types of interventions received by each household within the impact evaluation sample, through a combination of self-reported surveys and programme monitoring tools. This will allow us to understand: 1) the jointness of the programme and how different activities of the programme overlap within a village; and 2) changes in outcomes of household sub-groups receiving different packages of support.

3.3.2. Variations in access to services

70. Some interventions under the joint-resilience programme, such as education, health, nutrition, sanitation activities, are implemented at the community level (i.e., through public health centres, schools, or WASH facilities). Therefore, access to these facilities could influence how effectively households can benefit from these services. The heterogeneity analysis will examine how household access to services and their well-being outcomes vary within the impact evaluation villages.

[12] The impact evaluation team wanted to observe the entry-point children for at least two academic years. As not all schools offer all primary grades P1 to P8, the decision was to choose P1 and P4 because all schools were very likely to offer classes until P5 included. However, all schools are less likely to offer P6 to P8. So, the selection of P4, as opposed to a higher grade, increased the chances that the entry-point children will continue to be in school one year after the baseline as their school offers P5.

Figure 7: Quasi-experimental research design



71. The approach is to measure the outcomes of households that live at different distances with respect to schools, water sources and nutrition and health facilities. As the location of households relative to schools, clean water sources, and health and nutrition facilities is not random, the analysis will measure the correlation between access to services and household outcomes, while controlling for demographic and other relevant characteristics. Figure 7 gives an overview of the research design and comparison groups. Note that the distance groups – close-by, medium distance, and far away – will be determined empirically once all the data is available. A tentative definition of these groups is included in Table 10 (i.e., under 30 minutes, 30 to 60 minutes, and above 60 minutes).

Figure 8: Time to water source

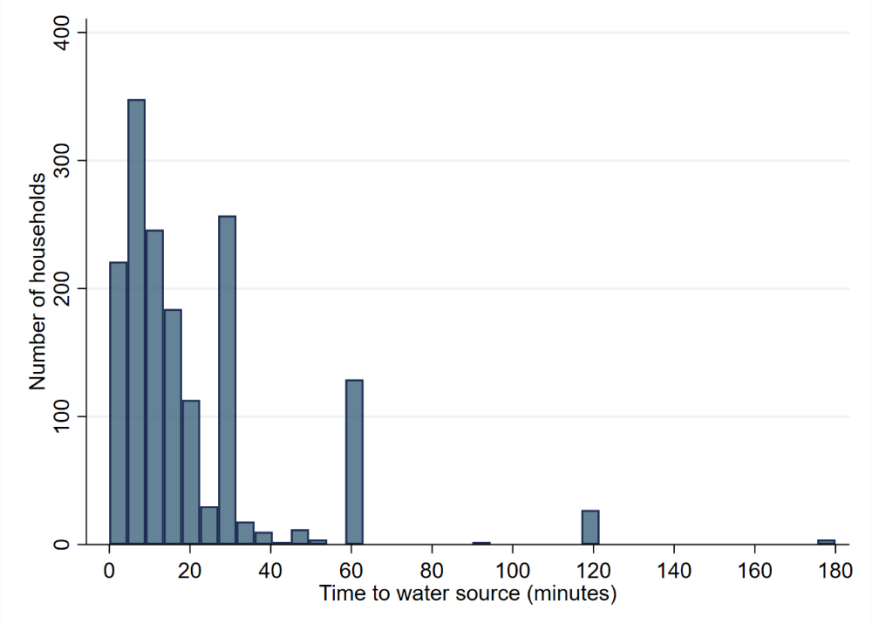
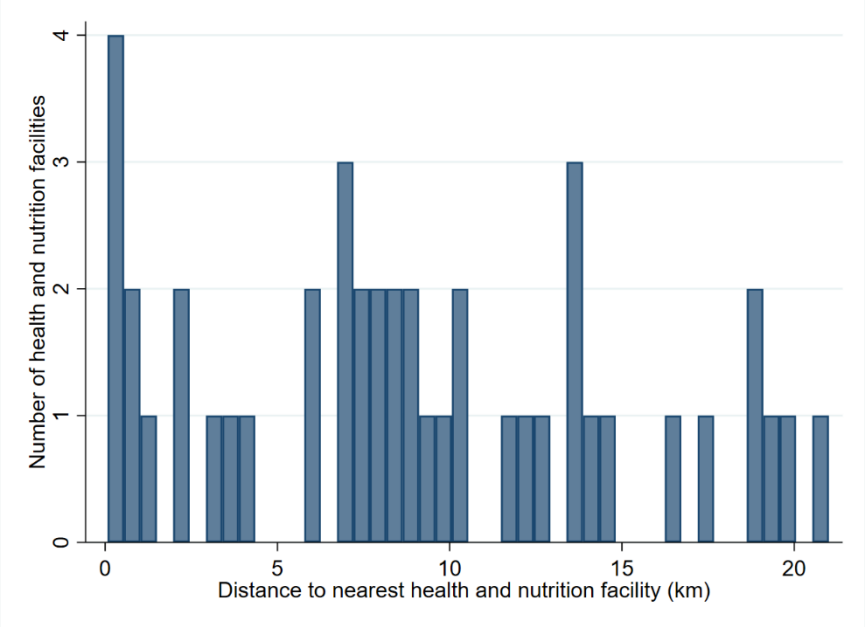


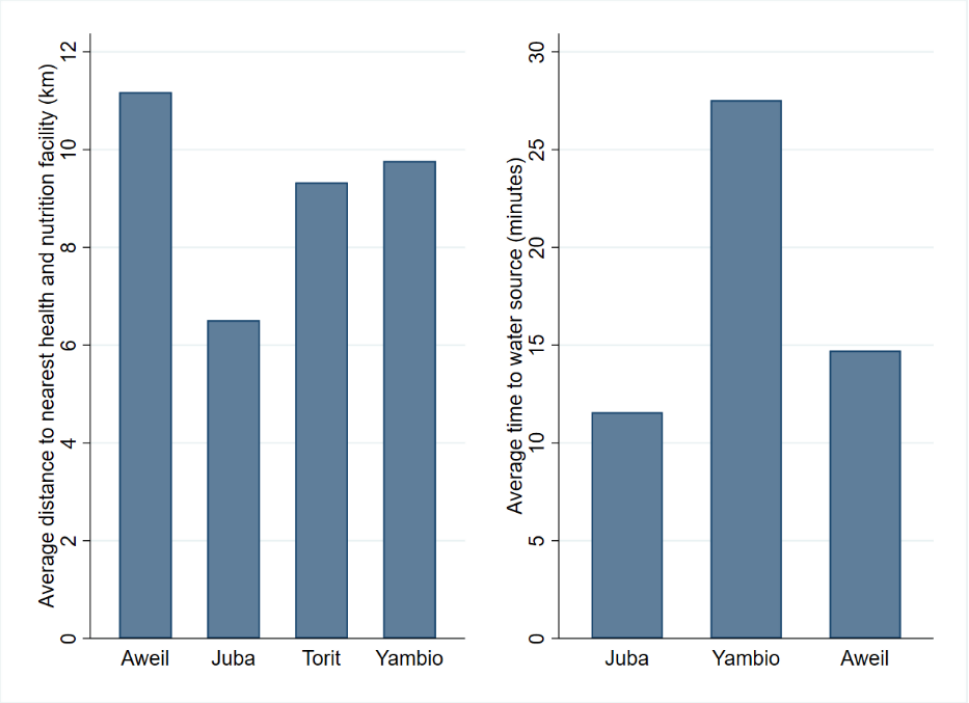
Figure 9: Distance to health and nutrition facilities



Note: Distances are computed using the GPS coordinates of villages and those of the health and nutrition facilities, which were provided by UNICEF. Note that distances do not consider roads, rivers, etc., and thus are a rough approximation.

72. Figure 8 offers a summary of the average time it takes households to reach their sources of water. The variable ranges between 0 minutes (on-site availability) and 3 hours one way. Figure 9 plots a summary of the distance between health and nutrition sites and the sampled villages. The variable ranges between less than 100 metres and 21 kilometres. Figure 10 summarizes the figures at county level.

Figure 10: County averages of time to water and distance to nutrition and health facilities



4. Data Source and Tools

73. Baseline data collection employed a multi-module household questionnaire capturing indicators in the domains listed below, which are aligned with the study objectives, impact evaluation inception report and the window pre-analysis plan:

    1) Information about the household (household characteristics)
    2) Main outcomes of interest:
        - Food security (food consumption score, household dietary diversity score)
        - Consumption (food and non-food items)
        - Education
        - Health and nutrition
        - Income generation: agriculture, livestock, wage employment, non-agricultural business
        - Shocks
        - Coping strategies
        - Financial outcomes
    3) Additional outcomes:
        - Social capital
        - Time use
        - Psychosocial well-being
        - Programme participation

74. The impact evaluation aims to measure resilience by observing welfare dynamics over multiple periods. This approach allows us to observe household exposure to shocks, seasonality, and trends in welfare. The questionnaire was reviewed by the WFP and UNICEF Country Offices and piloted to ensure that questions were relevant to the context. The duration of the baseline survey was of approximately 2.5 hours.

75. The evaluation team formulated extensive protocols to guide enumerators. A two-week training for enumerators took place, which included classroom discussions and field pilots. High-frequency consistency and performance quality checks were implemented daily during data collection. These checks included flagging missing or duplicate observations, unusual survey duration, unusual number of "no-consent" responses, outliers, and other inconsistent patterns in the data. Any anomalies detected through this process were flagged to the survey firm for correction. To ensure that data collection met the highest quality standards, the team also performed back-checks. This refers to drawing a random sample of households (15 percent) and re-visiting them to validate the data entered by enumerators.

5. Balance of Outcomes Across Treatment Groups

5.1. OUTCOME BALANCE ACROSS TREATMENT GROUPS, PHASE 1

76. In this section, we show the baseline situation of households in phase 1 of the livelihoods study sample. We first present a formal analysis of the balance (similarity) between treatment and control groups as a validation of the randomization procedure underlying the impact evaluation strategy. We then present summary statistics of household demographics, main outcomes, and other outcomes of interest.

77. Table 2 compares beneficiary characteristics across three village groups: newly eligible FFA, UCT, and control villages. In total, there are 140 observations in the control group, 129 observations in FFA and 132 observations in UCT. Since households had already started receiving transfers when baseline data collection started, we expect to see some differences between households in the treatment and control groups. More households in FFA villages compared to control villages reported rearing livestock in the last 12 months. Households in UCT villages have better educated household heads and fewer farm assets (hoes, spades, or axes) compared to households in control villages. When comparing households in FFA and UCT villages, more households in UCT villages have female or older household heads.

78. Programme-eligible households were selected from the most vulnerable households. To see how they differ from an average community member after transfers were distributed, we compare the characteristics of FFA beneficiaries to households from the community listing exercise. Table 3 shows that FFA beneficiaries have a larger household size, and more households cultivated land and owned or rented livestock in the last 12 months. FFA beneficiaries also report a higher number of household and farm assets. These results are not surprising as poorer households tend to have a larger household size and programme-eligible households may have used the transfers to purchase additional livestock or assets.

Table 2: Balance test: Control vs. FFA vs. UCT

	Mean			Difference		
	Control	FFA	UCT	T-test		
Variable	(1)	(2)	(3)	(1)-(2)	(1)-(3)	(2)-(3)
% female household head	32.14	27.13	41.67	5.01	-9.52	-14.53**
	(46.87)	(44.64)	(49.49)			
Household head age	38.68	38.09	41.75	0.59	-3.07*	-3.66**
	(12.13)	(11.72)	(13.80)			
Household size	6.53	6.74	7.09	-0.21	-0.56	-0.35
	(3.04)	(2.97)	(3.45)			
% household heads with primary education	11.43	20.00	23.26	-8.57*	-11.83***	-3.26
	(31.93)	(40.16)	(42.41)			
% households that cultivated land, in the last 12 months	90.71	95.35	90.15	-4.63	0.56	5.20
	(29.13)	(21.14)	(29.91)			
% households that reared livestock, in the last 12 months	39.29	51.94	40.15	-12.65**	-0.87	11.79*
	(49.01)	(50.16)	(49.21)			
Tropical Livestock Unit, (TLU) all households	0.07	0.18	0.15	-0.10***	-0.08**	0.03
	(0.19)	(0.33)	(0.37)			
% households that own a business	28.57	34.88	32.58	-6.31	-4.00	2.31
	(45.34)	(47.85)	(47.04)			
% household heads employed, in the last 12 months	7.86	10.08	15.38	-2.22	-7.53*	-5.31
	(27.00)	(30.22)	(36.22)			
Total household assets	4.27	4.50	4.76	-0.22	-0.49	-0.26
	(3.55)	(3.73)	(3.55)			
Total farm assets	5.58	5.00	4.69	0.58	0.89**	0.31
	(3.36)	(3.66)	(3.15)			
F-statistic				1.92**	3.25***	2.21**
Number of observations				265	268	253

Note: Standard deviations are reported in parenthesis. The number of observations is 140 for Control, ~ 129 for FFA and ~ 132 for UCT. The values displayed for t-tests are the differences in the means across the three treatment arms: FFA, UCT and Control. The F-statistic is calculated for all non-missing observations. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table 3: Balance test: Listing vs. programme-eligible

	Mean		Difference
	Listing	WFP List	T-test
Variable	(1)	(2)	(1)-(2)
% female household heads	29.32	32.55	-3.23
	(45.59)	(46.88)	
Household head age	41.77	41.54	0.23
	(15.24)	(13.35)	
Household size	5.45	6.67	-1.23***
	(3.05)	(3.31)	
% household heads with primary education	20.56	21.06	-0.50
	(40.48)	(40.80)	
% households that cultivated land, in the last 12 months	83.95	91.16	-7.21***
	(36.76)	(28.41)	
% households that rear livestock, in the last 12 months	34.88	45.64	-10.76***
	(47.73)	(49.84)	
Tropical Livestock Unit, (TLU) all households	0.14	0.20	-0.06*
	(0.39)	(0.52)	
% households that own a business	27.78	30.78	-3.00
	(44.86)	(46.18)	
% household heads employed, in the last 12 months	11.73	10.76	0.97
	(32.23)	(31.00)	
Total household assets	4.03	4.67	-0.63**
	(3.71)	(4.19)	
Total farm assets	4.17	4.63	-0.46**
	(3.17)	(3.28)	

Note: Standard deviations are reported in parenthesis. The number of observations is 324 for Listing and 848 for WFP-eligible households. The value displayed for t-tests are the differences in the means across the WFP beneficiaries and households from the listing conducted by Forcier. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

6. Descriptive statistics

80. The outcomes of interest for the programme-eligible households are summarized in the following sections. The analysis is generally presented separately for phase 1 of the livelihoods locations (Juba and Yambio) and education locations (Aweil counties). While some outcomes are designed to support the livelihoods component of the evaluation, others are better suited to describe the baseline context of the locations in the education experiment. Therefore, the presentation of summary statistics is specific to each evaluation component. Nevertheless, some outcomes are relevant to all locations, for example, demographic characteristics, and access and distance to WASH services. Thus, these are presented for the livelihoods and Aweil counties.[13] Results disaggregated by county (separate for Juba and Yambio) are also presented in the appendix.

6.1. DEMOGRAPHIC CHARACTERISTICS

81. To understand the age, sex, and household composition of the sample, we first examine household demographic characteristics.

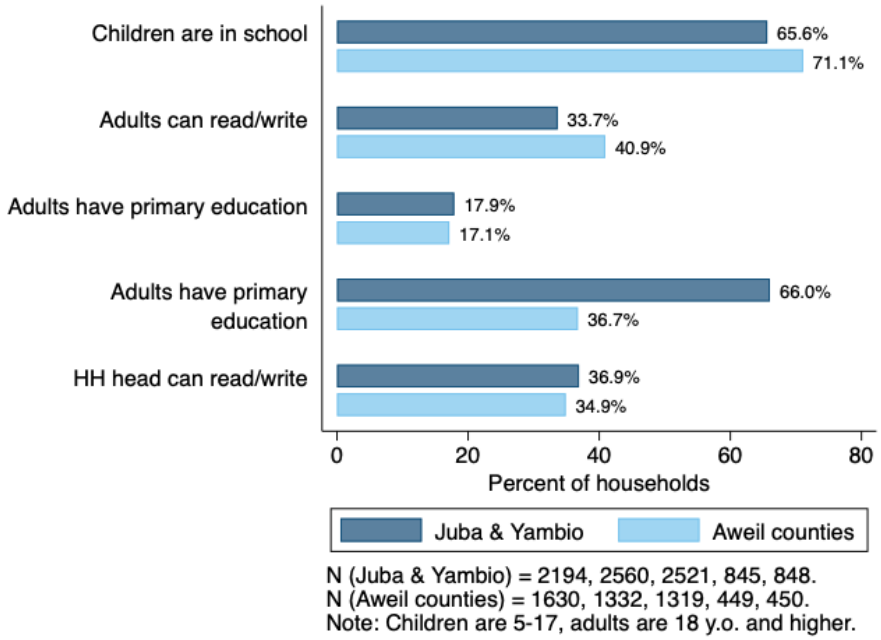
82. Households in Juba and Yambio were large and mostly led by males with little to no education. However, households headed by women were also common. Panel A of Table 4 shows that 33 percent of households were headed by women, and only 21 percent of all household heads had completed primary education. Panel B of Table 4 shows an average of about seven members per household. In households with school-aged children, 64 percent were enrolled in school per household. Households in Juba and Yambio had, on average, an equal number of farm and household assets, with the most commonly owned assets being mattresses or beds (77 percent of households), mosquito nets (66 percent) and mobile phones (44 percent). Internal migration was more prevalent compared to external migration, with 7 percent of households having had a migrant who moved within the country and 3 percent with a migrant who moved to another country.

83. Appendix Tables 6 and 13 provide additional information on household characteristics and outcomes disaggregated by sex of the household head in Juba and Yambio. For the most part, households in Juba and Yambio were very similar in their characteristics: male household heads were more educated, and their households were typically larger in size. Male-headed households also had more household and farm assets and engaged in rearing livestock more than female-headed households. A larger share of male-led households owned a business in Juba; however, this pattern does not appear in Yambio. Finally, female and male household heads were equally likely to cultivate plots in Juba and Yambio.

84. Figure 11 provides an overview of education characteristics on an individual level in the livelihoods sample. Of all school-aged children (ages 5–17 years) in the livelihoods sample, 66 percent were enrolled in school. Among adults (18 years and higher), only 18 percent had finished primary school, but 34 percent reported being able to read and write. Of all household heads, 66 percent had gone to school, and 37 percent knew how to read and write.

[13] The Appendix of this report is a good companion to learning about baseline summary statistics beyond the immediate interests of the impact evaluation — for example, the values of livelihoods-specific outcomes in education locations, as well as location-specific analysis.

Figure 11: Individual-level education characteristics, full sample



85. In comparison, households in Aweil counties had a similar share of households headed by women. Households were larger and had more than twice as many household assets than farm assets. The most common assets owned by these households included mosquito nets (92 percent of households), mattresses or beds (74 percent) and mobile phones (50 percent). Internal and external migration were equally common, with 13 to 14 percent of households having had at least one migrant. Since households in Aweil counties were selected from school enrolment lists, the share of children in school at the household level was higher (73 percent) compared to those in Juba and Yambio. Looking at individual-level education characteristics in Figure 11, 71 percent of all school-aged children (ages 5—17 years) were enrolled in school. Among adults (18 years and higher), only 17 percent had finished primary school, but 41 percent reported being able to read and write. Of household heads, 37 percent had gone to school, and 35 percent knew how to read and write.

86. Differences between households headed by men and women in Aweil are not as stark as in Juba and Yambio. Appendix Table 1 shows that, while households headed by men are larger in size, more educated and have higher rates of employment in wage jobs compared to their female counterparts, there are no significant differences in owning or renting plots, rearing livestock or the number of assets owned between the two groups. Moreover, more female-led households owned a business.

Table 4: Demographic characteristics

Mean		Standard Deviation	N	Mean	Standard Deviation	N
Panel A: Head of Household Characteristics						
	Juba and Yambio			**Aweil counties**		
% female	32.55	-	848	30.44	-	450
Age	41.54	13.35	848	46.01	12.27	450
% with primary education	21.06	-	831	17.98	-	445
Panel B: Household Characteristics						
	Juba and Yambio			**Aweil counties**		
Household size	6.67	3.31	848	7.45	2.43	450
% children in school	64.44	-	705	73.70	-	449
Total farm assets owned by household	4.63	3.28	848	3.37	2.27	450
Total household assets owned by household	4.67	4.19	848	7.23	4.54	450
Number of cars	0.01	0.35	848	0.01	0.11	450
Number of trucks	0.00	0.03	848	0.00	0.05	450
Number of motorcycles	0.08	0.30	848	0.05	0.22	450
Number of televisions	0.00	0.05	848	0.01	0.08	450
Number of radios	0.23	0.50	848	0.11	0.32	450
Number of mobile phones	0.66	0.91	848	0.70	0.89	450
Number of computers or laptops	0.01	0.09	848	0.00	0.07	450
Number of refrigerators	0.00	0.00	848	0.00	0.05	450
Number of mattresses or beds	2.01	1.92	848	2.63	2.22	450
Number of mosquito nets	1.66	1.83	848	3.71	2.07	450
% of households that have an internal migrant	7.44	-	847	13.78	-	450
% of households that have an external migrant	3.07	-	846	13.33	-	450

Note: 848 households were interviewed in Juba and Yambio and 450 households in Aweil counties. Answers such as "don't know" or "refuse to respond" occasionally lead to slightly smaller samples when computing summary statistics. In Juba and Yambio, not all households have children. Thus, N = 705 as 143 households did not report having children. Children are aged between 5 and 17 years. Farm assets include hoe, spade, or axe. Migration questions refer to anyone in the household migrating in the last two years within the country (internal) or outside of the country (external).

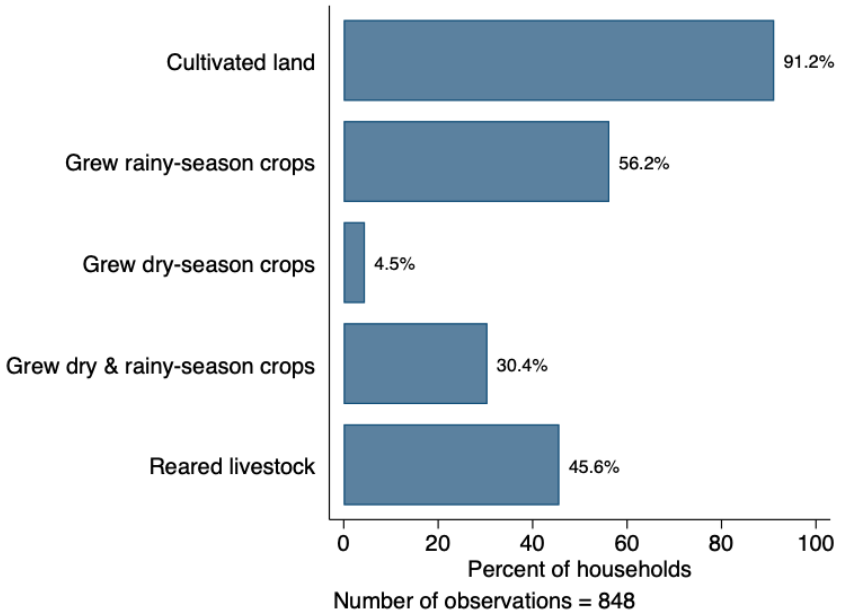
6.2. PRIMARY OUTCOMES OF INTEREST

6.2.1 Livelihoods opportunities

87. To understand how households in South Sudan earn their livelihoods, we collected data on different livelihood strategies such as engaging in farming activities, rearing livestock, having wage employment, and owning a business. Figure 12 and Table 5 show that many households in Juba and Yambio were engaged in farming and livestock activities, with 91 percent of households reporting at least one plot and owning, on average, between one and two plots. In 2020, 56 percent of households cultivated plots only during the rainy

season (March to July) compared to 5 percent of households that cultivated plots only during the dry season; 30 percent reported cultivating plots during both the dry and rainy seasons. Among the households that reported cultivating any plots, the average revenue from crop sales was SSP 16,960. Further, 46 percent of households in the sample were engaged in rearing livestock in the previous 12 months. Most households owned chickens (33 percent) and goats (18 percent). Households reported having had a profit of SSP 4,320 from selling livestock in the previous six months and estimated that the value of the consumed livestock would have been SSP 3,780 had it been sold at the market price instead.

Figure 12: Farming and livestock (last 12 months), Juba and Yambio



88. Having wage employment or owning a business is not common. Even for those households that earn income outside of farming their own land, these activities were often linked to agricultural work. Only 7 percent of all adults in the sample (18 years and older) reported to have been employed in the last year, 5 percent in the last month, and 1 percent reported having secondary employment. Out of those employed, 34 percent reported working on a farm and 66 percent worked in other types of employment, such as petty or retail trade, construction, transportation, carpentry, teaching, and aid or development work. Households with wage employment earned a total monthly income of SSP 27,880, which is the equivalent of a monthly income of SSP 19,570 per worker employed from the household. Of all households in Juba and Yambio, 31 percent owned an average of one business, which engaged the enterprise manager for about eight months of work per year and on average 17 days per month across all household members. Here, too, 40 percent of households with a business reported working on processing agricultural products or meat for resale. On average, the businesses brought in a total monthly profit of SSP 20,840, which is the equivalent of SSP 16,250 per household member who is engaged in the business.

Table 5: Income-generating activities, Juba and Yambio

	Mean	Standard Deviation	N
Panel A: Agriculture			
Number of plots	1.67	0.72	773
Plot size (hectares)	0.46	0.34	771
Farm size (hectares)	0.72	0.49	771
Annual revenue from all crop sales in 2020 (dry and rainy season)	16.96	40.48	773
Panel B: Livestock			
Total livestock count, all households	5.54	9.16	848
Tropical Livestock Unit (TLU), all households	0.20	0.52	848
Total livestock count, households with livestock	12.15	10.19	387
Tropical Livestock Unit (TLU), households with livestock	0.45	0.70	383
Number of chickens	11.28	8.64	285
Number of goats	7.84	7.11	154
Number of sheep	6.93	9.38	15
Number of pigs	5.43	4.24	7
Number of other animals	6.85	5.91	20
Profit from sold livestock and products	4.32	10.84	387
Value consumed of livestock and products	3.78	13.17	387
Panel C: Wage employment (main and secondary)			
Monthly household income	27.88	34.91	108
Average monthly wage income per worker	19.57	22.01	108
Panel D: Businesses			
Number of businesses	1.22	0.55	261
Number of months worked by manager last year	8.05	3.89	261
Average number of work days for all household members last month	16.66	9.20	223
Monthly business profit	20.84	22.75	221
Average monthly business profit per worker	16.25	17.71	221

Note: These are household-level summaries for households that report plots, various types of livestock, wage employment and non-agricultural businesses. Farm and plot size as well as revenue, profit and other monetary values are winsorized at the 2nd and 98th percentiles. All monetary values are expressed in thousand SSP. For livestock questions, the survey also asked about the number of cows; however, in South Sudan, households are unlikely to report this type of livestock accurately because it is a sensitive matter. Households report having ducks, pigeons, rabbits, and rats as other livestock. A higher number for TLU (common unit for livestock numbers) corresponds with improved food security and household resilience. Profits from sold livestock and monetary value of consumed livestock are reported for the period of the last 6 months as opposed to 12 months to maximize accuracy in memory recall.

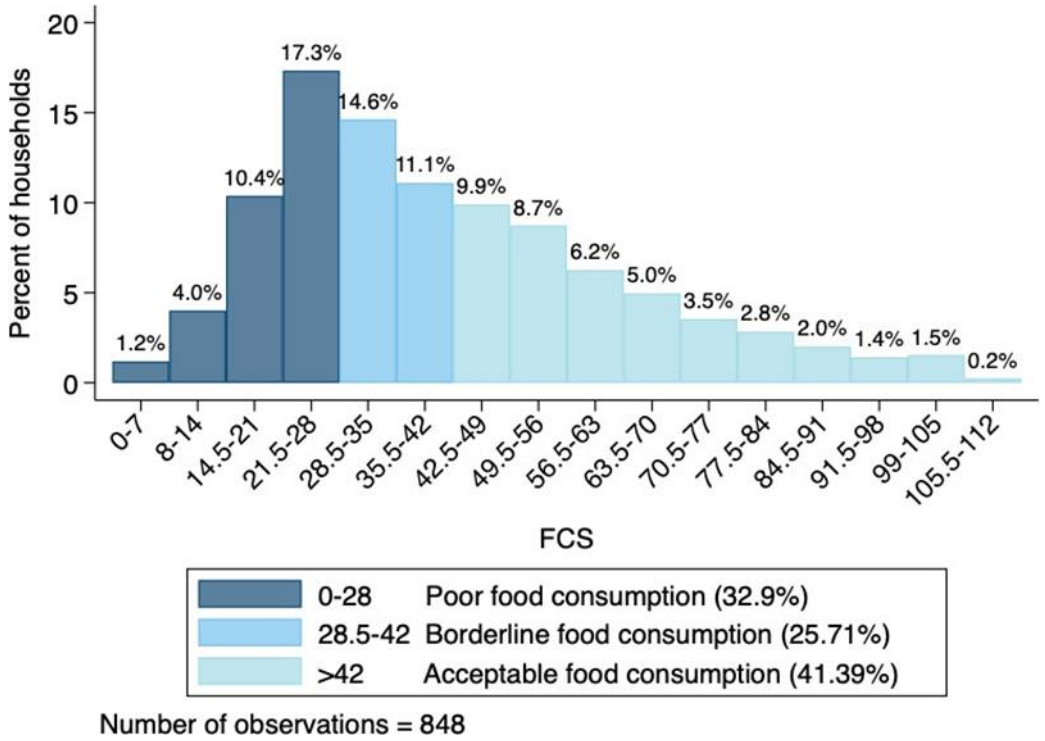
6.2.2 Food security

90. Given that agriculture, which is heavily impacted by seasonality and often happens on a subsistence basis, provides the main livelihood for households in South Sudan, food security and dietary diversity remain low. Several food and nutrition security indicators are used, including the Food Consumption Score (FCS), Food Consumption Score-Nutrition (FCS-N), Household Dietary Diversity Score (HDDS), and food expenditure share. Specific indicators, such as Minimum dietary diversity (MDD), Minimum meal frequency (MMF) and Minimum acceptable diet (MAD), are used to assess the dietary practices of women and children. These indicators are

key domains of interest for the resilience window, especially as resilience will be analysed by studying the dynamics of these indicators over time.

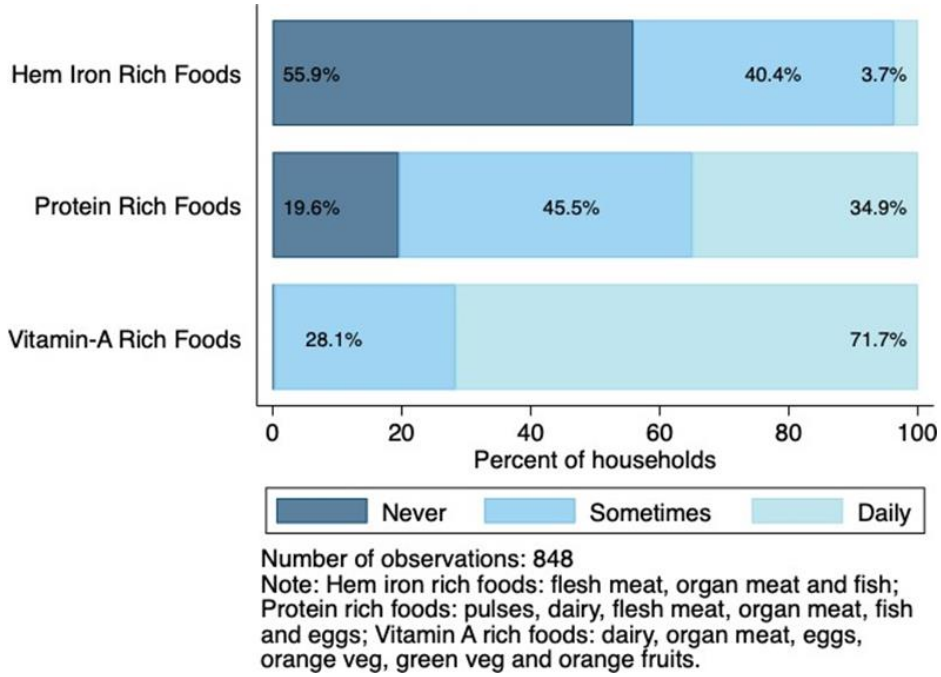
91. The FCS is calculated from the frequency of consumption of different food groups over a seven-day period. A high FCS increases the likelihood that a household's food intake is adequate. Figure 13 shows the distribution of the FCS across the sample in Juba and Yambio. According to the FCS classification, 33 percent of households had poor food consumption, 26 percent were borderline, and 41 percent had an acceptable food consumption.

Figure 13: Food consumption score (FCS) (last 7 days), Juba and Yambio



92. While the FCS serves as a good proxy for the food security status of households, FCS-N analyses the actual quality of the diet in terms of regular intake of protein and important micro-nutrients based on three nutrient-rich groups: protein, hem iron and vitamin A-rich foods. Figure 14 shows a frequent consumption of vitamin A-rich foods, with 72 percent of households having consumed these foods at least daily. However, 20 percent of households reported to never consume protein-rich foods, which is crucial for the prevention of wasting and stunting in children under 3 years of age. Finally, 56 percent of households reported to never consume hem iron-rich foods which can lead to iron deficiency, one of the main causes of anaemia.

Figure 14: Food consumption score (FCS)-nutrition (last 7 days), Juba and Yambio



Number of observations: 848
Note: Hem iron rich foods: flesh meat, organ meat and fish; Protein rich foods: pulses, dairy, flesh meat, organ meat, fish and eggs; Vitamin A rich foods: dairy, organ meat, eggs, orange veg, green veg and orange fruits.

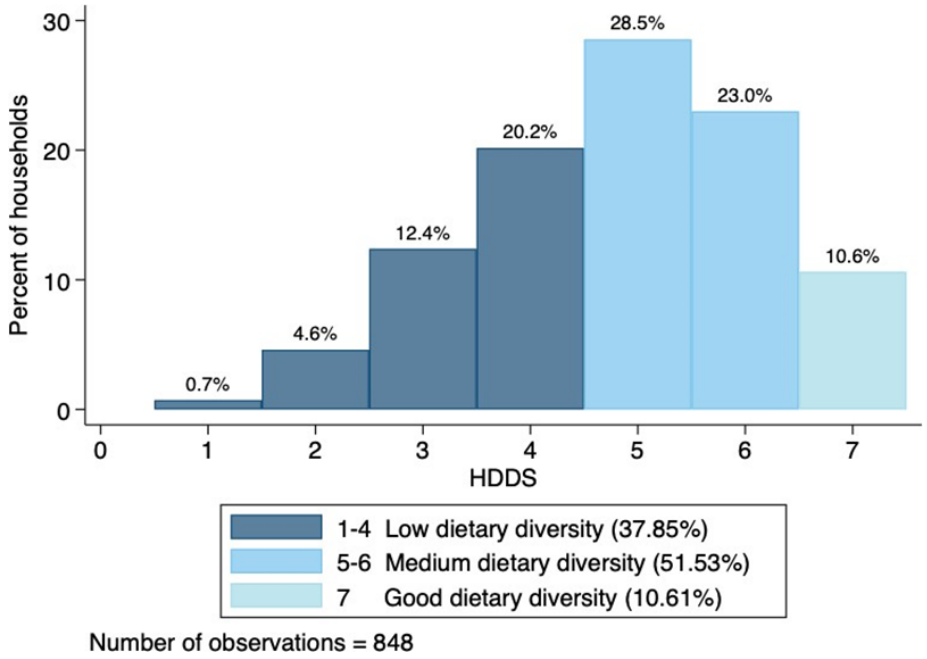
93. The HDDS is the sum of different food groups (such as starches, vegetables, dairy products, and meat and poultry) consumed by the household during the previous seven days and is intended to reflect the ability to access a variety of foods. Figure 15 shows that only 11 percent of the households in Juba and Yambio were classified as having a good dietary diversity, with 38 percent having a low dietary diversity score.[14]

94. A subsample of households was randomly selected to collect information on the dietary practices of women of reproductive age (15–49 years old). Women were asked about their consumption of food and drinks from ten different food groups on the previous day.[15] According to the minimum dietary diversity for women (MDD-W) index, women who have consumed at least five of the ten groups are classified as having minimum dietary diversity. As reported in Figure 16, 302 women were surveyed and 47 percent of them met the minimum dietary diversity.

[14] The HDDS was calculated with data collected for FCS.

[15] The ten food groups are: (1) cereals and tubers; (2) pulses; (3) nuts and seeds; (4) milk and milk products; (5) meat, poultry, fish, or organ meat; (6) eggs; (7) dark leafy green vegetables; (8) vitamin-A rich fruits (for example, mango, papaya); (9) other vegetables; and (10) other fruits.

Figure 15: Household dietary diversity score (HDDS) (last 7 days), Juba and Yambio

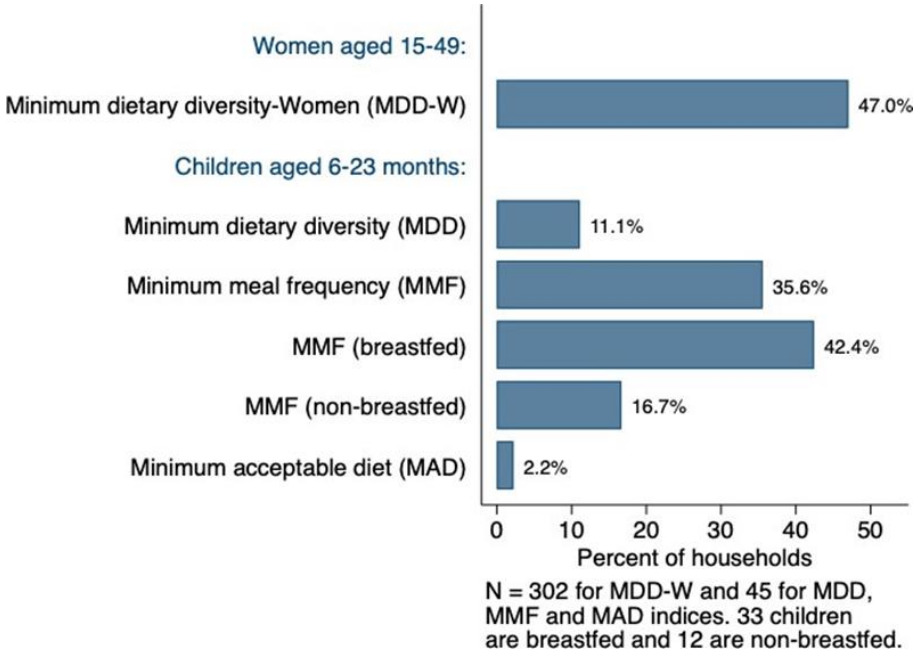


95. For those women or caregivers with children aged between 6 and 23 months, an additional set of questions was asked to gauge the infant and children feeding practices. The caregivers were asked whether children received foods from eight food groups[16] and whether they received any solid, semi-solid or soft foods or milk or yogurt during the previous day. Children are considered to have an MDD if they consumed from more than five out of eight food groups. The MMF is calculated based on the proportion of breastfed and non-breastfed children who received solid, semi-solid or soft foods (including milk feeds for non-breastfed children) the minimum number of times during the previous day.[17] The MAD is an indicator composed of the MDD and MMF and calculated using the proportion of breastfed children who had at least the MDD and MMF the previous day, and proportion of non-breastfed children who received at least two milk feedings and had at least the MDD and MMF the previous day. Figure 16 shows that, out of 45 children, 11.1 percent had the MDD, and 35.6 percent had the MMF the previous day. Also, 42.4 percent of the 33 breastfed children and 16.7 percent of the 12 non-breastfed children had the MMF the previous day. The composite indicator MAD shows that only 2.2 percent of children aged 6–23 months received the MAD the previous day. Overall, this is suggestive of very few children benefiting from proper nutrition, with significant room for improvement.

[16] The eight food groups are: (1) breastmilk; (2) grains, roots, and tubers; (3) legumes and nuts; (4) dairy products (milk, yogurt, cheese); (5) meat, fish, or poultry; (6) eggs; (7) vitamin-A rich fruits and vegetables (for example, mango, papaya, carrot, red pepper, pumpkin, orange, sweet potatoes); and (8) other fruits and vegetables.

[17] Minimum is defined as two times for breastfed children aged 6–8 months, three times for breastfed children aged 9–23 months, and four times for non-breastfed children aged 6–23 months. There were no breastfed infants aged 6–8 months in the sample.

Figure 16: Indicators on diet practices of women and children (previous day), Juba and Yambio



96. The survey also collected data on household expenditure for food and non-food items to understand the household's overall monthly budget. This data is also used to understand the proportion of a household's budget spent on food, as poorer households are more likely to spend a higher proportion of their income on food items. Food expenditure data collected information on the quantity and value of 23 food products purchased the last time they were bought.[18] Non-food expenditure questions collected data on the total amount households spent on non-food items during the previous month[19] and the last year.[20]

[18] Food products include dura, yellow maize (dura shami), rice (imported), dura flour, maize flour, other flour, bread, kisra and asida, goat and sheep meat (with bones, fresh, local), fresh beef, fresh fish, dried fish (local), fresh milk, milk powder, cooking oil, dry okra (dry bamia), natural groundnut (roasted), lentils (adasia), onions, cassava flour, sugar, chicken and poultry, eggs.

[19] The list of items includes monthly water fees, laundry soap (local), soap (powder), bathing soap, service cost at family house (for example, weekly salary for cleaning services), drug tablets and roots for reducing fever and malaria, medical consultation at hospital, operations at hospital, movement and freight using road transport, boda-boda, taxi and bus fares, tickets for air travel, mobile airtime or internet fees, haircuts for men or hairdressing for women, and decoration for women.

[20] The list of items includes infant clothing, boys' clothing, girls' clothing, men's clothing, ladies' clothing, maintenance costs at occupied family housing, pre-primary or primary education, secondary education.

Table 6: Monthly food and non-food expenditures, Juba and Yambio

	Mean	Standard Deviation	5 %	95 %
Food expenditure share	40.21%	-	-	-
Per household				
Food expenditure	21.88	27.00	0.00	81.60
Non-food expenditure	15.14	19.64	0.60	56.25
Total expenditure	37.02	38.36	2.43	118.00
Per household member				
Food expenditure	4.04	5.53	0.00	16.80
Non-food expenditure	2.56	3.57	0.10	9.50
Of which, water bills	0.39	1.02	0.01	1.67
Total expenditure	6.61	7.51	0.38	24.15
Observations	848			

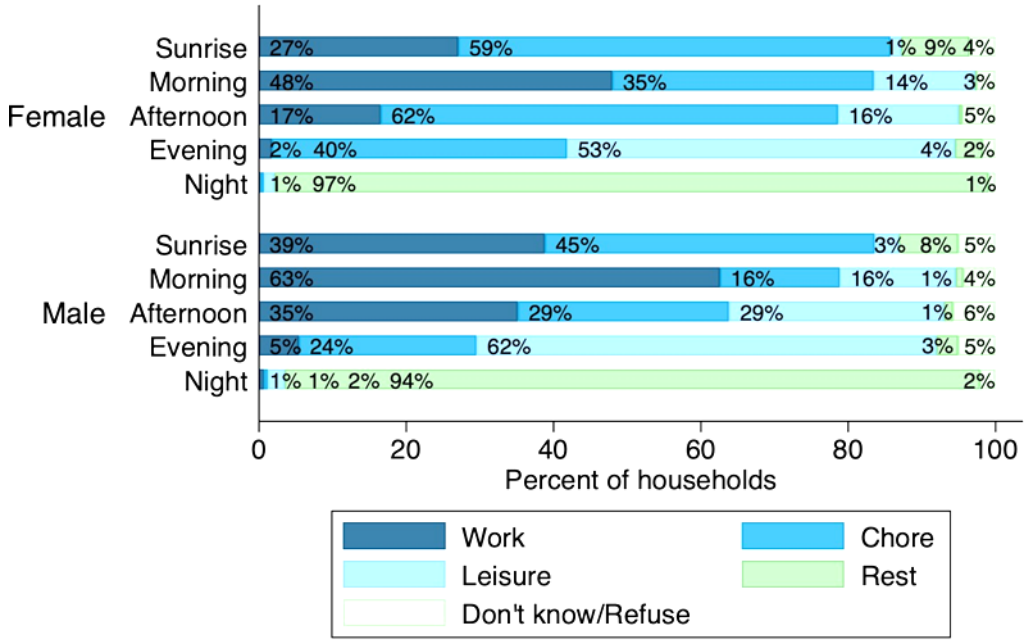
Note: Food expenditure share is defined as the percentage of households spending more than 65 percent of their monthly budget on food. Expenditures are presented in thousand SSP. Food and non-food expenditures (including monthly water bills) are winsorized at the 2nd and 98th percentiles. N for monthly water bills = 71. Food expenditure was collected based on the last purchase of the food item and non-food expenditure for the period of the last 30 days and the last year, depending on the item.

98. Table 6 presents the summary statistics of monthly household food, non-food, and total expenditure in Juba and Yambio. Every month, on average, households spent SSP 21,880 on food and SSP 15,140 on non-food items. Total monthly household expenditure was SSP 37,020. On average, monthly household spending on food per household member was higher than for non-food items, comprising 61 percent of household expenditure per household member. Food expenditure share is estimated at approximately 40%, which means that 40 percent of households spent more than 65 percent of their monthly budget on food. Total monthly expenditure per household member was SSP 6,610.

6.2.3 Time use

99. As programme beneficiaries are engaged in asset work throughout the year, it is important to understand how households usually allocate their time and whether this work will displace other activities that they engage in. To understand this, the survey asked about the activities of the individual at different times of the day. Figure 17 presents the summary of time spent on work, chores, leisure, and rest at sunrise (06:00), morning (10:00), afternoon (15:00), evening (19:00) and night (22:00). The summary differentiates responses between the male and female heads of household. For the responses in the female group, if the household head is male, the questions were asked to the primary female decision maker or other female adult in the household, if the female decision maker was not available.

Figure 17: Time employment throughout the day by sex (last business day), Juba and Yambio



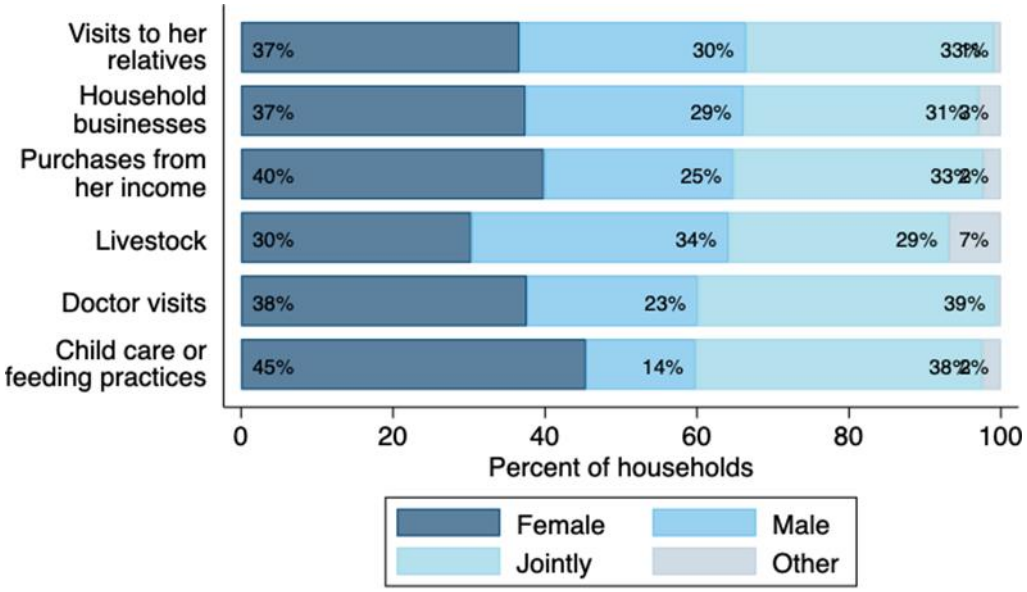
N (male) = 572, N (female) = 617. Male group includes male HHH, and female group includes female HHH, primary female decision maker or other female adult.

100. Figure 17 shows that, while both female and male decision makers in the household spent most of their time on work and chores, there were disparities between the two. Males on average spent 36 percent of their time during the day (between 06:00 and 22:00) working, compared to 24 percent for females. Females spent 49 percent of their day (between 06:00 and 22:00) on chores, compared to 29 percent for males. The graph also shows that most of the work was done before 19:00 for both female and male decision makers in the household, but chores were still prevalent for females, taking up 40 percent of their evening time.

6.2.4 Women's empowerment

101. Female decision makers in the household were asked six questions to understand their perception of who usually makes decisions in the household: the female decision maker, the male decision maker, jointly, or someone else in or outside of the household. Figure 18 presents the summary of the responses. Overall, women believe that they have more agency over household decision making compared to men, except for decisions on livestock. These differences are particularly noticeable with regards to doctor's visits and childcare or feeding practices: 37.6 percent and 45.4 percent of women believe that they are the primary decision makers in the household regarding doctor's visits, and childcare or feeding practices, respectively. However, only 22.5 percent and 14.4 percent of women believe that men are the primary decision makers on these topics, respectively. On average, 72 percent of women reported making decisions or participating in the decision making process on all six items.

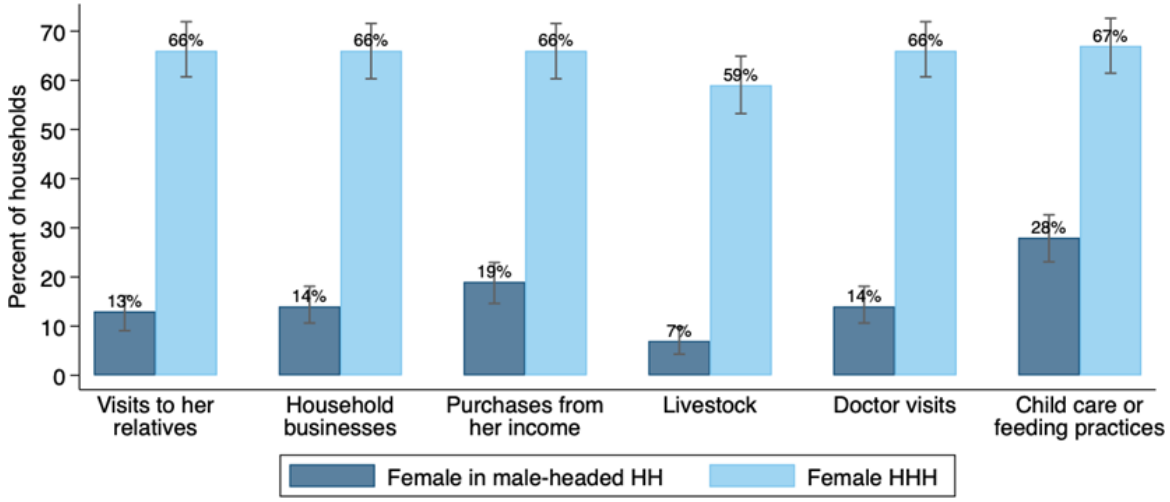
Figure 18: Women's perceptions on gendered decision making, Juba and Yambio



Number of observations = 617
The respondent is female HHH, primary female decision maker or other female adult. The respondent was asked who in the household makes decision on the 6 items above: respondent, male decision-maker, jointly or other.

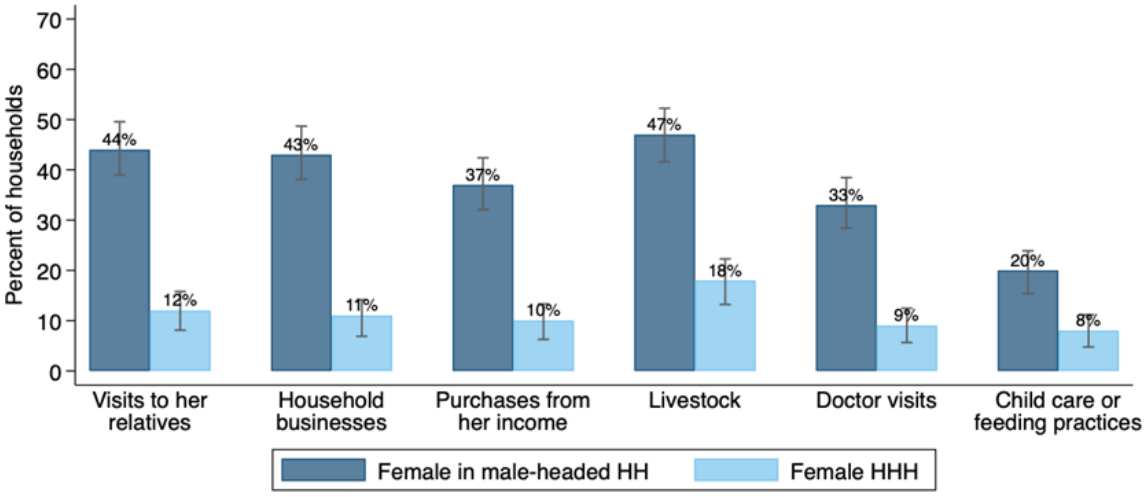
102. Figures 19, 20 and 21 show how much the results differ based on whether the respondent was a female head of household or a female decision maker – that is, another female adult in a male-headed household. We can see that, on all six decisions, female heads of household generally have more agency than females in a household headed by a man. The percentages are also very similar across the questions. For instance, with regards to visits to her relatives, household businesses and purchases from her income, 39–43 percent of women in households headed by men reported that these decisions are made jointly, and only 13–19 percent had the full agency. Women in households headed by men had the lowest agency over decisions on livestock (7 percent) and the highest agency over decisions on childcare or feeding practices (28 percent). In households headed by a woman, while most women reported having agency across different decisions, 8–18 percent of women still reported that they were not participating in household decision making.

Figure 19: Decisions in the household are made by a female, Juba and Yambio



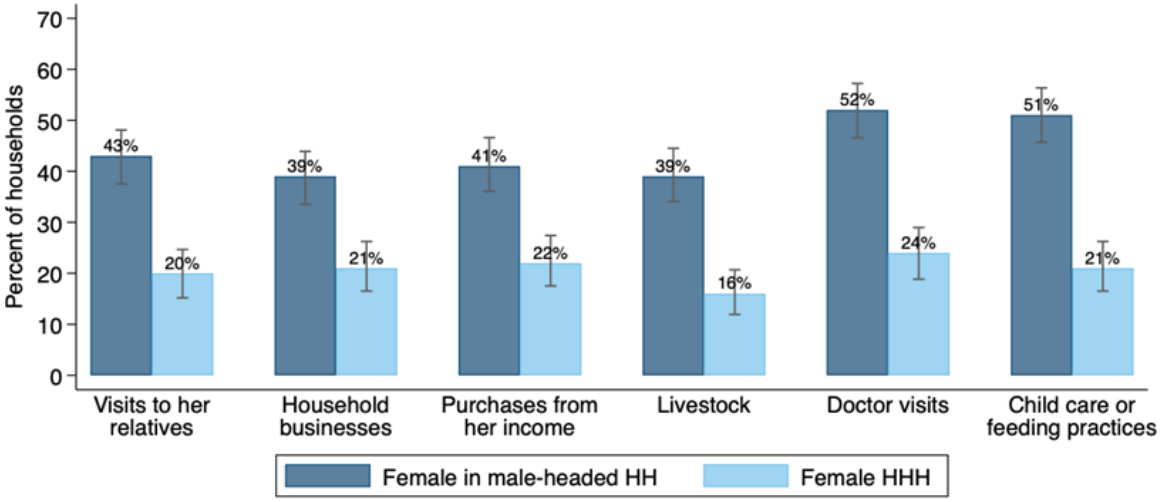
N (female in male-headed HH) = 341, N (female HHH) = 276
Note: Error bars display a 95% confidence interval.

Figure 20: Decisions in the household are made by a male, Juba and Yambio



N (female in male-headed HH) = 341, N (female HHH) = 276
Note: Error bars display a 95% confidence interval.

Figure 21: Decisions in the household are made jointly, Juba and Yambio

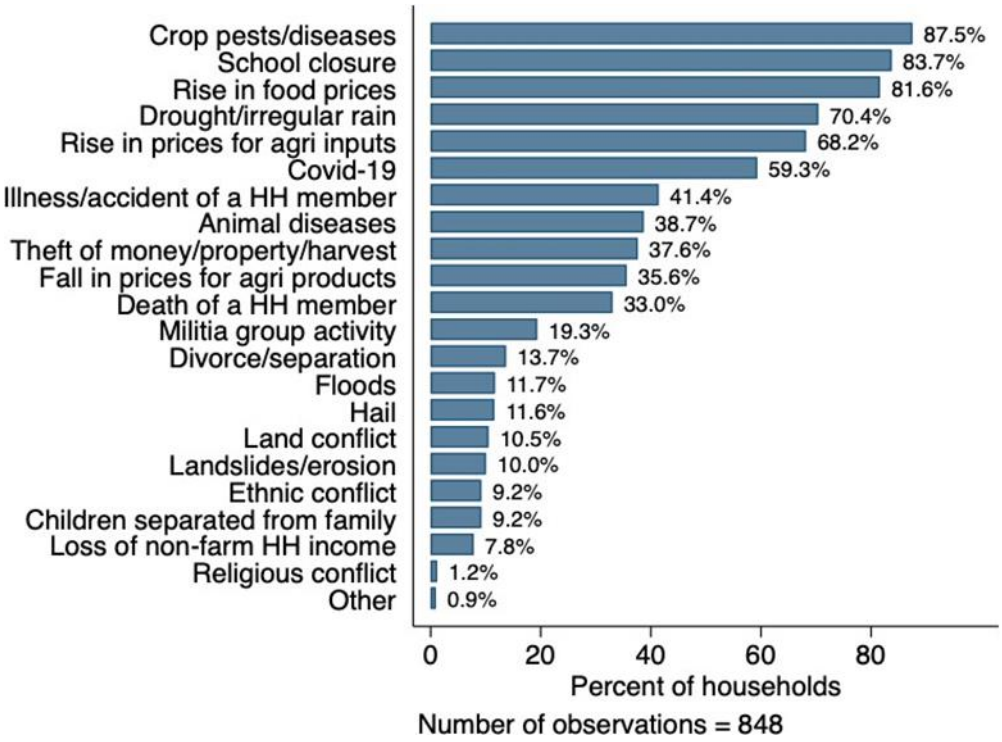


N (female in male-headed HH) = 341, N (female HHH) = 276
Note: Error bars display a 95% confidence interval.

6.2.5 Shocks

103. To explore how food insecurity and poverty are affected by shocks, respondents were asked whether their household has been negatively affected by different shocks in the previous 12 months.

Figure 22: Shocks experienced by households (last 12 months), Juba and Yambio

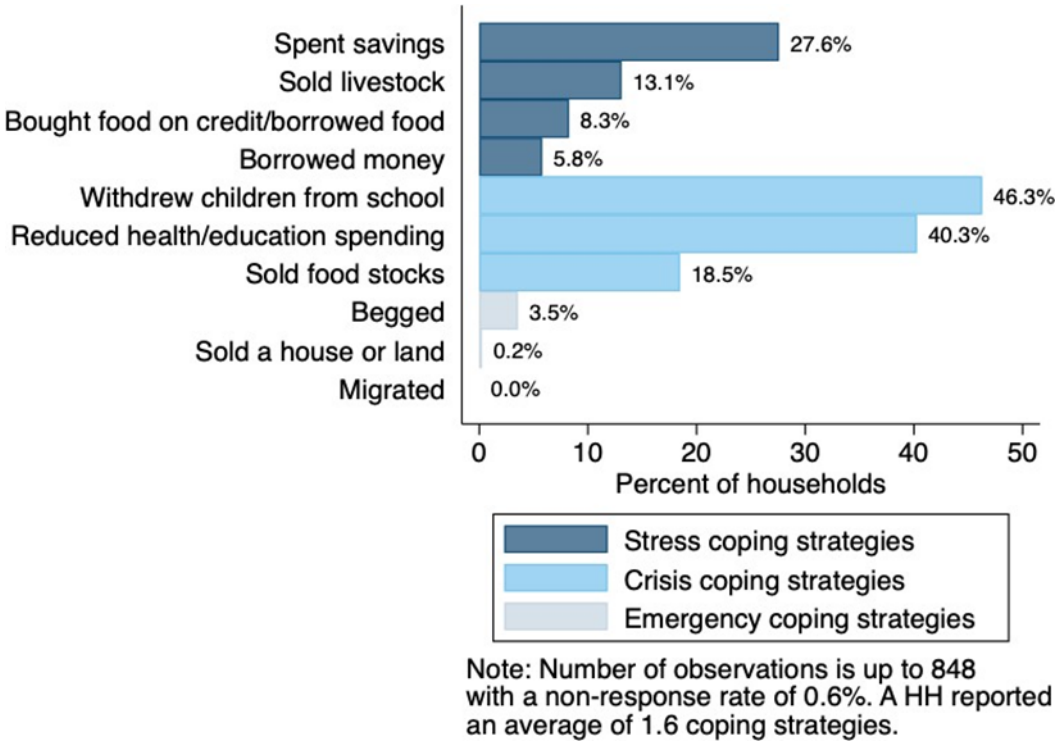


104. On average, households in Juba and Yambio reported experiencing 7 shocks out of 22 in the last 12 months. Figure 22 shows the percent of households that reported experiencing different challenges. Shocks related to farming and livestock activities were among the top five most prevalent shocks. The figure shows that 88 percent of households reported struggling with crop pests and diseases, 82 percent faced a rise in food prices, 70 percent experienced drought or irregular rain, and 68 percent experienced a rise in prices for agricultural inputs. The COVID-19 pandemic and related school closures have also negatively affected 59 and 84 percent of households, respectively.

6.2.6 Coping strategies

105. To understand household behaviour in response to these shocks, the survey asked about different coping strategies used in the last 12 months and the last 30 days. The households were first asked about the following seven coping strategies: (1) reduced health/education spending; (2) spent savings; (3) sold livestock; (4) sold food stocks; (5) withdrew children from school; (6) reduced food consumption (quantity/meal); and (7) reduced food consumption (number of meals/day).

Figure 23: Livelihood coping strategies (last 12 months), Juba and Yambio

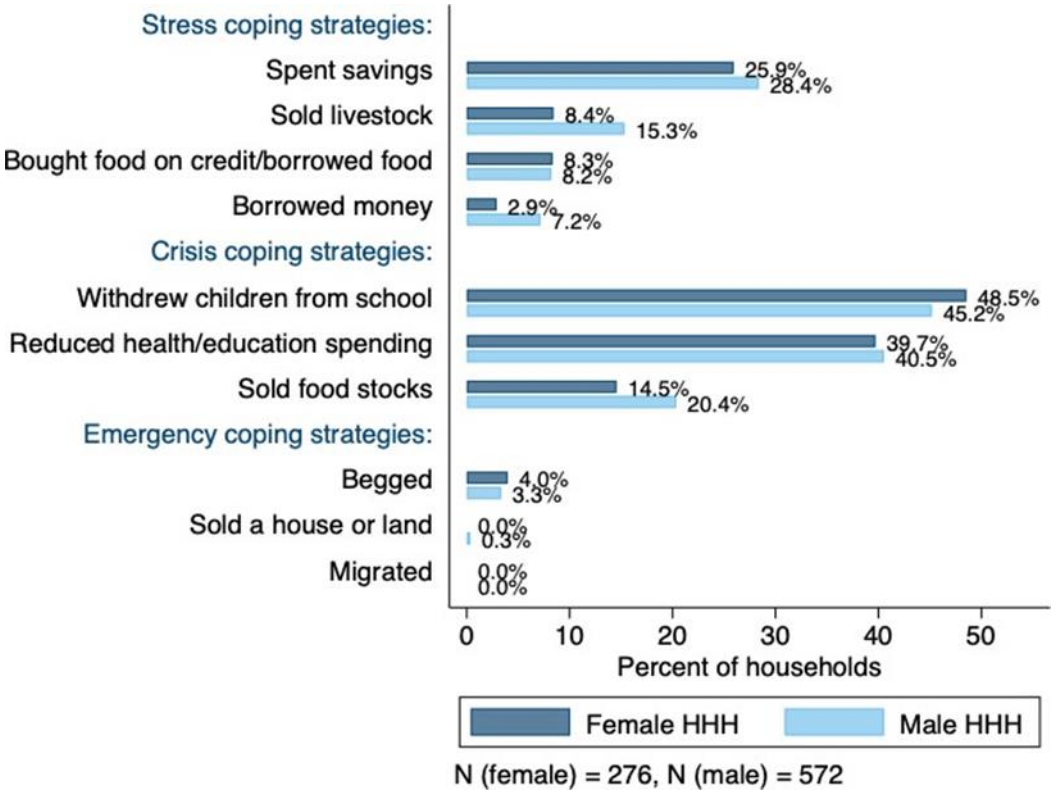


Note: Respondents were asked about 7 coping strategies explicitly and were provided a list of 19 additional coping strategies to choose from. Coping strategies were then grouped into stress, crisis and emergency categories based on guidance from the WFP country office and Consolidated Approach for Reporting Indicators of Food Security (CARI) guidelines. The most common coping strategies (four stress, three crisis and three emergency) were selected and presented in the graph.

106. The households were then given the opportunity to report any additional coping strategies. All coping strategies were categorized into three groups: Stress, Crisis, and Emergency based on guidance from the WFP Country Office and WFP CARI guidelines. For the analysis, the most prevalent ten coping strategies were selected from each group using a combination of four stress, three crisis and three emergency coping strategies. Figure 23 shows the percentage of households that reported using each of these coping strategies in the last 12 months in Juba and Yambio.[21] The figure shows that the most common coping strategies used by households include withdrawing children from school (46.3 percent), reducing household health or education spending (40.3 percent), spending savings (27.6 percent), selling food stocks (18.5 percent) and selling livestock (13.1 percent).

[21] Since the first seven questions were asked individually, some households responded with "don't know" or "refuse to answer" with an average rate of 0.6 percent. For this reason, the number of observations for these seven questions is sometimes below 848.

Figure 24: Livelihood coping strategies (last 12 months) by sex of household head, Juba and Yambio



Note: There is a 0.8 percent non-response rate for females and 0.6 percent non-response rate for males due to "don't know" and "refuse to respond" answers.

107. Figure 24 shows the use of the ten livelihood coping strategies disaggregated by the sex of the household head. Male household heads were more likely to sell livestock, borrow money and sell food stocks compared to females.

108. Households were then grouped according to the most extreme strategy that they employed. Households that did not use any coping strategies, or only used strategies categorized as "neutral", were grouped together. Figure 25 shows the percentage of households within each group of coping strategies. The higher the share of people using crisis and emergency coping strategies, the more severe and long-term the consequences and the longer the recovery process. In Juba and Yambio, 64.1 percent of households resorted to crisis coping strategies, and 3.8 percent resorted to using emergency coping strategies (such as selling a house or land, begging, or migrating); 7.8 percent reported using stress coping strategies; and 24.3 percent of households reported using only neutral coping strategies, or none at all.

109. Respondents were also asked about consumption-based coping strategies, which form the basis of the reduced Consumption-based Coping Strategies Index (rCSI). Respondents were asked about the frequency (number of days in the last seven days) with which the household had to: (1) rely on less preferred and less expensive foods; (2) borrow food or rely on help from a friend or relative; (3) reduce food consumption (quantity/meal); (4) restrict consumption by adults so small children could eat; and (5) reduce food consumption (number of meals/day). The rCSI is calculated by summing up the number of days reported by households for each coping strategy weighted by its severity. The lower the score, the more food secure the household is. The distribution of the rCSI index in Juba and Yambio is shown in Figure 26. The distribution is right-skewed, with 1 percent of households having had a score of 43 and higher. The average rCSI score in Juba and Yambio was 12.01, and the median was 9.

Figure 25: Households per coping strategies group (last 12 months), Juba and Yambio

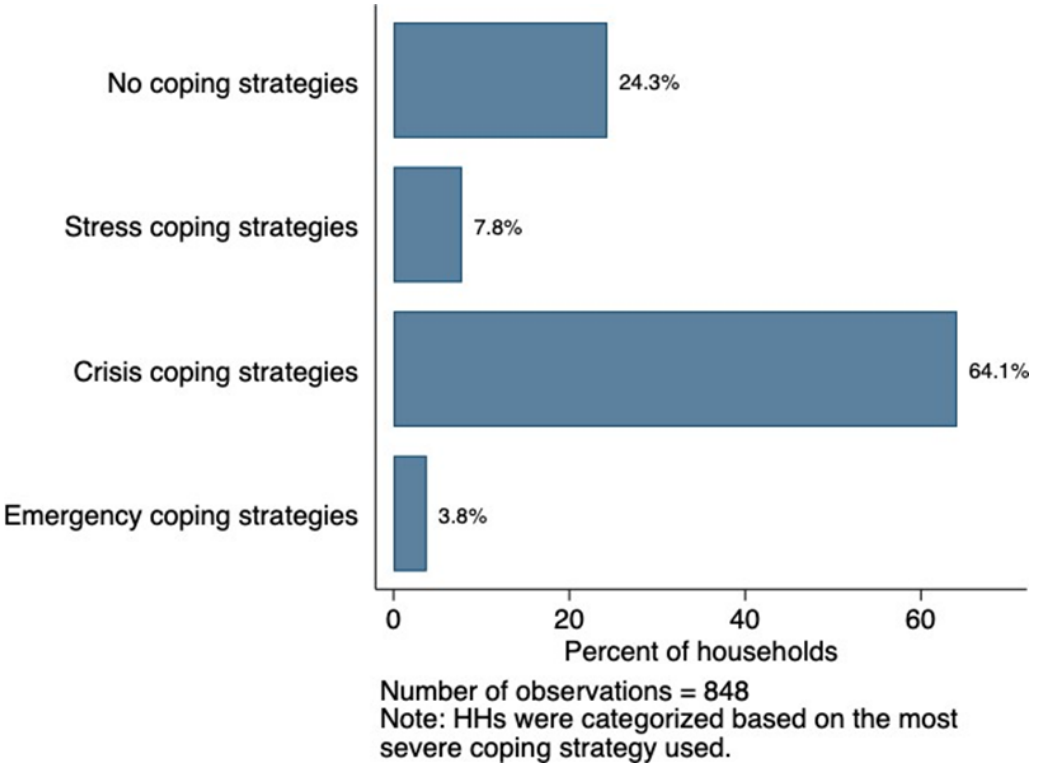
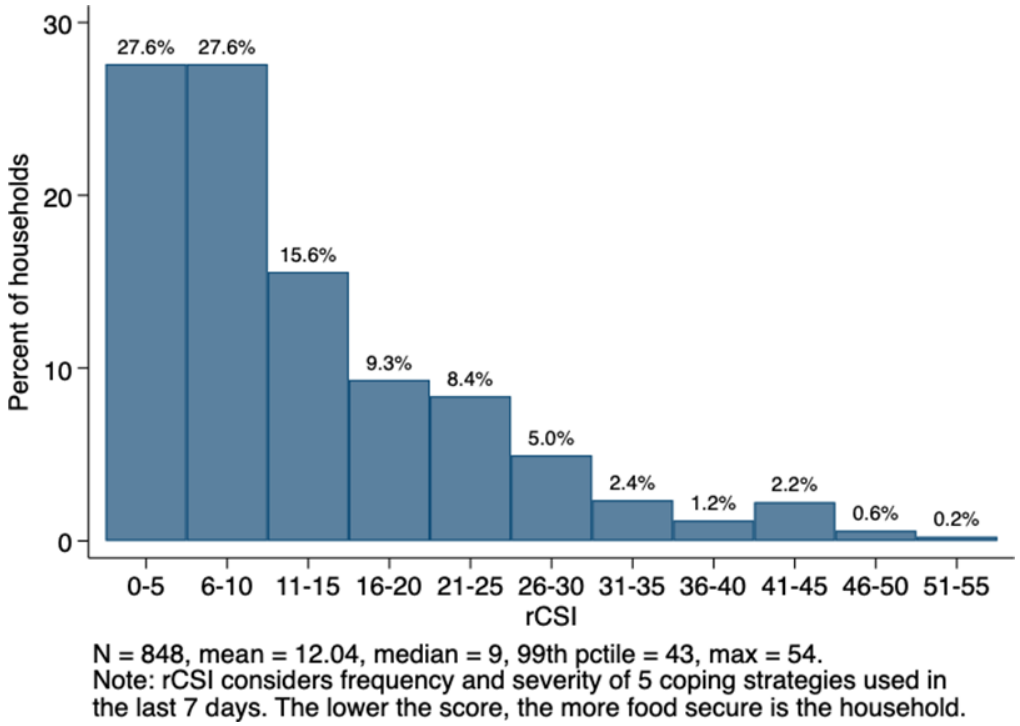


Figure 26: Reduced consumption-based coping strategies index (rCSI) (last 7 days), Juba and Yambio



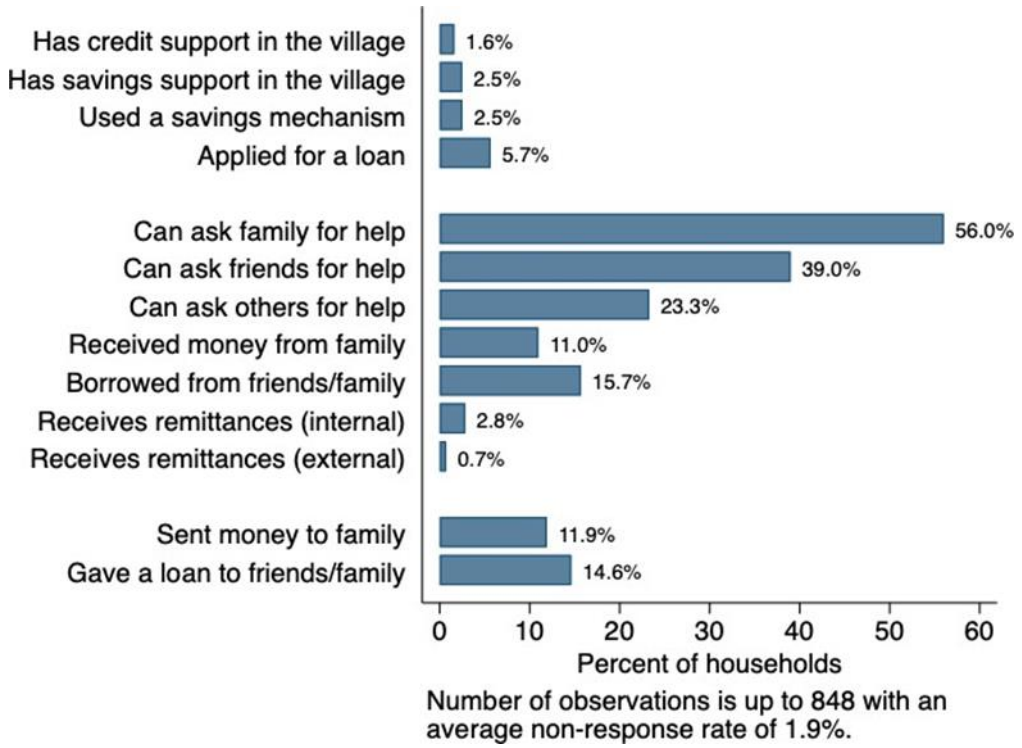
6.2.7 Financial outcomes and social capital

110. Households' financial activity and social support can sometimes serve as protective factors to help improve their livelihoods and cope with shocks. This section provides results on households' access to credit and savings support in the village, help from community members, level of savings, outstanding debt, and any transfers sent or received in the last 12 months.

111. Figure 27 shows that only a small share of households reported to have credit or savings support in the village – 1.6 percent and 2.5 percent respectively. Only 2.5 percent of households had made a deposit in any type of savings group in the last 12 months. Table 7 shows that, out of those who had used this channel, on

average, they had a current balance of SSP 30,420 and had deposited SSP 16,520 in the last three months. A slightly higher share of households (5.7 percent of all households in Juba and Yambio) had applied for a loan; among them, the average amount borrowed in the last 12 months was SSP 12,460.

Figure 27: Financial outcomes and social capital, Juba and Yambio



Note: All values, except for social capital (asking for help) and remittances questions, refer to a period of the last 12 months. A savings mechanism includes a bank, savings bank, formal institution, village savings and loan association (VSLA) or other. Internal migration refers to remittances received from a person who migrated within the country, while external migration defines someone who migrated to another country. Non-responses refer to "don't know" and "refuse to respond" answers.

112. Help between friends and family was very common, with 56 percent and 39 percent of households being able to ask family and friends for money, respectively. Relatively equal shares of households had sent or received money to friends or family (11 and 11.9 percent, respectively) and gave or received a loan from friends or family (15.7 and 14.6 percent, respectively). Only 23.3 percent reported being able to ask other community members for help with money.

113. As mentioned previously, internal migration is more common than external migration in Juba and Yambio, and 2.8 percent of households reported receiving remittances from migrants who had moved elsewhere in the country.

Table 7: Financial outcomes and social capital, Juba and Yambio

	Mean	Standard Deviation	N
Savings mechanisms			
Balance of formal savings accounts	30.42	57.79	19
Amount deposited in the last 3 months	16.52	32.81	20
Amount borrowed in the last 12 months	12.46	11.93	48
Amount outstanding on the loan	6.35	10.37	48
Social capital			
Number of family members a household can ask for money	1.17	1.52	823
Number of friends a household can ask for money	0.76	1.20	818

Number of community members a household can ask for money	0.54	1.22	816
Amount received from family	21.85	26.55	93
Amount borrowed from friends/family	6.64	8.17	132
Amount sent to family	30.40	42.92	98
Amount of the loan to friends/family	7.35	12.08	121

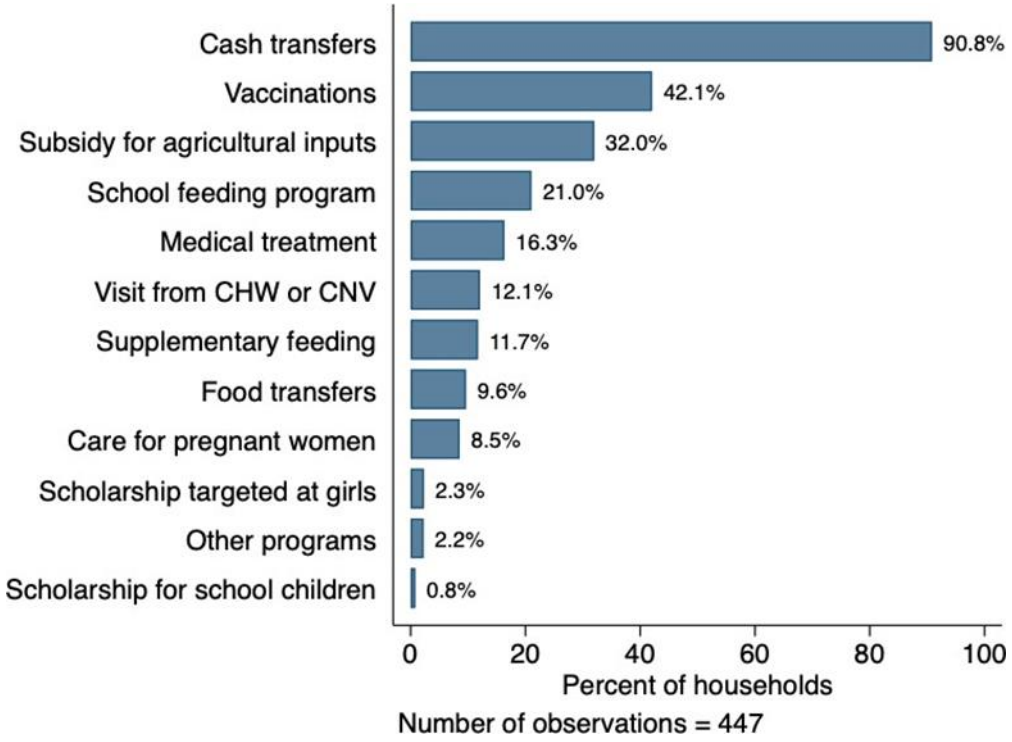
Note: These are household-level summaries for households that reported making a deposit in a savings institution, applied for credit, and made transfers with friends/family. Monetary values are shown in thousand SSP and winsorized at the 2nd and 98th percentiles.

6.2.8 Safety nets, health, and livelihoods programmes

114. Households were asked about their participation in different safety nets, health, and livelihoods programmes over the last 12 months. Figure 28 shows the percentage of households receiving food or cash transfers only for a subset of 447 households who started receiving benefits before 2021 (existing FFA villages). Table 8 provides additional information on the livelihoods programmes, including the total number of transfers and amount per transfer received in the last 12 months: 90.8 percent of households reported receiving cash transfers; and 9.6 percent reported receiving food transfers. Households received, on average, four cash transfers, with SSP 13,250 per transfer.

115. Land clearing and planting was the most common activity reported by households participating in cash for work programmes (88 percent). Other commonly reported programmes included: vaccinations (42.1 percent); subsidies for agricultural inputs (32 percent); and school feeding programmes (21 percent).

Figure 28: Programme participation (last 12 months) (existing FFA villages), Juba and Yambio



Note: CHWs and CNVs are community health workers and community nutrition volunteers. Supplementary feeding is for children aged under 5 years, and pregnant or lactating women. Medical treatment excludes treatments for pregnant women.

Table 8: Programme participation (last 12 months) (existing FFA villages), Juba and Yambio

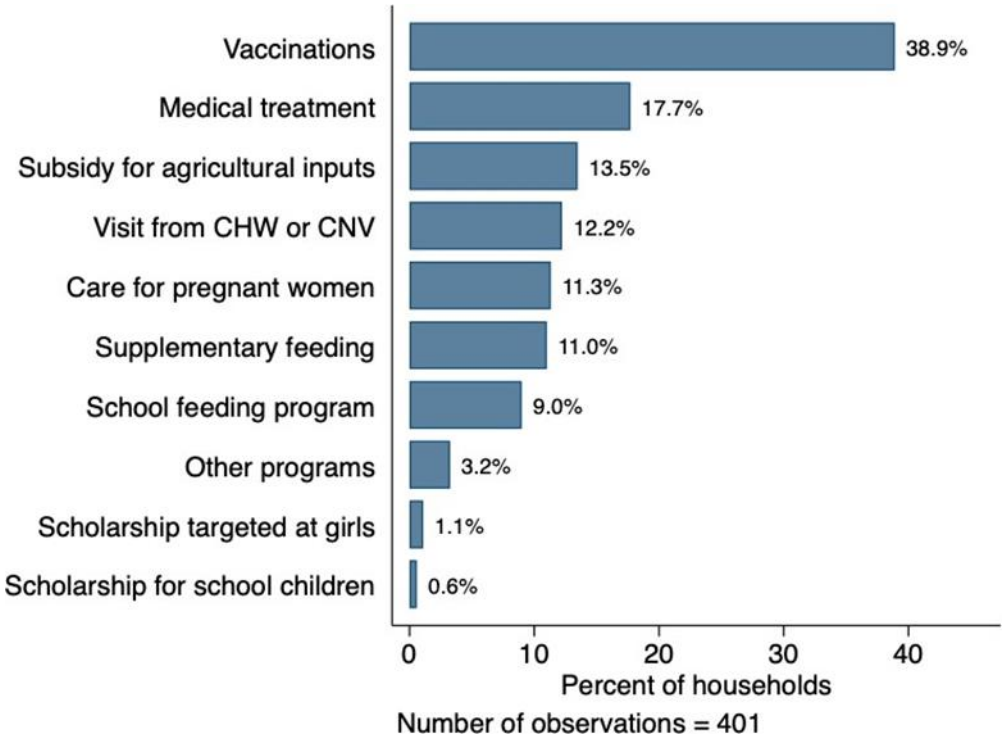
	Mean	Standard Deviation	5%	95%	N
Cash transfers					

Number of transfers	3.82	2.85	1.00	10.00	375
Amount per transfer	13.25	4.01	7.00	17.62	389
Food transfers					
Number of transfers	2.49	1.80	1.00	5.00	41
Amount per transfer	12.16	4.31	7.00	17.60	38

Note: Amounts are shown in thousand SSP and winsorized at the 98th percentile. For in-kind (food) transfers, the amount is the monetary equivalent of the transfer in SSP. Number of observations within the panel relating to a certain programme varies due to "don't know" and "refuse to respond" answers.

116. Figure 29 shows the percentage of households that participated in different safety nets, health, and livelihoods programmes in control and newly eligible FFA and UCT locations in the last 12 months. Among the five most commonly reported programmes were: vaccinations that benefited 38.9 percent of households; medical treatment (excluding treatments for pregnant women) (17.7 percent); subsidies for agricultural inputs (13.5 percent); visits from community health workers or nutrition volunteers (12.2 percent); and care for pregnant women (11.3 percent).

Figure 29: Programme participation (last 12 months) (newly eligible locations), Juba and Yambio



Note: CHWs and CNVs are community health workers and community nutrition volunteers. Supplementary feeding is for children aged under 5 years, and pregnant or lactating women. Medical treatment excludes treatments for pregnant women.

6.2.9 Psychosocial well-being

117. To measure the psychological well-being of the respondents, households were asked how many days they felt in a certain way in the last week. For example: How many days did you feel that the details of daily life bothered you more than usual?

118. Table 9 lists the average responses for ten questions in Panel A and four questions in Panel B. The responses are used to construct the following two indices:[22]

- Less depression (0–70): The ten questions in Panel A come from the Center for Epidemiologic Studies Depression Scale Revised (CES-D-R 10), which is used as a measure of depression. To calculate this index, responses for the ten questions are summed up. Higher scores suggest greater severity of symptoms (risk of depression).
- Less disability (0–28): The four questions in Panel B come from the Self-Reporting Questionnaire 20-Item (SRQ-20), which is designed to detect psychological distress. Similarly, the index is constructed as the sum of the responses for these four questions.

119. Table 9 shows that, on average, households reported having depression symptoms between —two to three days in the week before the survey. On at least four days, respondents did not feel confident in the future or happy. The average Less Depression index is 26.36 out of 70 and Less Disability index is 9.01 out of 28. Note that the levels of these indices are not necessarily meaningful by themselves, however, they will be used to evaluate programme impacts over time.

Table 9: Psychological well-being (last 7 days), Juba and Yambio

	Mean	Standard Deviation	N
Panel A: Depression scale			
Mental health index: Less depression (0–70)	26.36	10.93	808
Details of daily life bothered you more than usual	2.38	2.03	839
Had trouble concentrating on what you were doing	2.17	1.77	838
Felt sad	2.31	1.90	836
Felt that everything you did took all your energy	2.43	1.84	839
Felt confident in the future (reverse scale)	4.13	2.14	836
Felt nervous, tense or worried	2.28	1.88	833
Had trouble sleeping peacefully	2.34	2.03	841
Felt happy (reverse scale)	4.27	1.91	845
Felt alone	1.88	2.01	836
Felt so tired that you couldn't do anything	2.30	1.74	839
Panel B: Disability scale			
Mental health index: Less disability (0–28)	9.01	5.56	826
Had a headache	2.07	1.69	842
Your digestion was bad	1.46	1.70	836
Had difficulty fulfilling family responsibilities	3.13	2.30	836
Had difficulties in your daily work	2.34	1.91	839

Note: Households were asked ten questions based on the Center for Epidemiologic Studies Depression Scale Revised (CES-D-R 10) to measure depression and four questions from Self-Reporting Questionnaire 20-Item (SRQ-20) to measure mental health disability. The questions were framed: In the last 7 days, how many days you felt a

[22] For a detailed discussion of the construction of these indices, see: Bossuroy, Thomas et al. (Mar. 2021). *Pathways out of Extreme Poverty: Tackling Psychosocial and Capital Constraints with a Multi-Faceted Social Protection Programme in Niger*. Policy Research Working Paper; No. 9562. World Bank, Washington, DC.

certain way? Higher scores for the Less depression and Less disability indices suggest higher risk of depression. Number of observations varies due to "refuse to respond" answers.

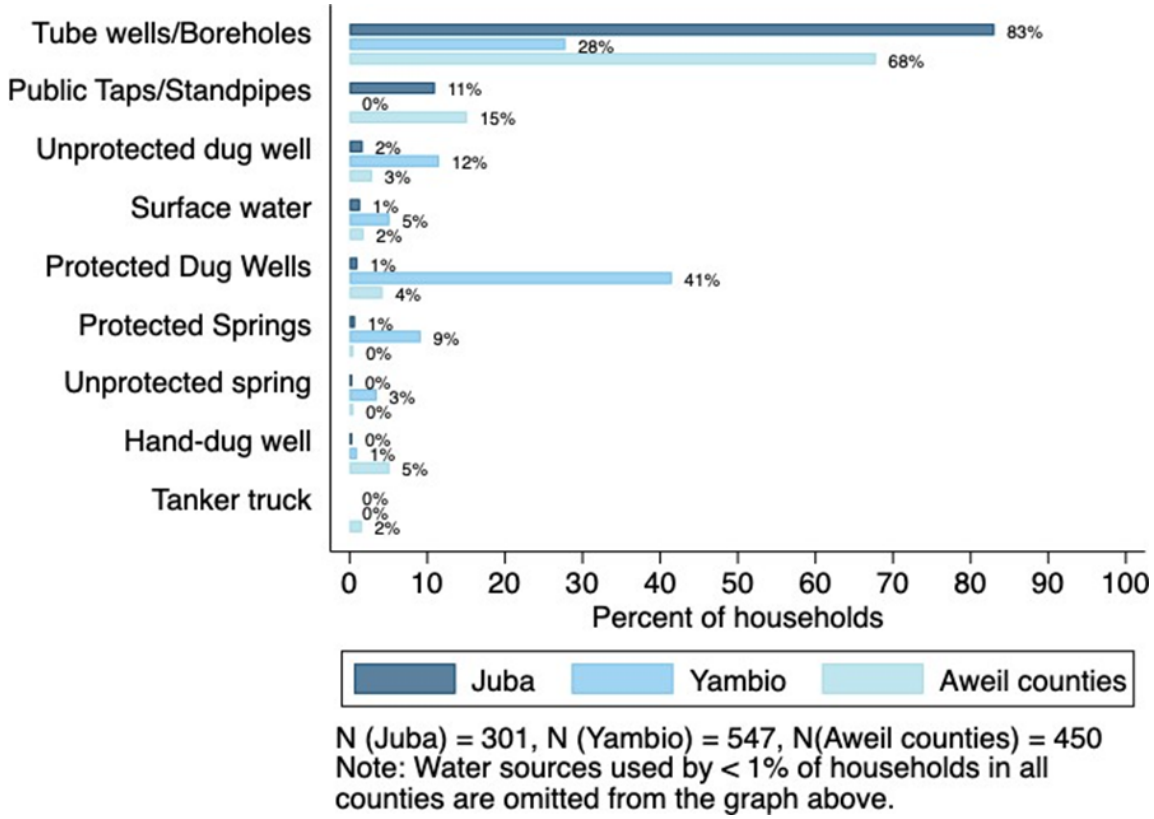
6.2.10 Access and distance to water, sanitation, and hygiene (WASH) services

120. This section provides an overview of households' outcomes relative to access and distance to WASH services across all counties. Figure 30 shows the main sources of drinking water reported by households. In Juba, 96 percent of household heads reported using improved facilities[23] which include: tube wells or boreholes (83 percent); public taps or standpipes (11 percent); protected dug wells (1 percent); protected springs (1 percent) as their main source of drinking water. Also, 2 percent used unimproved facilities such as unprotected dug wells and 1 percent used surface water. In terms of expenditures, on average, a household in Juba and Yambio spent 388 SSP per household member on water bills every month (see Table 6).

121. In Yambio, 79 percent of household heads reported using improved facilities. The most common source of drinking water was protected dug wells (41 percent), followed by tube wells or boreholes (28 percent), protected springs (9 percent), and hand-dug wells (1 percent). In addition, 15 percent used unimproved facilities such as unprotected dug wells and springs and 5 percent used surface water.

122. In Aweil counties, using tube wells or boreholes was the most common source of drinking water reported by 68 percent of household heads. In total, 92 percent of household heads reported using improved facilities. In addition to tube wells or boreholes, 15 percent used public taps or standpipes, 5 percent used hand-dug wells, and 4 percent used protected dug wells. Also, 5 percent used unimproved facilities such as unprotected wells and 2 percent used surface water. In terms of expenditures, on average, a household in Aweil counties spends 59 SSP per household member on water bills every month (see Appendix Table 3).

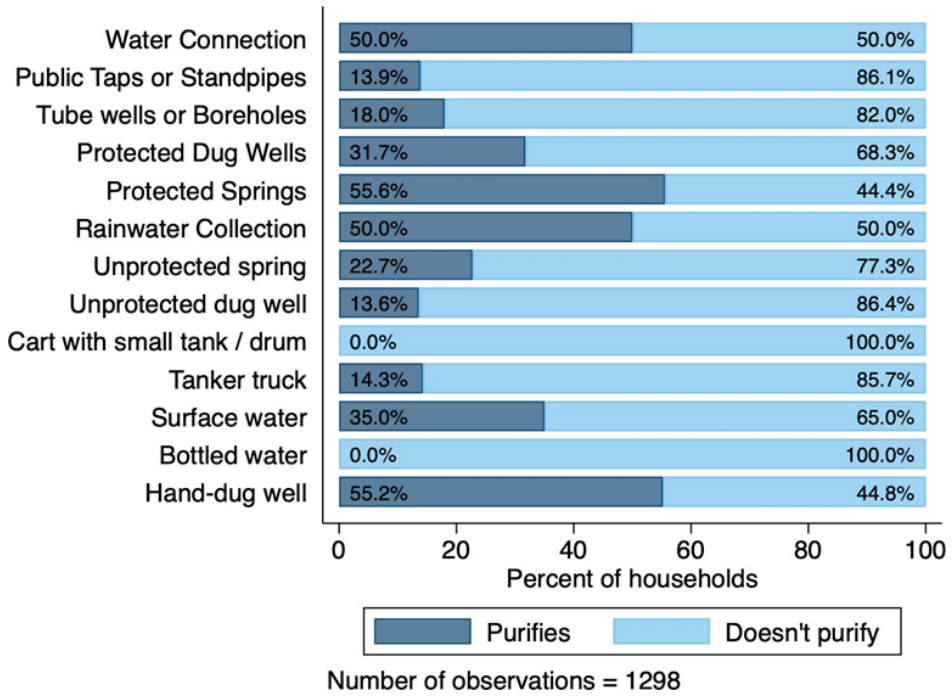
Figure 30: Main source of drinking water, full sample



[23] The definitions of improved and unimproved drinking water facilities are sourced from the World Health Organization. https://www.who.int/data/nutrition/nlis/info/improved-sanitation-facilities-and-drinking-water-sources

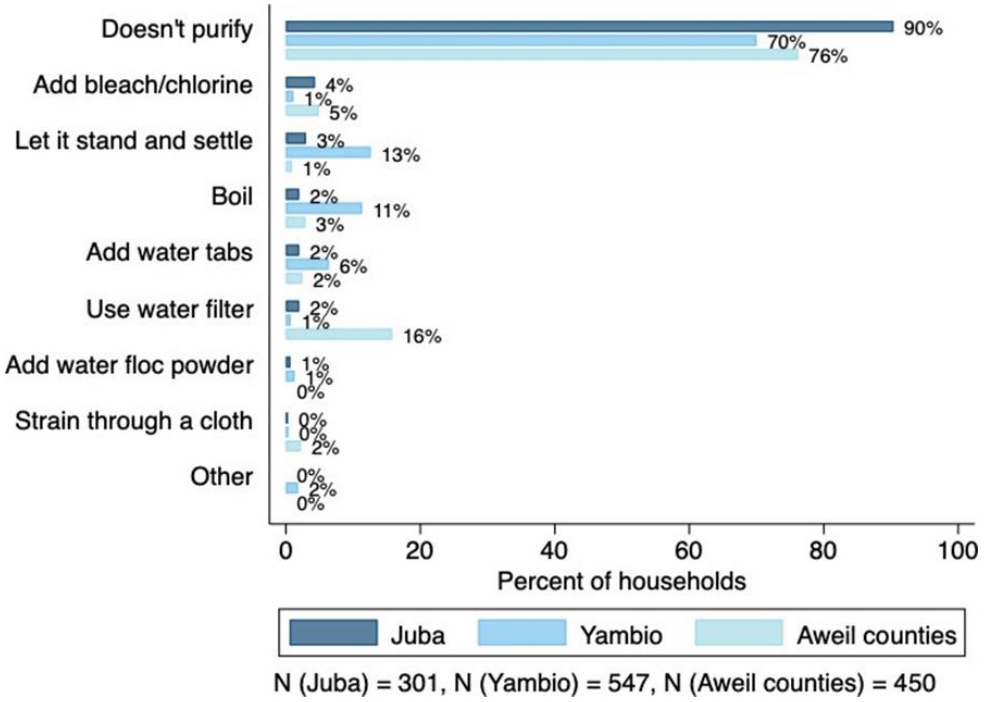
123. Figure 31 shows the share of households that purify water, depending on their main water source across the full sample. The figure shows that most households did not purify the water that came from unimproved facilities such as unprotected springs and dug wells and surface water.

Figure 31: Household heads that report making water safe to drink, full sample



124. Figure 32 shows that only 10 percent of households in Juba make water safe to drink compared to 30 percent in Yambio and 24 percent in Aweil counties. In Yambio, to make water safe to drink, most households let it stand and settle (13 percent), boiled it (11 percent) and added water tablets (6 percent). In Aweil counties, most households used water filters (16 percent of all households in the education sample), added bleach or chlorine (5 percent), boiled it (5 percent), added water tabs (2 percent) and strained through a cloth (2 percent).

Figure 32: Methods used to make water safe to drink, full sample

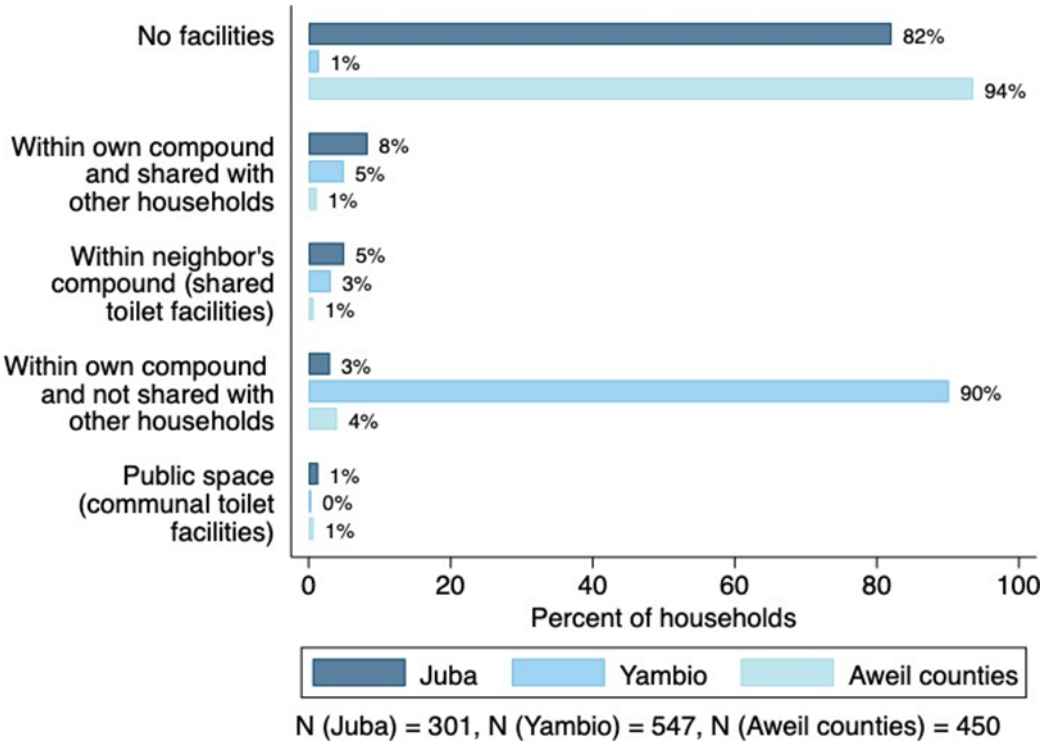


125. There are stark differences in access to sanitation facilities between households in Juba, Yambio and Aweil counties. Basic sanitation services as defined by the UNICEF/World Health Organization joint monitoring

programme, refer to the use of improved sanitation facilities[24] that are not shared with other households. According to these two criteria, 43 percent of households in Yambio have access to improved sanitation. As Figure 33 shows, 90 percent of households in Yambio reported having a toilet or a latrine within their own compound and not shared with other households. However, from Figure 34, we can see that only half of these facilities can be considered as improved sanitation: 49 percent of households used unimproved sanitation such as pit latrines without slabs. However, in Juba, 81 percent of households reported defecating in the open field (see Figure 35), and less than 1 percent of households had access to improved sanitation.

126. In Yambio and Juba, 5 to 8 percent of households shared their latrine with other households, and 3 to 6 percent used either a neighbour's compound or public space, which were around 4 minutes away (one way). On average, a shared latrine was used by three households in Yambio and six households in Juba. Only 15 percent of all the facilities (shared or not) had internal locks and adequate lighting.

Figure 33: Location of the public toilet or latrine used by the household members, full sample



127. As Figure 33 shows, Aweil counties were similar to Juba, with 94 percent of households reported not having any toilet facilities and going to the open field instead. The latrine in the household, as shown in Figure 34, was most commonly a pit latrine with a slab (reported by 4 percent of households). For 6 percent of household heads that reported using any working toilet (shared or not), 35 percent of these facilities had internal locks and adequate lighting.

[24] Improved sanitation facilities separate human waste from human contact. These facilities include flush or pour-flush to piped sewer system, septic tank pit latrines, ventilated-improved pit latrines, pit latrines with slab or composting toilets. Flush or pour-flush to elsewhere, pit latrines without slabs or open pits, bucket latrines, hanging latrines or open defecation are not considered to be improved sanitation.

Figure 34: Main type of toilet or latrine used by the household head, full sample

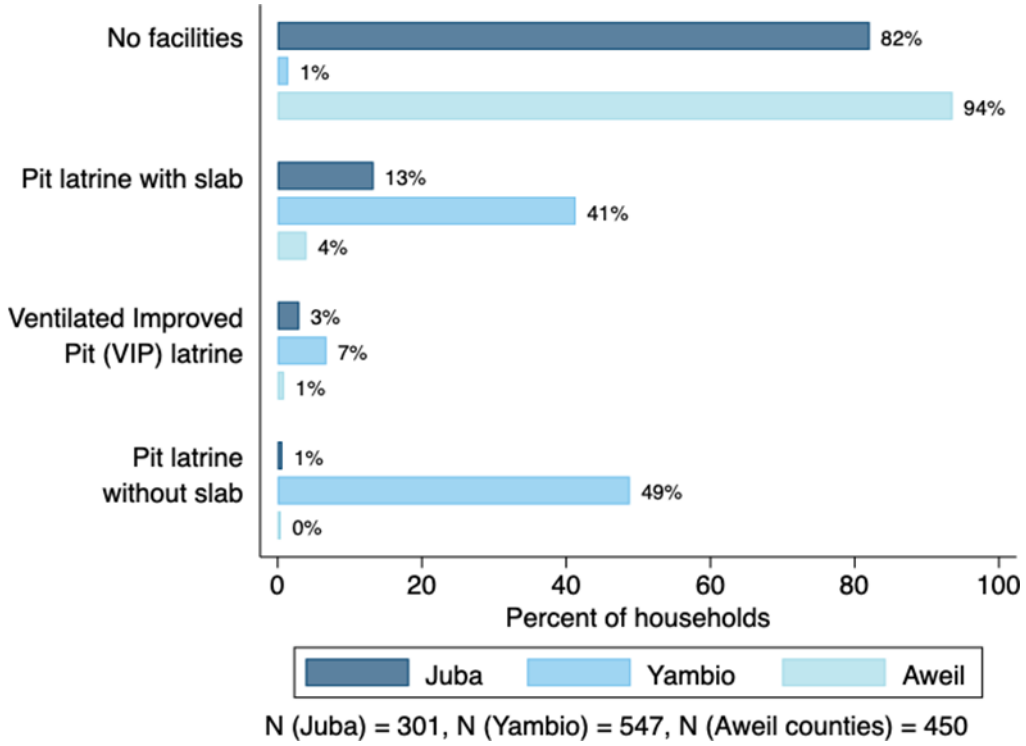
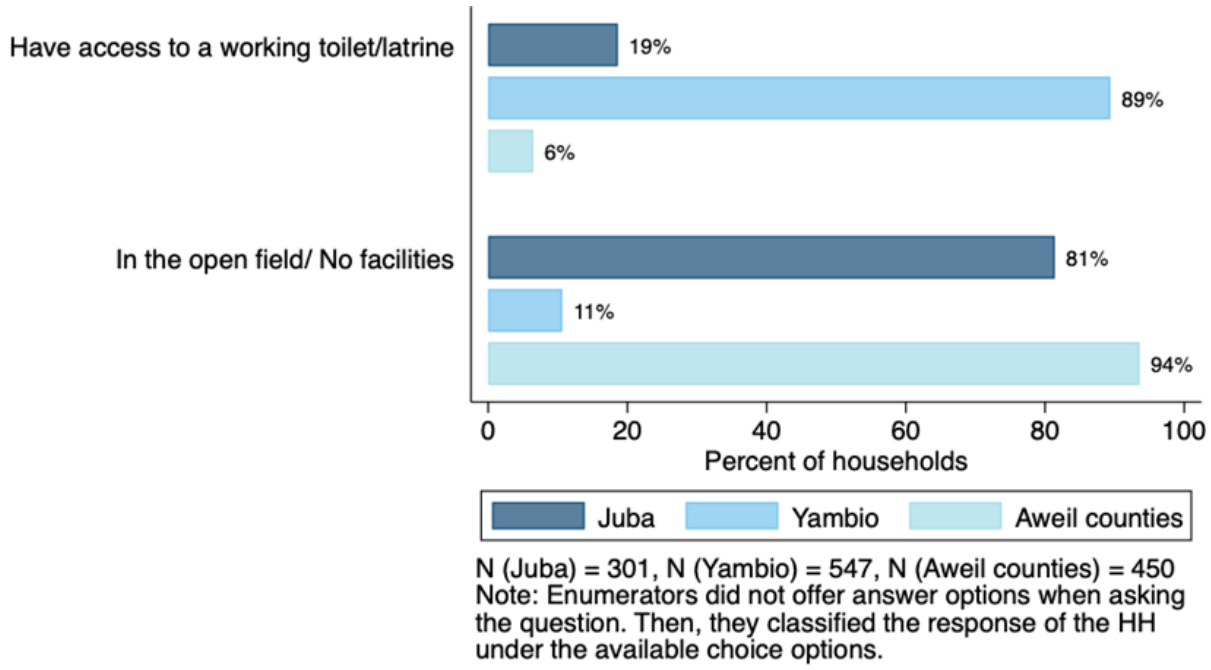
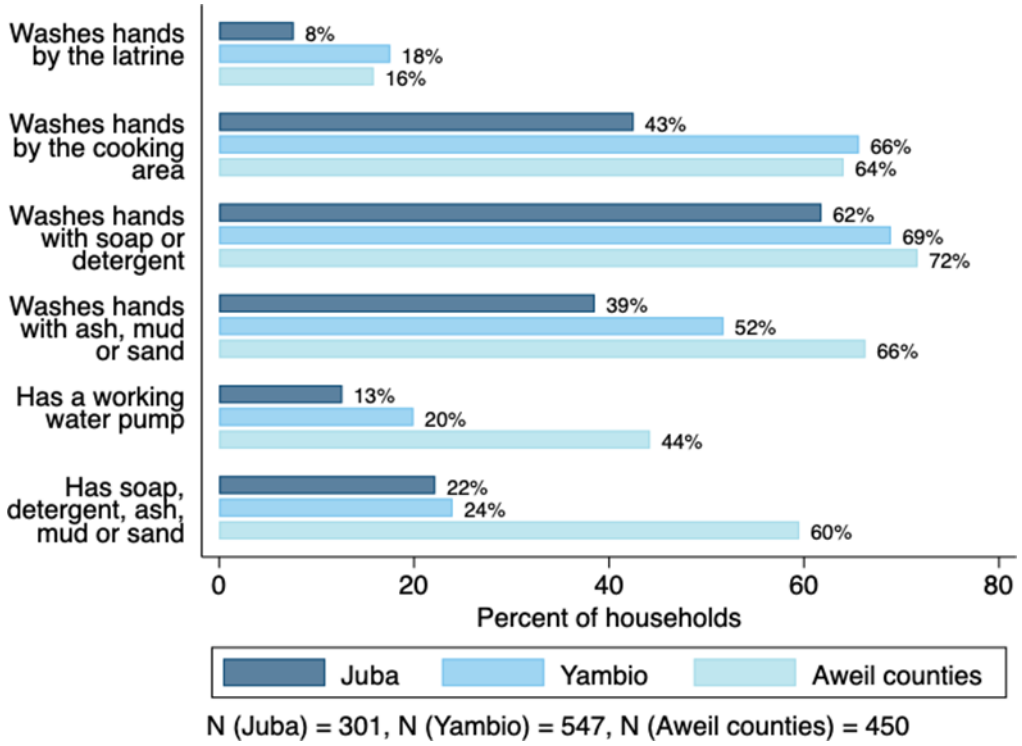


Figure 35: Household head's answer to "Where do you defecate most often?", full sample



128. In terms of hand-washing behaviour, household heads reported washing their hands on average four and six times per day in Juba and Yambio, respectively. Figure 36 shows that more respondents washed their hands by the cooking area rather than by the latrine. However, according to enumerator observation, only 13 to 20 percent of households had a working water pump. Between 62 and 69 percent of households reported washing their hands with soap or detergent, and 39 to 52 percent with ash, mud, or sand. Enumerators were also asked to observe whether soap, detergent, ash, mud, or sand were present for those who reported using them. Only 23.4 percent of households had these items present.

Figure 36: Household behaviour, WASH (responses by household head), full sample



Note: The last two questions (household has a working water pump and household has soap, detergent, ash, mud or sand) are reported from observation by the enumerator. The latter question is reported for the subset of the population that reported using those items. For this question, N (Juba) = 212, N (Yambio) = 430 and N (Aweil counties) = 368.

129. In Aweil counties, household heads reported to wash their hands on average four times per day. As Figure 36 shows, 16 percent of households washed their hands by the latrine and 64 percent washed their hands by the cooking area. According to enumerator observation: 44 percent of households had a working water pump; 72 percent of households reported to wash their hands with soap or detergent; and 66 percent washed their hands with ash, mud, or sand. According to enumerator observations, 60 percent of households that reported using these items had these items present.

130. Households were also asked about the distance from their dwelling to the nearest facilities (in minutes, one way), such as a health centre and primary school. Table 10 shows regression results of child health outcomes by distance to the nearest health centre for livelihoods and education RCT locations. The distance is collated into three groups: (1) below 30 minutes; (2) 30 to 60 minutes; and (3) more than 60 minutes. Table 10 shows that, for children who had diarrhoea, fever, cough, difficulty breathing or other illnesses in the last two weeks, seeking treatment in a clinic by the caretaker is less likely if the household is located more than 30 minutes away from the health centre. Households were also less likely to be visited by community health workers or nutrition volunteers if they were between 30 and 60 minutes away from the health centre, compared to being within half an hour distance.

Table 10: Outcomes by distance to health centres in minutes (one way), full sample

Explanatory Variable	Explained Outcomes (%)			
Time to health centre	**Sought treatment in a clinic**	**Visited by CHW/CNV**	**Child has measles vaccine**	**Child received vitamin A**
30 to 60 mins	-0.148**	-0.130**	-0.051	-0.016
	(0.059)	(0.054)	(0.042)	(0.053)
60+ mins	-0.161***	-0.059	-0.044	0.056
	(0.055)	(0.058)	(0.053)	(0.062)
Constant	0.825***	0.416***	0.833***	0.831***
	(0.042)	(0.062)	(0.038)	(0.033)
County dummies	Yes	Yes	Yes	Yes
F-statistic	3.4**	4.8***	.79	12***
R-squared	.034	.045	.0048	.058
N	344	440	602	592

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors are clustered at the village level. Reference category for the distance to health centre is under 30 minutes. Sought treatment is reported for children under 5 years old who had diarrhoea, fever, cough, difficulty breathing or other illnesses in the last two weeks. A clinic refers to a government, non-government or private health centre or clinic. Visits by community health workers and community nutrition volunteers (CHWs and CNVs) refer to the last 12 months. Questions on measles vaccine and vitamin A doses are asked about children aged between 6 months and 5 years old. A child receiving a dose of vitamin A refers to the last six months.

131. Table 11 presents the gendered schooling outcomes by distance to the closest primary school. These are only reported for the livelihoods sample, since the education sample consists of households with children in school, which are therefore more likely to be in close proximity to a school. The distance is collated in four groups: (1) below 30 minutes; (2) 30 to 60 minutes; (4) 60 to 90 minutes; and (5) more than 90 minutes.[25] The table shows that school-age children (aged 5 to 17) in the livelihoods sample were less likely to be enrolled in school if they were more than 90 minutes away from the school, compared to those that were under 30 minutes away. This result seems to be driven by gendered impacts. Girls in particular were less likely to be enrolled in school if they lived more than 90 minutes away.

[25] The collating is different in Table 10 and Table 11 due to a limited number of observations in brackets for distance to a health centre.

Table 11: Outcomes by distance to primary schools in minutes (one way), Juba and Yambio

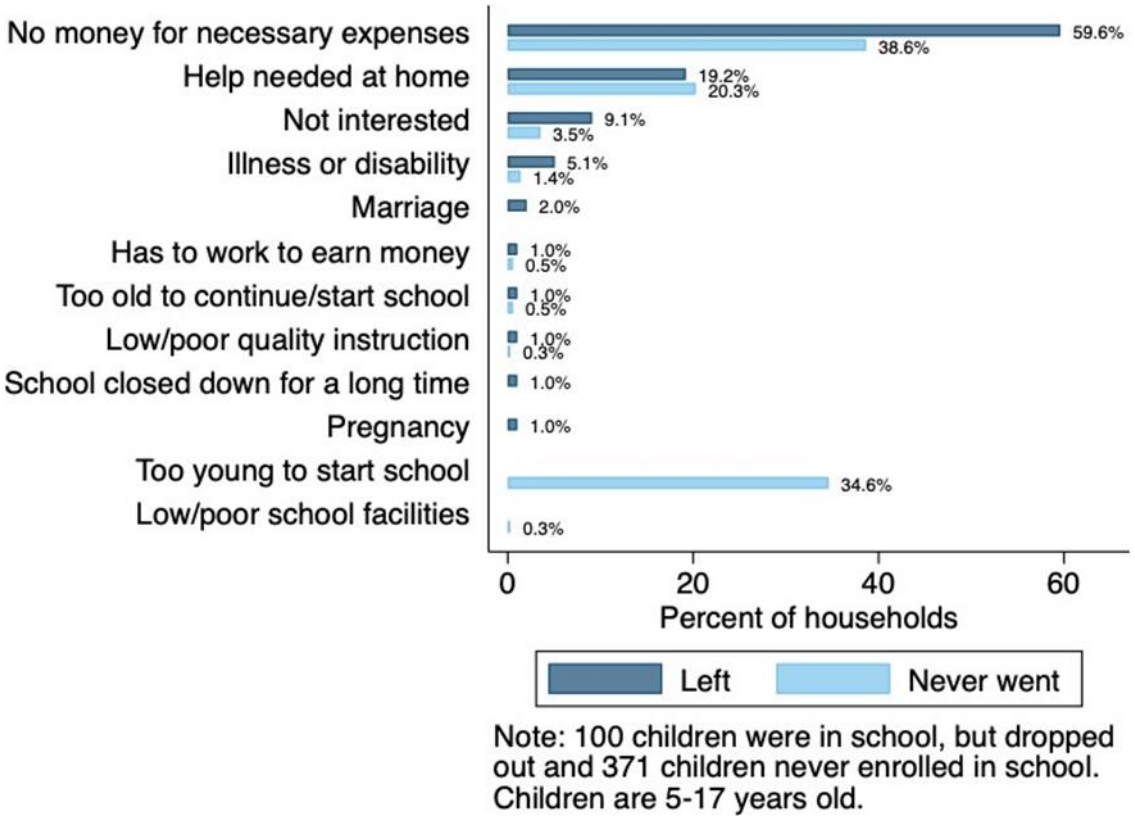
Explanatory Variable	Explained Outcomes (%)		
Time to school	**Children in school**	**Girls in school**	**Boys in school**
30 to 60 mins	0.012	0.010	0.010
	(0.048)	(0.051)	(0.055)
60 to 90 mins	0.039	0.002	0.092
	(0.081)	(0.091)	(0.081)
90+ mins	-0.163**	-0.189**	-0.133
	(0.079)	(0.080)	(0.090)
Constant	0.696***	0.642***	0.752***
	(0.019)	(0.029)	(0.025)
County dummies	Yes	Yes	Yes
F-statistic	2.2*	2.8**	1.6
R-squared	.014	.016	.015
N	2,194	1,122	1,072

Note: * p<0.1, ** p<0.05, *** p<0.01. Standard errors are clustered at the village level. Reference category for the distance to school is under 30 minutes. Outcome variables are for school-age children between 5 and 17 years old.

6.2.11 Education, school feeding and well-being

132. This section provides an overview of baseline characteristics of children in Aweil counties. The data was collected for 1,630 children between the ages of 5 and 17 years. As mentioned in Figure 11, 71 percent of these children were enrolled in school at the time of the survey; 23 percent of children in the sample had never been enrolled in school; and 6 percent had been to school but dropped out. Figure 37 shows that 38.6 percent out of 371 children never enrolled in school because the household did not have enough money for necessary expenses; 34.6 percent were too young to start school; and 20.3 percent had to stay and help at home. Out of those who were too young to enrol in school, 70 percent were aged between 5 and 6 years old; and 67 percent of children who had to help at home were girls. Out of 100 children in the sample who dropped out of school, 38.6 percent did not have enough money to cover necessary expenses; 19.2 percent had to help at home; 9.1 percent were not interested in schooling; and 5.1 percent had an illness or disability.

Figure 37: Reasons for leaving school or never having enrolled, Aweil counties



133. On average, children started school at the age of 8 (the same for boys and girls) and 90 percent of children were in grade 5 of the primary school and below at the time of the survey. Figure 38shows that 18.4 percent of children missed, on average, four days in the last month. The most common reasons for missing school were illness (45.1 percent); having to help at home (22.5 percent); and having no money for necessary expenses (14.1 percent). Of the children who had to stay at home to help, 67 percent were girls; 92.7 percent of children that missed school due to illness had a fever; 56.2 percent were vomiting; and 30.2 percent had a cough.

134. Figure 39 shows that 76.2 percent of children in the sample received de-worming treatment in the last 12 months. Almost exclusively these treatments were administered in school.

135. In Aweil counties, several questions were asked to understand the types of meal support received by the children between 5 to 17 years old who were enrolled in primary school. Figure 40 shows that 83.5 percent of all children in the sample received some type of meal support in school: 48.3 percent of children received meals on-site; 36.6 percent received meals to take home; and 1.8 percent received both types of meal support. Most on-site meals came in the form of lunch and 46.7 percent of all children received lunch at school. Out of those who reported receiving meal support, in 36 percent of cases the support was conditional on attending school on average 17 days per month. Out of those children who reported receiving on-site meals, 4 percent bring these meals home and most (74 percent) shared their meals with other siblings who do not go to school.

Figure 38: Absence of children from school (last 30 days), Aweil counties

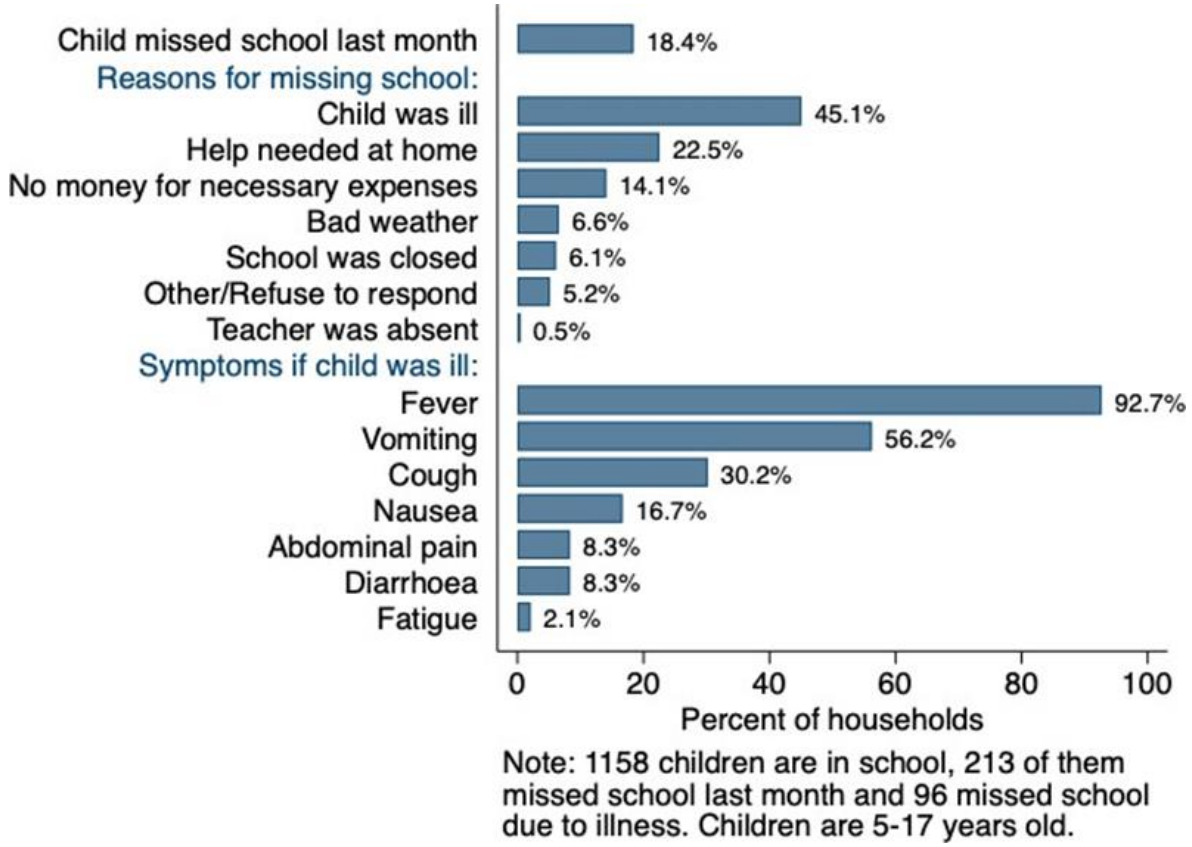


Figure 39: Access to de-worming treatment (last 12 months), Aweil counties

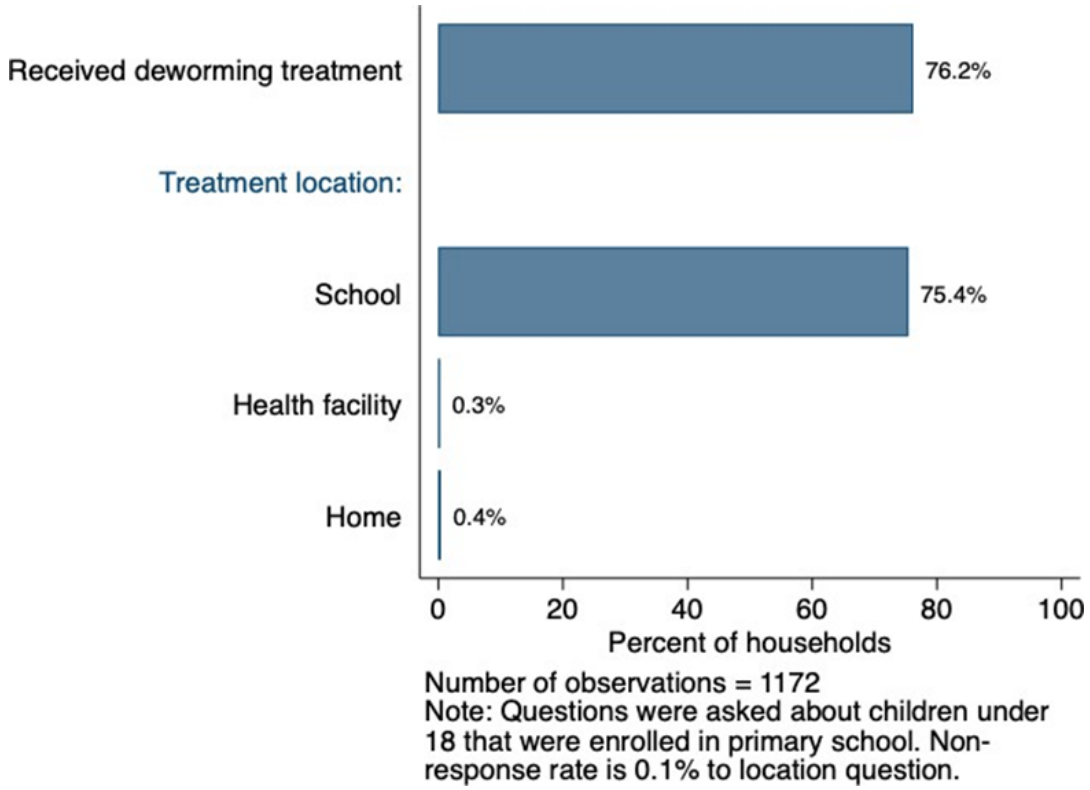


Figure 40: Meal support received in school (child-level data), Aweil counties

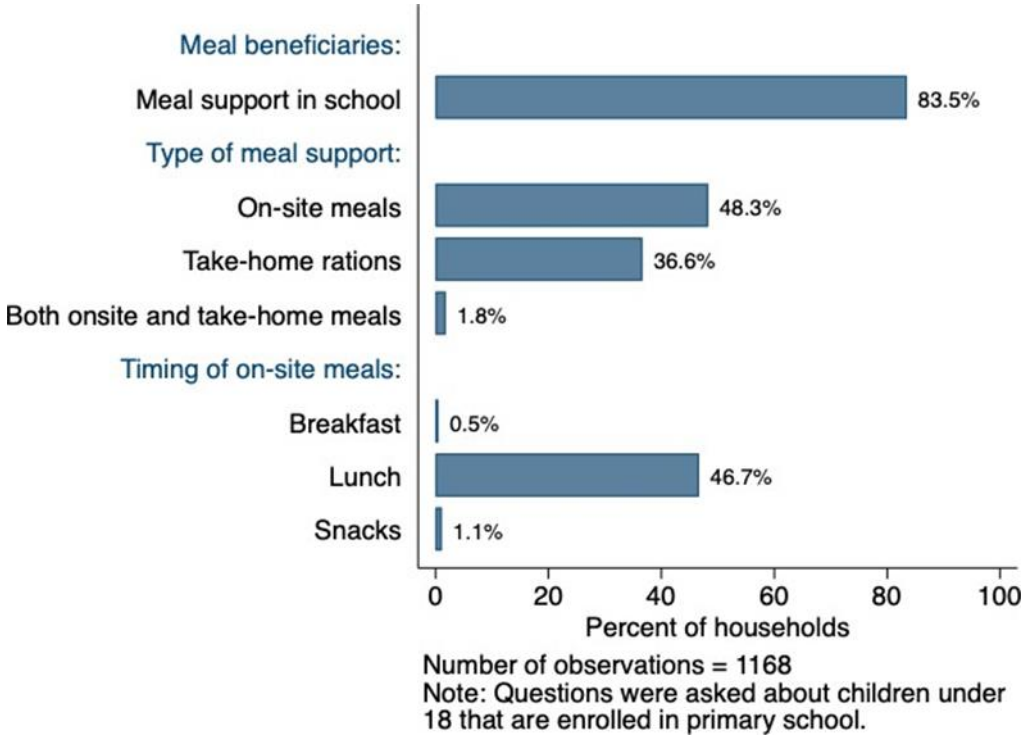
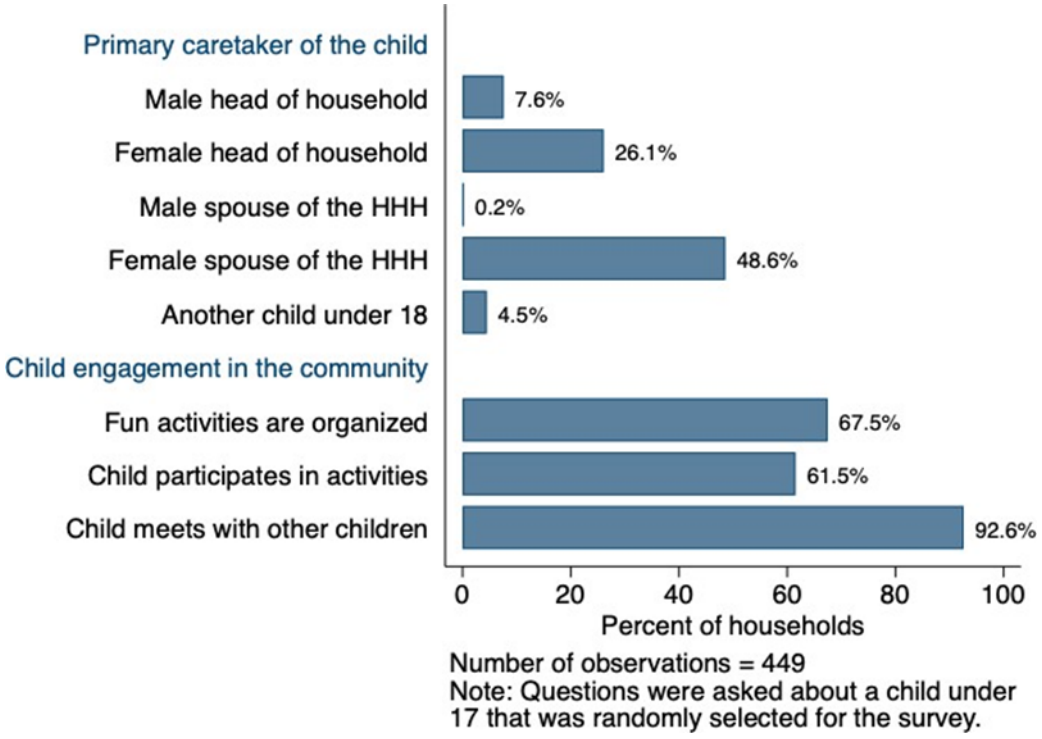


Figure 41: Child caregiver and child engagement in the local community, Aweil counties



136. To assess children's well-being, respondents were asked about one child in the household aged between 5 and 16 years who was randomly selected for the survey. The questions were directed at the child's caregiver. Figure 41 shows that main care-taking responsibilities fall on female figures in the household. In almost 75 percent of cases, the caretaker was either the female household head or the spouse of a male household head. Only 8 percent of male household heads or spouses of a female household head had childcare responsibilities.

137. The respondents were also asked about children's engagement with the local community: 68 percent of households reported that fun activities were organized for children in their community.[26] Overall, children seem to be very engaged in the local community, with 62 percent of them participating in such activities, and 93 percent meeting and interacting with other children. On average, children played 2.5 hours a day on weekdays and 4.2 hours during the weekend. When asked about the well-being of the child, 94 percent of respondents reported that the child feels happy all or most of the time.

7. Lessons and conclusions

7.1. CHALLENGES

138. The collection of baseline data faced two main obstacles. First, on account of the tight schedule of programme activities, cash and food transfers started before the deployment of the baseline survey in some of the livelihoods locations. To mitigate the risk that the impacts of C/FFA or UC/FT activities may have materialized shortly after implementation, a pre-baseline survey was implemented in 16 treatment villages. The aim of the survey was to establish the pre-transfer levels of key outcomes that may have been impacted in the short term by the cash/food transfers. Pre-baseline data collection took place between 29 April and 30 May 2021 and was implemented using the WFP Post-Distribution Monitoring System. Second, due to tensions and insecurity, the survey team was unable to reach one village in the Juba County and the whole of Torit County. Consequently, this report has not offered summary statistics for these locations.

139. There are a few aspects of the process that need to be considered while interpreting the data from baseline, follow-up surveys and the endline. First, household food security status is expected to vary across seasons, and as households encounter shocks. Therefore, the timing of the support provided through each activity (e.g., FFA, cash transfers, etc.) will be important.

140. Second, some of the activities implemented (e.g., some of the larger assets built through FFA), could benefit households outside the treatment villages. High-frequency and endline data will collect information on programme participation to understand which households benefitted from different interventions, and take that into consideration in the analysis. It is also not clear if all assets constructed during the impact evaluation timeframe will be fully functional. Some assets may take three to five years to be productive and beneficial to the targeted population. The impact evaluation team will document the location of these activities as much as possible.

7.2. CONCLUSIONS

141. This baseline report has presented the descriptive analysis of the pre-programme situation and serves as a point of reference for the impact evaluation. The report described highly vulnerable communities, highlighting the context in which the WFP-UNICEF joint resilience programme will seek to strengthen resilience. A large percentage of the households studied had high levels of food insecurity, low levels of food consumption, and diets lacking nutritional diversity. Most households were subsistence farmers who mostly grew crops during the main agricultural season. The most common shocks were droughts, floods, high food prices, and crop diseases. Most households were also exposed to multiple shocks: households in the sample experienced an average of seven shocks per year.

142. This report also verified that the main outcomes of interest for the impact evaluation (such as food consumption, and food or nutrition security) were balanced between treatment and control sites at baseline, and thus documented that the randomization process was successful in generating a valid control group to estimate counterfactual outcomes over time. This is a necessary step to ensure that the impact evaluation will deliver rigorous estimates of the short- and medium-term impacts of the resilience package, including the dynamics of welfare and food security over time.

143. The baseline data has also informed the implementation of the ensuing high-frequency rounds and the associated survey tool. For instance, inquiries into assets that are rarely owned – such as televisions, laptops, and refrigerators – were removed from the questionnaire. Instead, enumerators started collecting data on the ownership of chairs and bicycles. Similarly, baseline data pointed to important heterogeneities between counties. The subsequent high-frequency surveys thus started to elicit information on social norms and

[26] Examples of such activities include sports, music, dancing, art, wrestling or other activities children may do for fun.

traditions to the extent that they relate to the coping strategies that households employ. The discussion of baseline statistics has led to the inclusion of additional modules in the endline questionnaire to further the information on WASH-specific topics, public assets, and social behaviour change.

APPENDIX

A.1 INDICATORS IN AWEIL COUNTIES, EDUCATION EXPERIMENT

A.1.1 Demographic characteristics

Appendix Table 1: Demographic characteristics disaggregated by the sex of the household head, Aweil counties

	Mean		Difference
Variable	**Male**	**Female**	**T-test**
	(1)	**(2)**	**(1)-(2)**
Household head age	48.81	39.63	9.18***
	(11.91)	(10.63)	
Household size	7.69	6.88	0.81***
	(2.26)	(2.69)	
% Household head with primary education	24.03	4.38	19.65***
	(42.79)	(20.54)	
% households that cultivated land, in the last 12 months	82.11	81.02	1.09
	(38.39)	(39.36)	
% households that reared livestock, in the last 12 months	62.30	61.31	0.99
	(48.54)	(48.88)	
Tropical Livestock Unit (TLU), all households	1.51	1.08	0.43
	(3.39)	(2.91)	
% households that own a business	13.74	21.17	-7.43**
	(34.48)	(41.00)	
% household heads employed, in the last 12 months	14.06	6.57	7.49**
	(34.81)	(24.87)	
Total household assets	7.19	7.30	-0.10
	(4.69)	(4.19)	
Total farm assets	3.32	3.48	-0.16
	(2.36)	(2.07)	

Note: Standard deviations are reported in parenthesis. The number of observations is 313 for the male group and 137 for the female group. The values displayed for t-tests are the differences in the means between male and female-headed households. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

A.1.2 Livelihoods opportunities

The following section provides a summary on different livelihood strategies such as engaging in farming activities, rearing livestock, having wage employment, and owning a business in Aweil counties. Appendix Figure 1 and Appendix Table 2 show that many households were engaged in farming and livestock activities, with 82 percent of households reported having at least one plot and, on average, between one to two plots. In 2020, households in Aweil counties cultivated crops only during the rainy season (March to July). Among the households that reported cultivating any plots, the average revenue from crop sales was SSP 13,720. Further, 62 percent of households in the sample were engaged in rearing livestock in the previous 12

months. The majority of households own chickens (51 percent), goats (42 percent) and cows (19 percent). Households reported having had a profit of SSP 13,320 from selling livestock in the previous 6 months and estimated that the revenue of livestock consumed by the household at SSP 1,650 if it had been sold at the market.

Appendix Table 2: Income-generating activities, Aweil counties

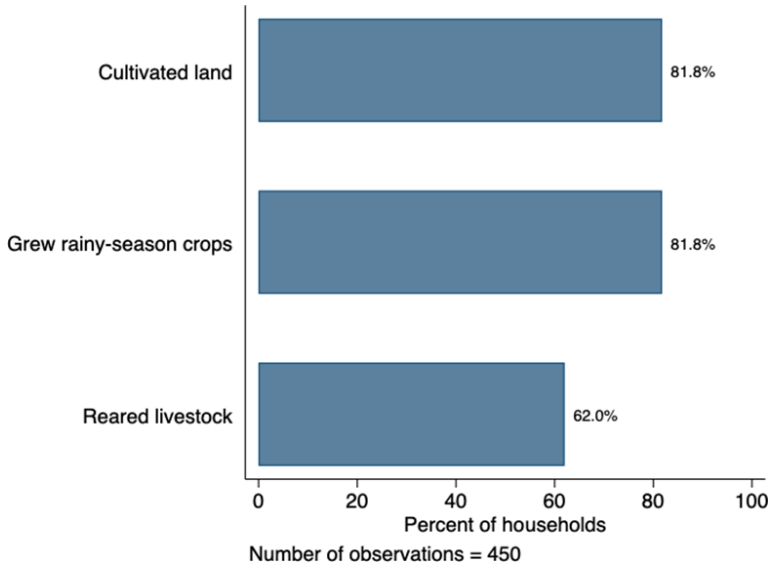
	Mean	Standard Deviation	N
Panel A: Agriculture			
Number of plots	1.54	0.88	368
Plot size (hectares)	0.65	0.33	355
Farm size (hectares)	0.96	0.65	355
Annual revenue from all crop sales in 2020 (dry and rainy season)	13.72	40.46	368
Panel B: Livestock			
Total livestock count, all households	9.07	12.74	450
Tropical Livestock Unit (TLU), all households	1.74	3.25	450
Total livestock count, households with livestock	14.63	13.44	279
Tropical Livestock Unit (TLU), households with livestock	2.81	3.90	279
Number of chickens	5.82	3.98	229
Number of goats	8.66	6.81	189
Number of cows	9.63	10.20	86
Number of sheep	7.50	6.37	38
Number of pigeons	1.00	.	1
Profit from sold livestock and products	13.32	42.08	279
Value consumed of livestock and products	1.65	5.22	279
Panel C: Wage employment (main and secondary)			
Monthly household income	15.79	23.86	49
Average monthly wage income per worker	12.18	18.09	49
Panel D: Businesses			
Number of businesses	1.03	0.17	72
Number of months worked by manager last year	9.28	3.63	72
Average number of work days for all household members last month	23.44	9.23	61
Monthly business profit	47.48	86.54	53
Average monthly business profit per worker	45.75	85.33	53

Note: These are household-level summaries for households that report plots, various types of livestock, wage employment and non-agricultural businesses. Farm and plot size as well as revenue, profit and other monetary values are winsorized at the 2nd and 98th percentiles. All monetary values are expressed in thousand SSP. A higher number for TLU (common unit for livestock numbers) corresponds with improved food security and household resilience. Profits from sold livestock and monetary value of consumed livestock are reported for the period of the last 6 months as opposed to 12 months to maximize accuracy in memory recall.

Having wage employment or owning a business is not common. Only 8 percent of all adults in the sample (18 years and older) reported to have been employed in the last year, 5 percent in the last month, and less

than 1 percent reported having secondary employment. Out of those employed, 94 percent worked in petty or retail trade, construction, transportation, carpentry, teaching, and aid or development work compared to 6 percent who worked on a farm. Households with wage employment earned a total monthly income of SSP 15,790 and monthly income of SSP 12,180 per worker engaged from the household. Sixteen percent of households owned an average of one business, which engaged the enterprise manager for about 9 months of work per year and, on average, 23 days per month across all household members. Half of households with a business reported working on processing agricultural products or meat for resale. On average, the businesses brought a total monthly profit of SSP 47,480.

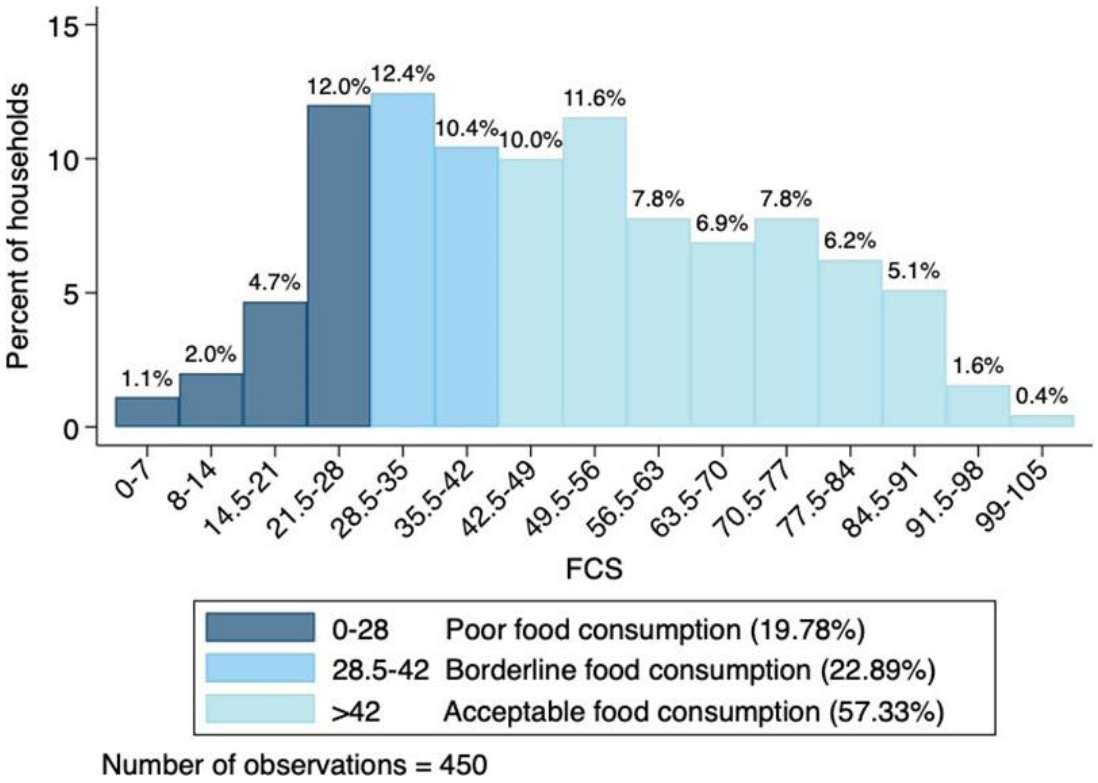
Appendix Figure 1: Farming and livestock (last 12 months), Aweil counties



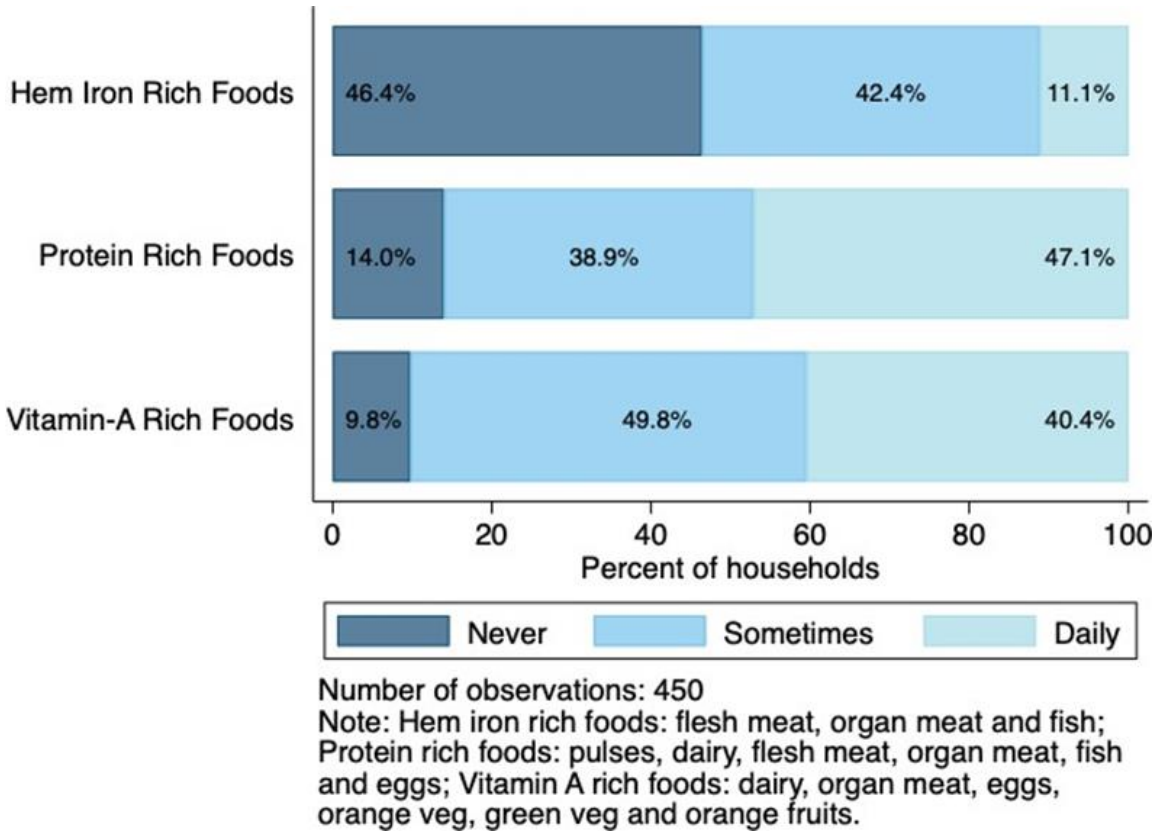
A.1.3 Food security

The following section provides a summary of several food and nutrition security indicators, such as Food Consumption Score (FCS), Food Consumption Score-Nutrition (FCS-N), Household Dietary Diversity Score (HDDS), food expenditure share and indicators that are used to assess dietary practices of children in Aweil counties. Appendix Figure 2 shows the distribution of the FCS across the sample. According to the FCS classification, 19.8 percent of households had poor food consumption, 22.9 percent were borderline, and 57.3 percent had an acceptable food consumption. Appendix Figure 3 shows that 46 percent households reported to never consume hem iron-rich foods, 14 percent never consumed protein-rich foods and 10 percent never consumed vitamin A rich-foods. Appendix Figure 4 shows that only 6.4 percent of the households in Aweil counties were classified as having a good dietary diversity, with almost 50 percent having a low dietary diversity score. Appendix Figure 5 shows that, out of 49 children between 6 and 23 months old, 18.4 percent had the minimum dietary diversity (MDD) and 18.4 percent had the minimum meal frequency (MMF) the previous day; 14.3 percent of the 42 breastfed children and 42.9 percent of the 7 non-breastfed children had the MMF the previous day. The composite indicator MAD shows that only 6.1 percent of children 6–23 months of age received the minimum acceptable diet (MAD) the previous day.

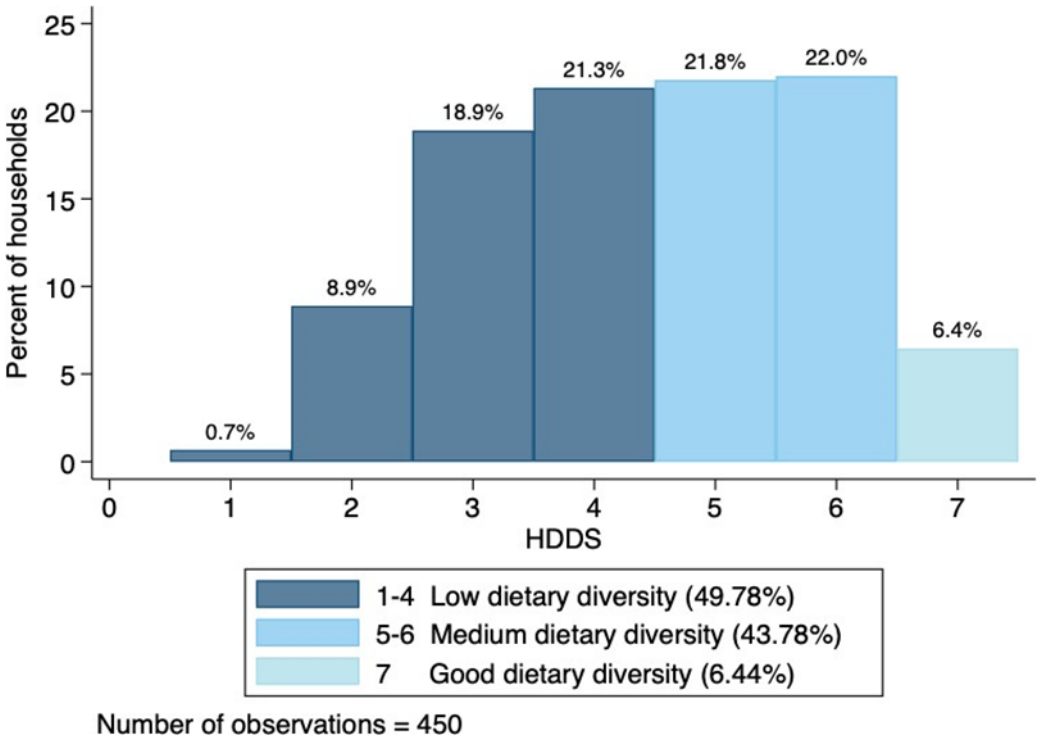
Appendix Figure 2: Food consumption score (FCS) (last 7 days), Aweil counties



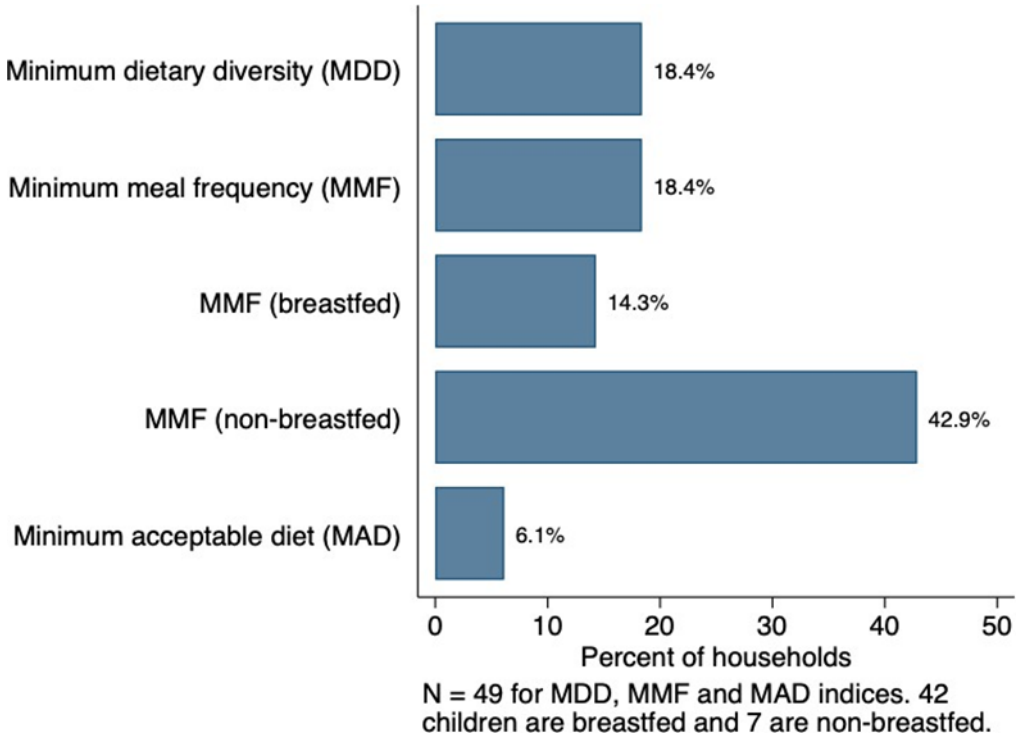
Appendix Figure 3: Food consumption score (FCS) –nutrition (last 7 days), Aweil counties



Appendix Figure 4: Household dietary diversity score (HDDS) (last 7 days), Aweil counties



Appendix Figure 5: Indicators assessing diet practices of children 6–23 months of age (previous day), Aweil counties



Appendix Table 3: Monthly food and non-food expenditures, Aweil counties

	Mean	Standard Deviation	5 %	95 %
Food expenditure share	29.11%	-	-	-
Per household				
Food expenditure	8.54	9.78	0.40	28.00
Non-food expenditure	9.79	12.80	0.35	36.88
Total expenditure	18.33	17.59	1.80	53.97
Per household member				
Food expenditure	1.30	1.66	0.05	4.29
Non-food expenditure	1.30	1.61	0.05	4.46
Of which, water bills	0.06	0.03	0.02	0.13
Total expenditure	2.60	2.55	0.24	8.49
Observations	450			

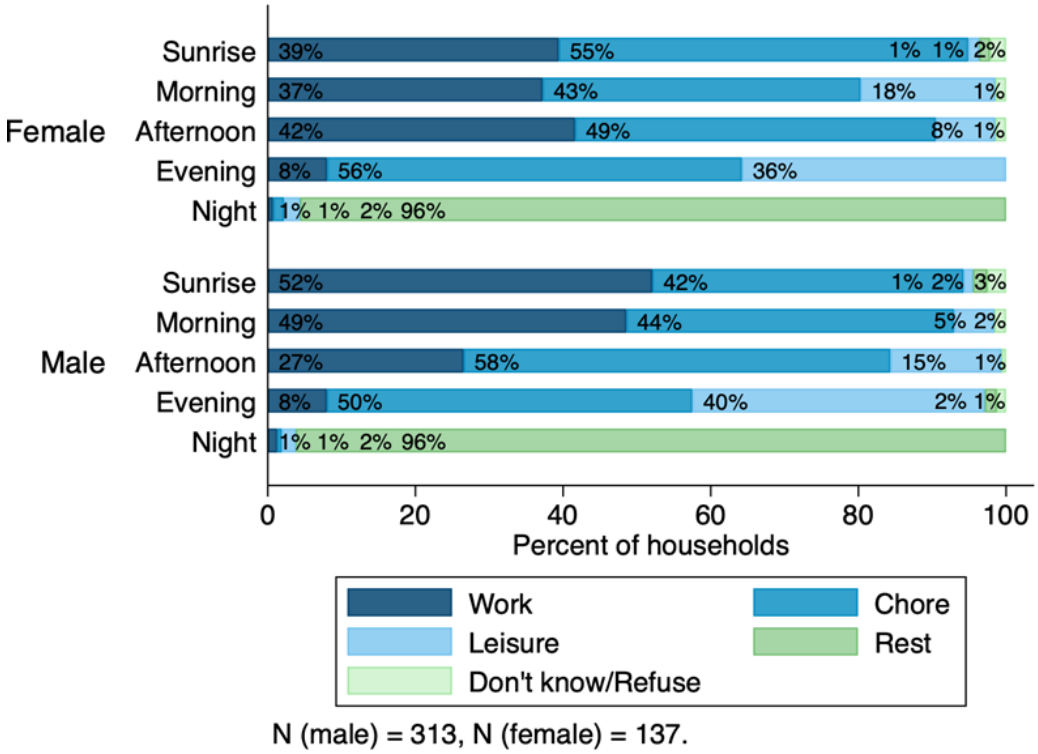
Note: Food expenditure share is defined as percentage of households spending more than 65 percent of their monthly budget on food. Expenditures are presented in thousand SSP. Food and non-food expenditures (including monthly water bills) are winsorized at the 2nd and 98th percentiles. N for monthly water bills = 137. Food expenditure was collected based on the last purchase of food items and non-food expenditure based on the last 30 days and the last year, depending on the item.

Appendix Table 3 presents the summary statistics of monthly household food, non-food, and total expenditure in Aweil counties. The household food expenditure was SSP 8,540 per month; household non-food expenditure was SSP 9,790 per month; and total monthly household expenditure was SSP 18,330. On average, households had the same monthly food and non-food expenditure per household member and average total monthly expenditure per household member was SSP 2,600.

A.1.4 Time use

Appendix Figure 6 shows time allocation of heads of household on work, chores, leisure, and rest, based on different times of the day by sex. The figure shows that, on average, male and female household heads spent an equal amount of time working and doing domestic work.

Appendix Figure 6: Time employment by sex of the household head (last business day), Aweil counties

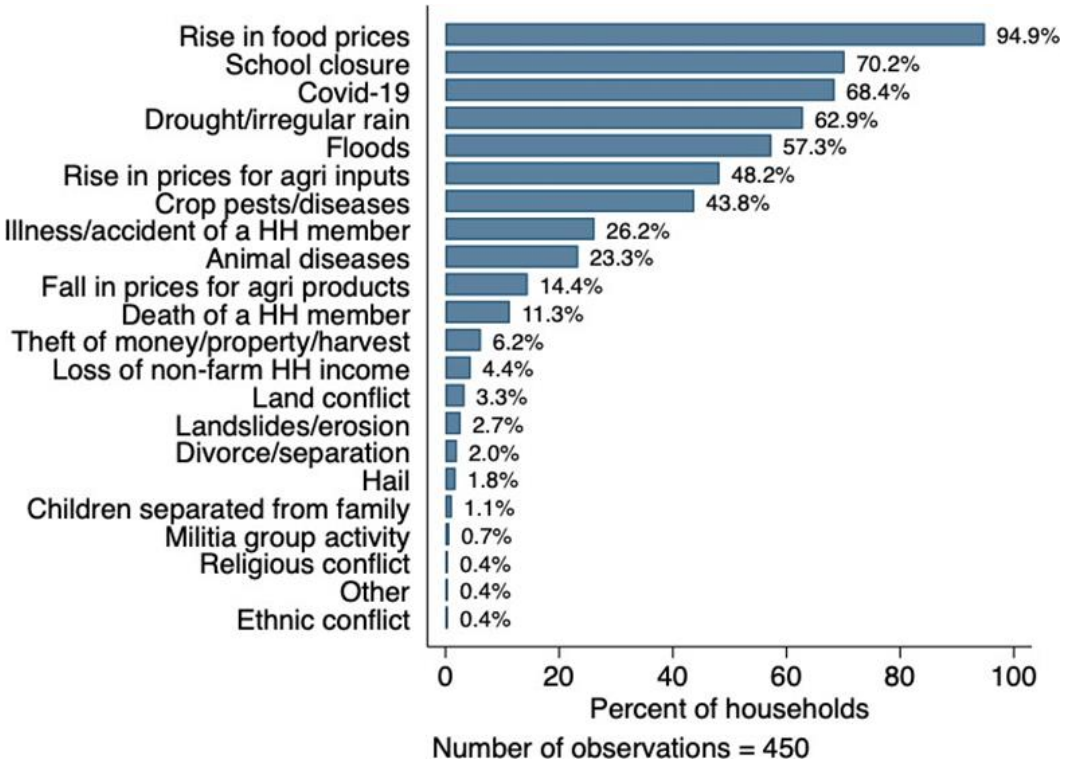


N (male) = 313, N (female) = 137.

A.1.5 Shocks

Appendix Figure 7 shows the percentage of households that reported experiencing different shocks. The figure shows that 95 percent of households experienced a rise in food prices; 63 percent experienced drought or irregular rain; 57 percent were affected by floods; and 48 percent faced a rise in prices for agricultural inputs. The COVID-19 pandemic and related school closures also negatively affected 68 percent and 70 percent of households, respectively.

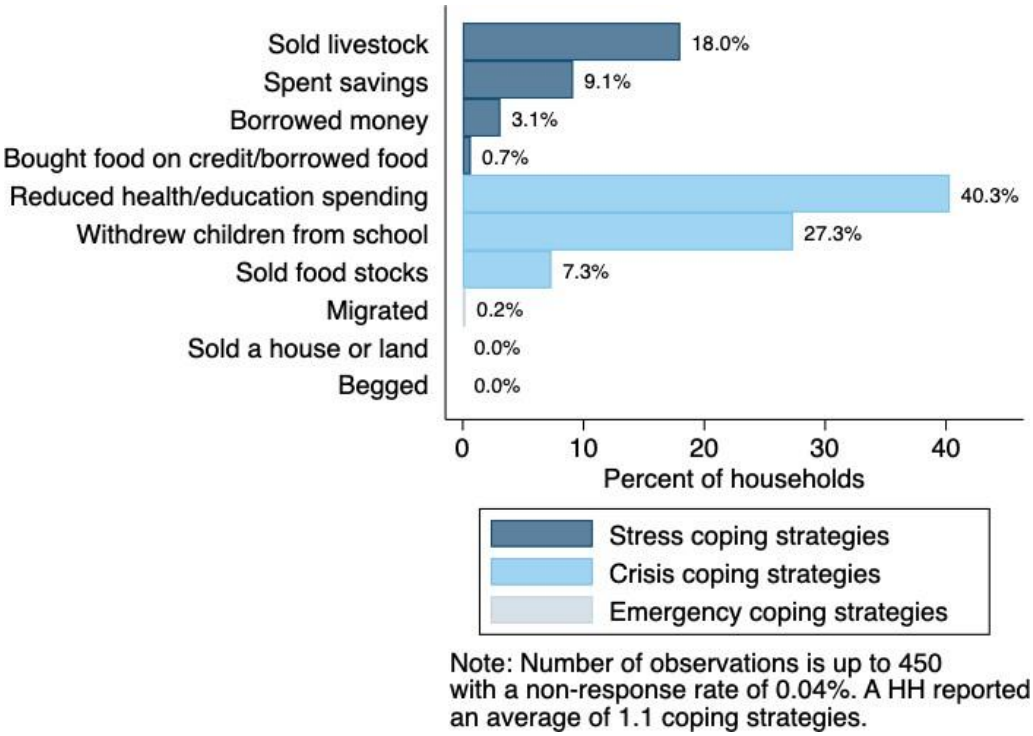
Appendix Figure 7: Shocks experienced by households (last 12 months), Aweil counties



A.1.6 Coping strategies

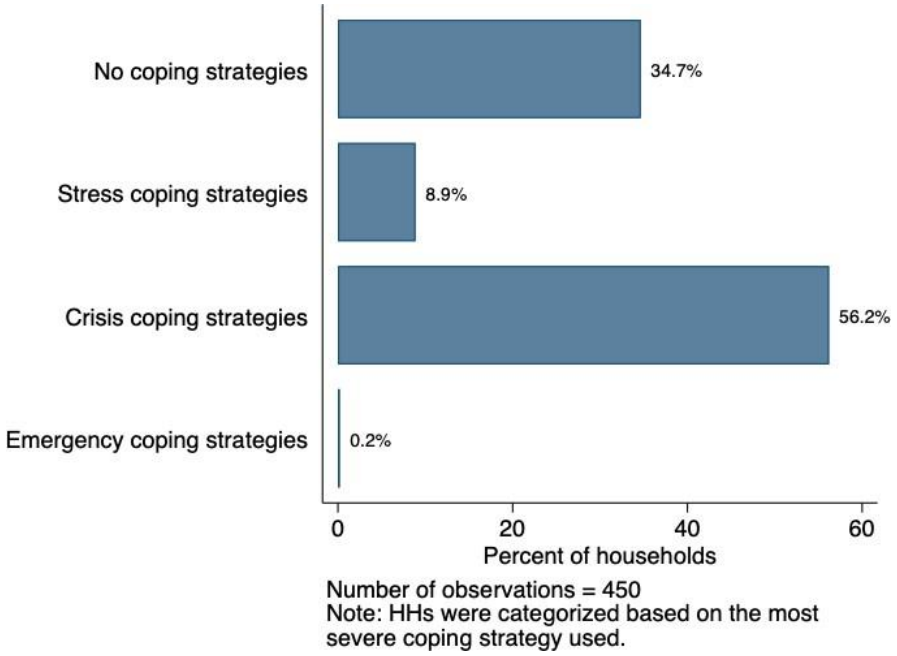
In Aweil counties, as Appendix Figure 9 shows, 56.2 percent of households resorted to crisis coping strategies and 0.2 percent reported using emergency coping strategies (migrated); 8.9 percent reported using stress coping strategies and 34.7 percent of households reported using none or only neutral coping strategies. Appendix Figure 8 shows that the most common coping strategies used by households in Aweil counties included reducing their health or education spending (40.3 percent), withdrawing children from school (27.3 percent), selling livestock (18 percent), spending savings (9.1 percent) and selling food stocks (7.3 percent). The distribution of the reduced Consumption-based Coping Strategies Index (rCSI) in Aweil counties is shown in Appendix Figure 10. The distribution is right skewed with 1 percent of households having had a score of 42 and higher. The average rCSI score was 8.68 and the median was 5.

Appendix Figure 8: Livelihood coping strategies (last 12 months), Aweil counties

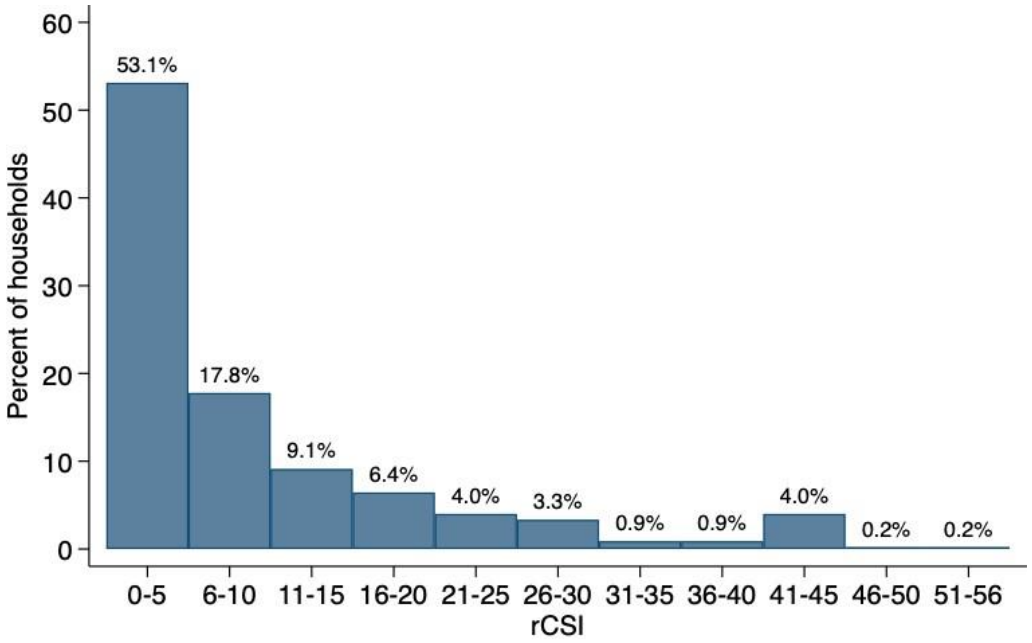


Note: Respondents were asked about 7 coping strategies explicitly and were given a list of 19 additional coping strategies to choose from. Coping strategies were then grouped into stress, crisis and emergency categories based on guidance from the WFP country office and Consolidated Approach for Reporting Indicators of Food Security (CARI) guidelines. The most commonly reported coping strategies (four stress, three crisis and three emergency) were selected and presented in the graph.

Appendix Figure 9: Percentage of households within each group of coping strategies, Aweil counties



Appendix Figure 10: Reduced consumption-based coping strategies index (last 7 days), Aweil counties



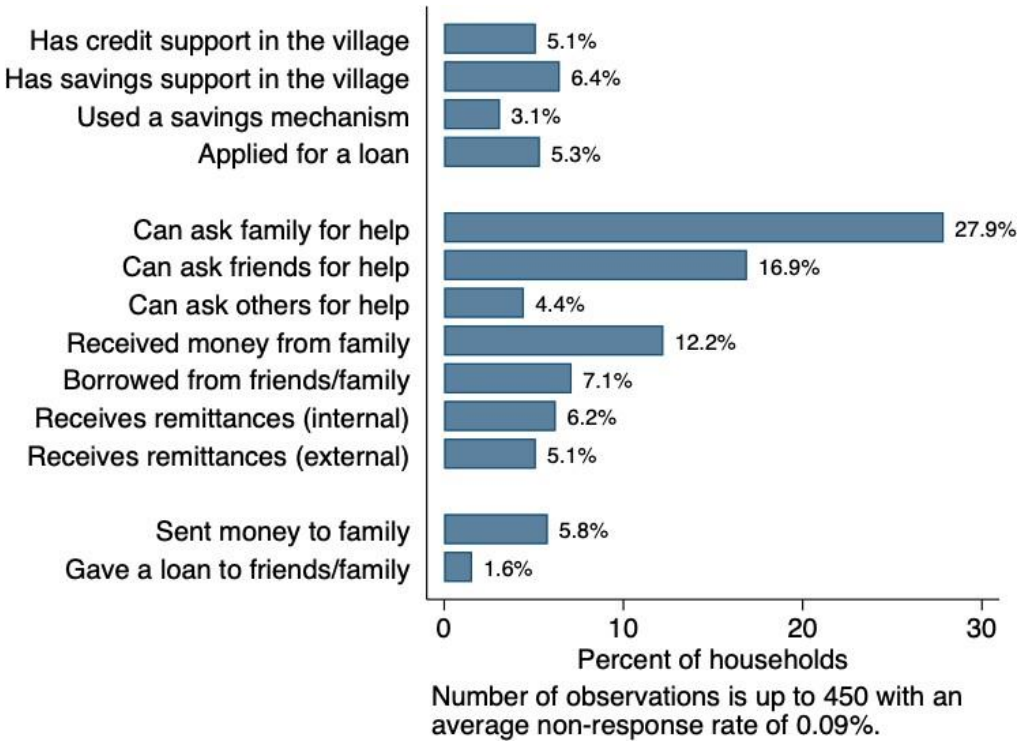
N = 450, mean = 8.68, median = 5, 99th pctile = 42, max = 56.
Note: rCSI considers frequency and severity of 5 coping strategies used in the last 7 days. The lower the score, the more food secure is the household.

A.1.7 Financial outcomes and social capital

Appendix Figure 11 shows that only a small share of households reported to have credit or savings support in the village: 5.1 percent and 6.4 percent respectively. Only 3.1 percent of households had made a deposit in any type of savings group in the last 12 months. Appendix Table 4 shows that, out of those who had used this channel, on average they had a current balance of SSP 9,810 and had deposited SSP 5,900 in the last 3 months. A slightly higher share of households (5.3 percent) had applied for a loan; among them, the average amount borrowed in the last 12 months was SSP 9,900.

In the same line, the number of households that reported being able to ask family and friends for money was 27.9 percent and 16.9 percent respectively. More households reported receiving and borrowing money from family compared to those who sent or gave a loan to family. Only 4.4 percent reported being able to ask other community members for help with money; 6.2 and 5.1 percent of households reported receiving remittances from migrants who moved elsewhere in the country, or to another country, respectively.

Appendix Figure 11: Financial outcomes and social capital, Aweil counties



Note: All values, except for social capital (asking for help) and remittances questions, refer to a period of the last 12 months. A savings mechanism includes a bank, savings bank, formal institution, village savings and loan association (VSLA) or other. Internal migration refers to remittances received from a person who migrated within the country, while external migration defines someone who migrated to another country. Non-responses refer to 'don't know' and 'refuse to respond' answers.

Appendix Table 4: Financial outcomes and social capital, Aweil counties

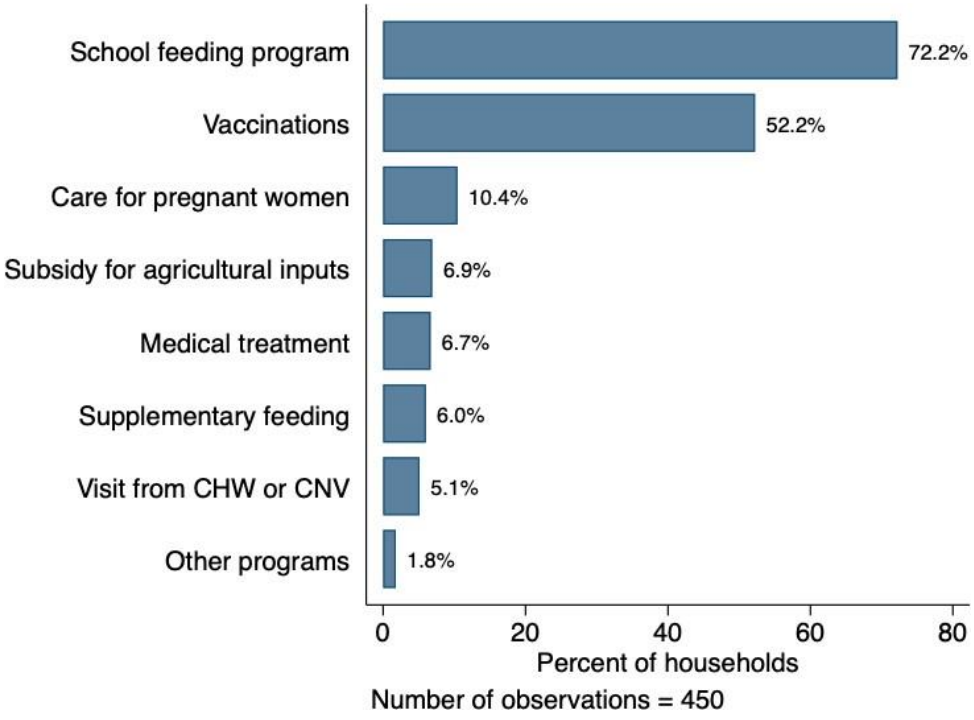
	Mean	SD	N
Savings mechanisms			
Balance of formal savings accounts	9.81	7.18	13
Amount deposited in the last 3 months	5.90	5.89	12
Amount borrowed in the last 12 months	9.90	13.30	24
Amount outstanding on the loan	4.51	5.73	24
Social capital			
Number of family members a household can ask for money	0.49	0.96	445
Number of friends a household can ask for money	0.28	0.70	450
Number of community members a household can ask for money	0.08	0.44	450
Amount received from family	30.31	93.89	54
Amount borrowed from friends/family	11.40	17.29	32
Amount sent to family	24.36	24.12	25
Amount of the loan to friends/family	7.67	7.15	6

Note: These are household-level summaries for households that reported making a deposit in a savings institution, applied for credit, and made transfers with friends/family. Monetary values are shown in thousand SSP and winsorized at the 2nd and 98th percentiles.

A.1.8 Safety nets, health and livelihoods programmes

Appendix Figure 12 shows the percentage of households in Aweil counties that participated in different safety net, health, and livelihoods programmes in the last 12 months. The two most commonly reported safety net programmes were school feeding programmes that benefited 72.2 percent of households and vaccinations (reported by 52.2 percent of households).

Appendix Figure 12: Programme participation (last 12 months), Aweil counties



Note: CHWs and CNVs are community health workers and community nutrition volunteers. Supplementary feeding is for children aged under 5 years, and pregnant or lactating women. Medical treatment excludes treatments for pregnant women.

A.2 INDICATORS IN JUBA COUNTY, PHASE 1 LIVELIHOODS EXPERIMENT

A.2.1 Demographic characteristics

Appendix Table 5: Demographic characteristics, Juba

	Mean	Standard Deviation	N
Panel A: Head of Household Characteristics			
% female	39.87	49.04	301
Age	45.75	14.85	301
% with primary education	18.12	38.58	287
Panel B: Household Characteristics			
Household size	5.52	2.69	301
% children in school	70.63	35.85	228
Total farm assets owned by household	2.75	1.84	301
Total household assets owned by household	3.03	3.03	301
Number of cars	0.00	0.06	301
Number of motorcycles	0.09	0.33	301
Number of televisions	0.00	0.06	301
Number of radios	0.18	0.42	301
Number of mobile phones	0.68	0.94	301
Number of mattresses or beds	1.22	1.33	301
Number of mosquito nets	0.85	1.15	301
% of households that have an internal migrant	8.33	27.68	300
% of households that have an external migrant	3.68	18.86	299

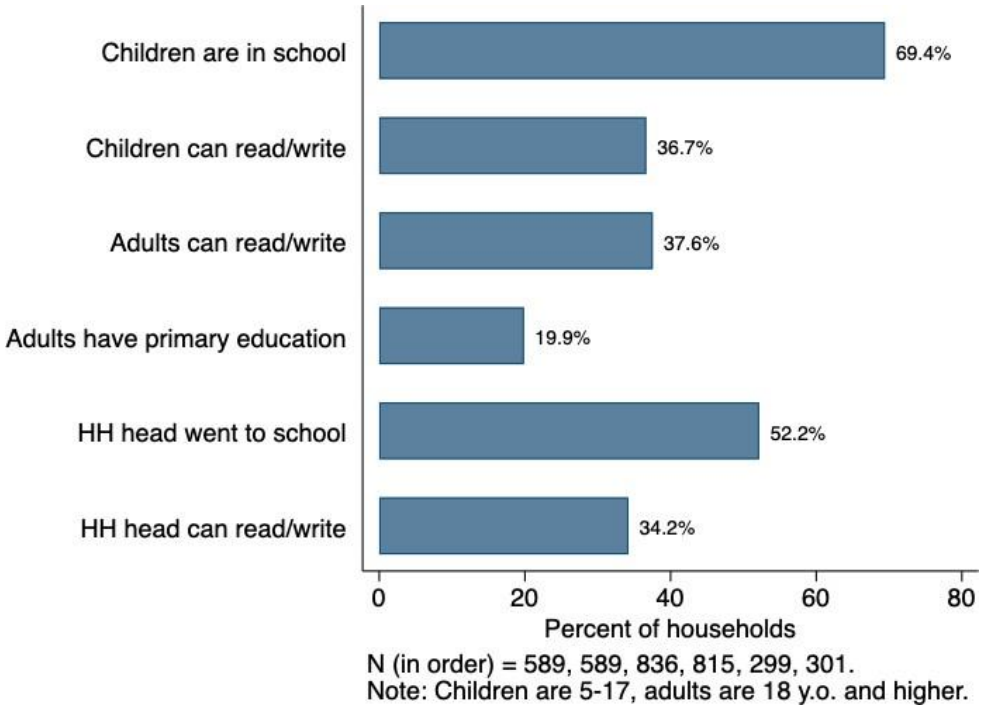
Note: 301 households were interviewed in Juba: answers such as 'don't know' or 'refuse to respond' occasionally lead to slightly smaller samples when computing summary statistics; 73 households did not report having children. Children are aged between 5 and 17 years. Farm assets include hoe, spade or axe. No one in Juba reported having trucks, computers and refrigerators. Migration questions refer to anyone in the household migrating in the last two years within the country (internal) or outside of the country (external).

Appendix Table 6: Demographic characteristics disaggregated by sex of the household head, Juba

	Mean		Difference
	Male	Female	T-test
Variable	**(1)**	**(2)**	**(1)-(2)**
Household head age	45.00	46.88	-1.88
	(13.80)	(16.30)	
Household size	5.95	4.87	1.08***
	(2.69)	(2.56)	
% Household head with primary education	28.99	2.54	26.45***
	(45.51)	(15.81)	
% households that cultivated land,	93.37	88.33	5.04
in the last 12 months	(24.95)	(32.24)	
% households that reared livestock,	50.28	34.17	16.11***
in the last 12 months	(50.14)	(47.63)	
Tropical Livestock Unit (TLU),	0.45	0.24	0.22**
all households	(0.93)	(0.44)	
% households that own a business	40.88	19.17	21.72***
	(49.30)	(39.53)	
% household heads employed,	13.26	10.83	2.43
in the last 12 months	(34.01)	(31.21)	
Total household assets	3.67	2.08	1.59***
	(3.18)	(2.51)	
Total farm assets	3.08	2.24	0.84***
	(1.97)	(1.51)	

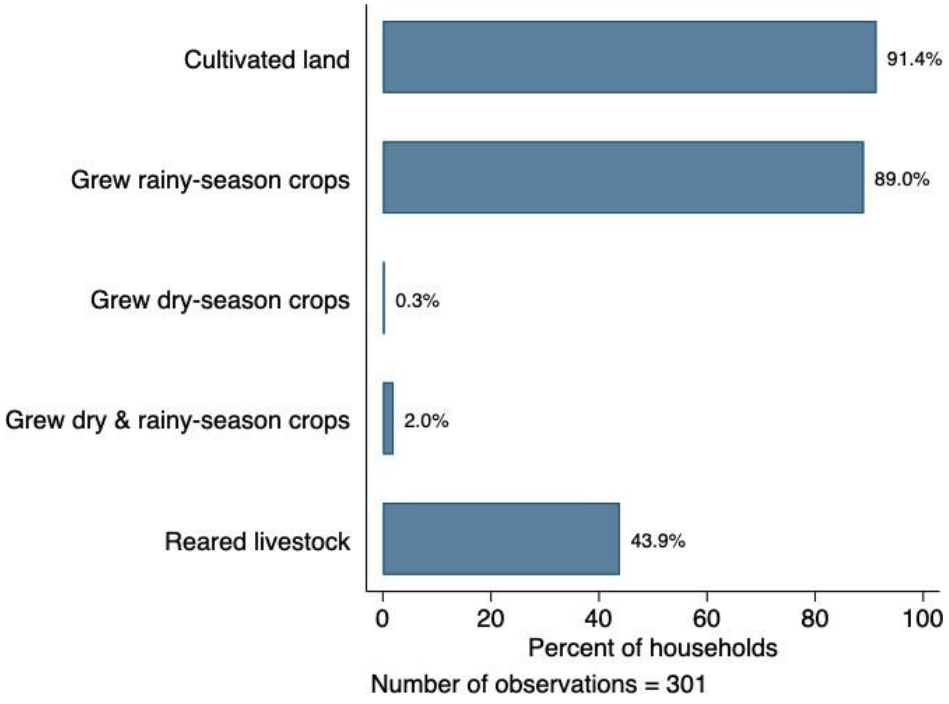
Note: Standard deviations are reported in parenthesis. The number of observations is 181 for the male group and 120 for the female group. The values displayed for t-tests are the differences in the means between male- and female-headed households. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Appendix Figure 13: Individual-level education characteristics, Juba



A.2.2 Livelihood opportunities

Appendix Figure 14: Farming and livestock (last 12 months), Juba



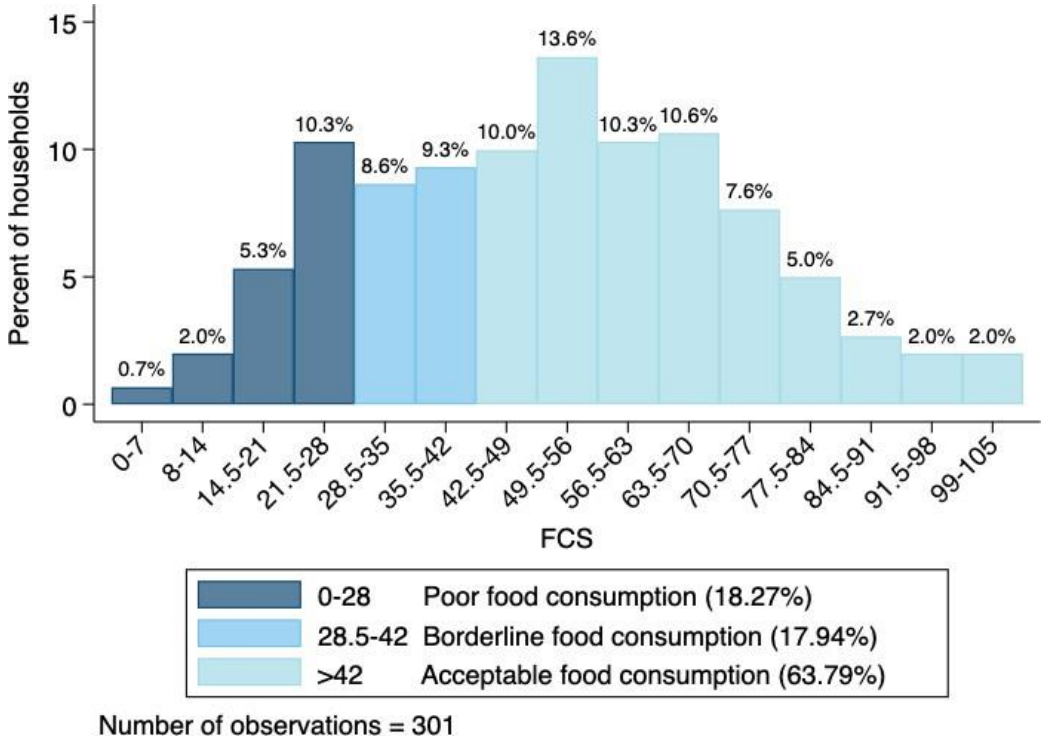
Appendix Table 7: Income-generating activities, Juba

	Mean	Standard Deviation	N
Panel A: Agriculture			
Number of plots	1.78	0.69	275
Plot size (hectares)	0.41	0.20	273
Farm size (hectares)	0.73	0.45	273
Annual revenue from all crop sales in 2020 (dry and rainy season)	3.92	10.48	275
Panel B: Livestock			
Total livestock count, all households	4.84	9.42	301
Tropical Livestock Unit (TLU), all households	0.37	0.78	301
Total livestock count, households with livestock	11.03	11.59	132
Tropical Livestock Unit (TLU), households with livestock	0.83	0.99	132
Number of chickens	6.65	5.04	52
Number of goats	8.44	7.89	114
Number of sheep	7.29	9.63	14
Number of other animals	7.67	5.28	6
Profit from sold livestock and products	7.40	25.61	132
Value consumed of livestock and products	9.71	29.39	132
Panel C: Wage Employment			
Monthly household income	34.99	39.70	45
Average monthly wage income per worker	22.92	22.40	45
Panel D: Non-Agricultural Business			
Number of businesses	1.15	0.42	97
Number of months worked by manager last year	8.40	3.97	97
Average number of work days for all household members last month	16.10	9.73	84
Monthly business profit	31.81	45.04	76
Average monthly business profit per worker	26.67	42.25	76

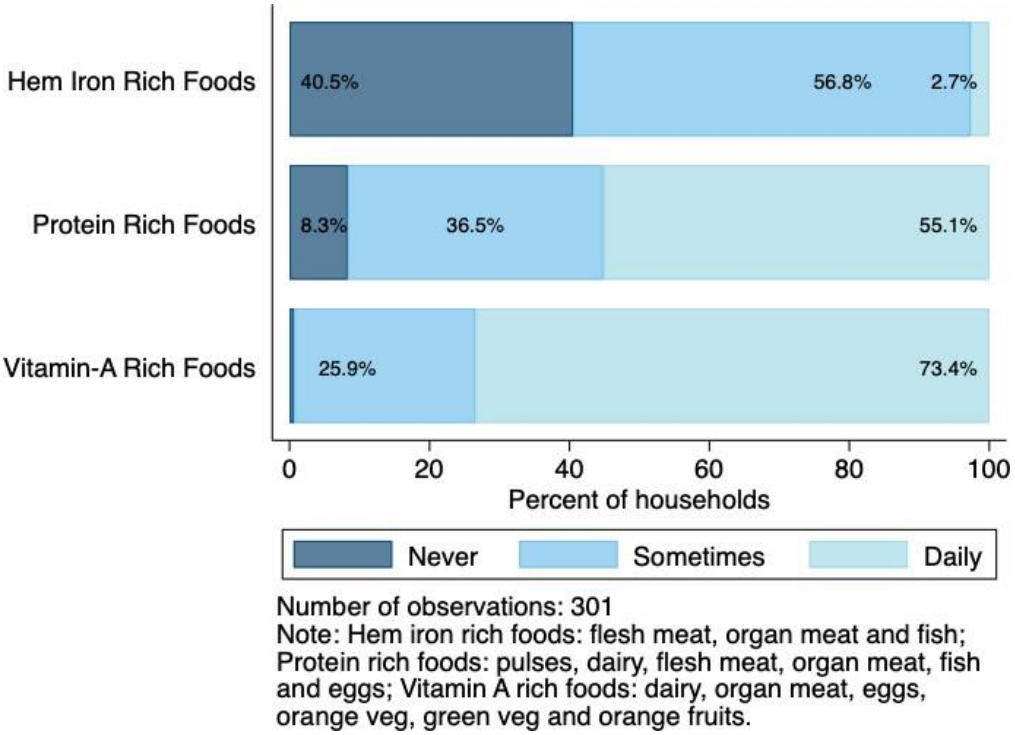
Note: These are household-level summaries for households that report plots, various types of livestock, wage employment and non-agricultural businesses. Farm and plot size as well as revenue, profit and other monetary values are winsorized at the 2nd and 98th percentiles. All monetary values are expressed in thousand SSP. For livestock questions, the survey also asked about the number of cows; however, in South Sudan, households are unlikely to report this type of livestock accurately because it is a sensitive matter. Households report having ducks, pigeons, rabbits, and rats as other livestock. A higher number for TLU (common unit for livestock numbers) corresponds with improved food security and household resilience. Profits from sold livestock and monetary value of consumed livestock are reported for the period of the last 6 months as opposed to 12 months to maximize accuracy in memory recall.

A.2.3 Food security

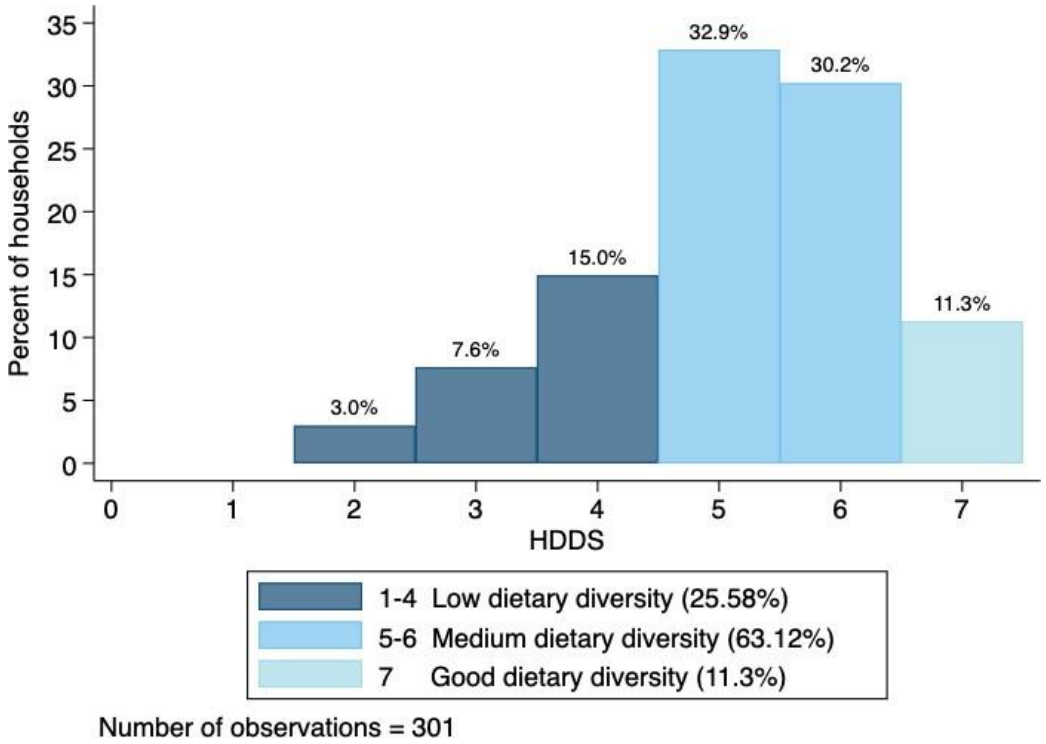
Appendix Figure 15: Food consumption score (FCS) (last 7 days), Juba



Appendix Figure 16: Food consumption score (FCS) – nutrition (last 7 days), Juba



Appendix Figure 17: Household dietary diversity score (HDDS) (last 7 days), Juba



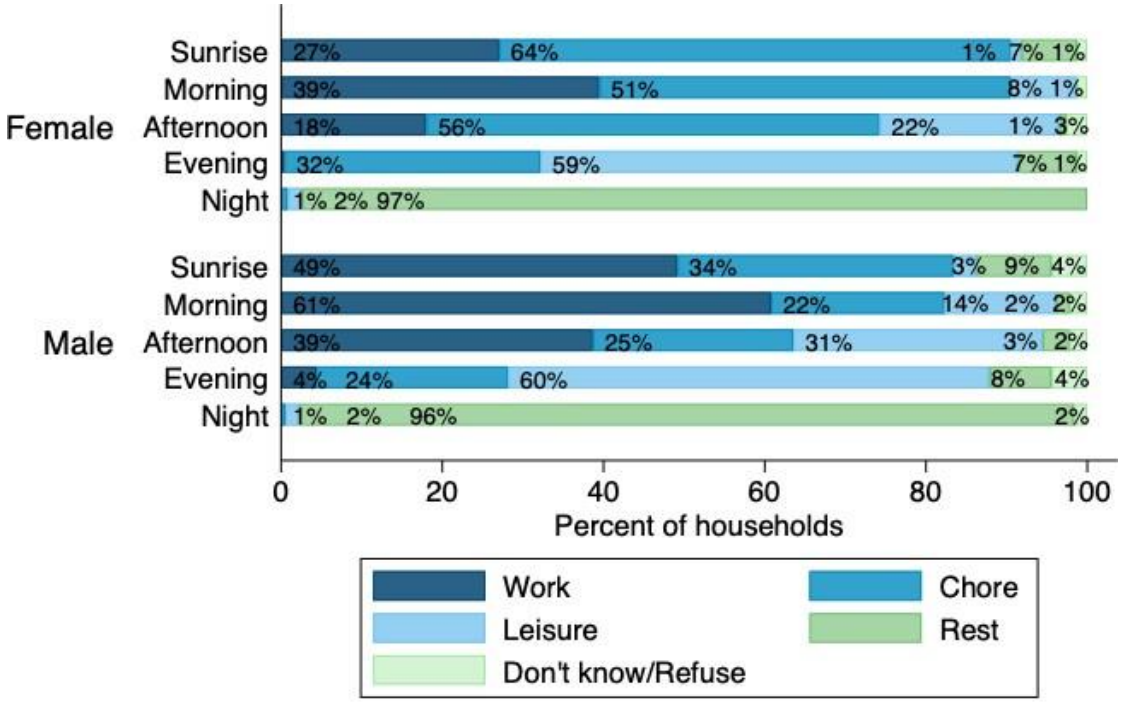
Appendix Table 8: Monthly food and non-food expenditures, Juba

	Mean	Standard Deviation	5 %	95 %
Food expenditure share	59.14%	-	-	-
Per household				
Food expenditure	40.19	38.06	2.10	121.60
Non-food expenditure	21.96	28.22	0.65	86.03
Total expenditure	62.15	52.80	4.80	181.14
Per household member				
Food expenditure	8.52	9.36	0.56	25.97
Non-food expenditure	4.54	6.52	0.13	16.20
Of which, water bills	0.67	1.41	0.01	6.00
Total expenditure	13.06	12.33	1.36	37.81
Observations	301			

Note: Food expenditure share is defined as percentage of households spending more than 65 percent of their monthly budget on food. Expenditures are presented in thousand SSP. Food and non-food expenditures are winsorized at the 2nd and 98th percentiles. N for monthly water bills = 35. Food expenditure was collected based on the last purchase of the food item and non-food expenditure for the period of the last 30 days and the last year depending on the item.

A.2.4 Time use

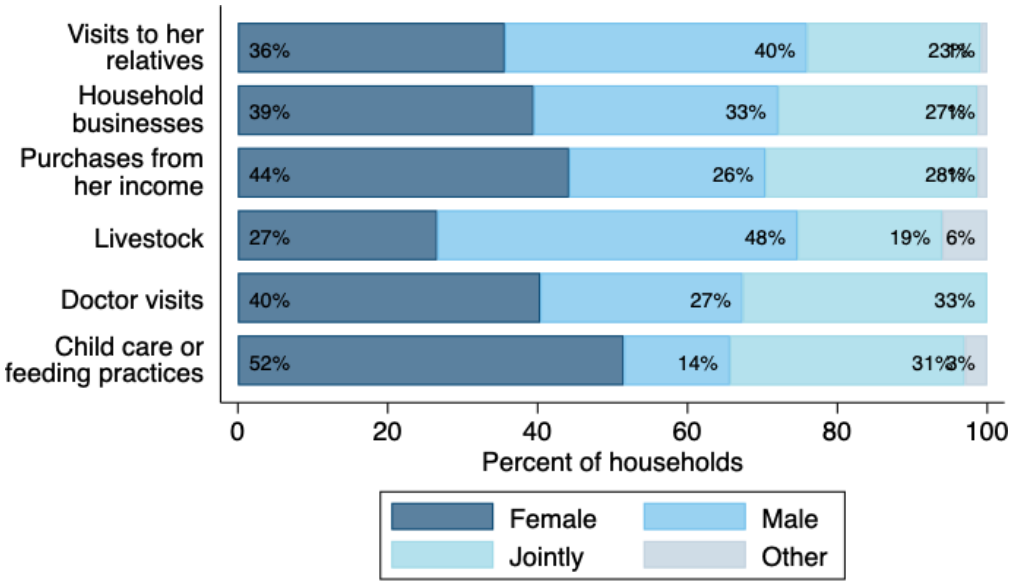
Appendix Figure 18: Time employment by sex (last business day), Juba



N (male) = 181, N (female) = 233. Male group includes male HHH, and female group includes female HHH, primary female decision maker or other female adult.

A.2.5 Women's empowerment

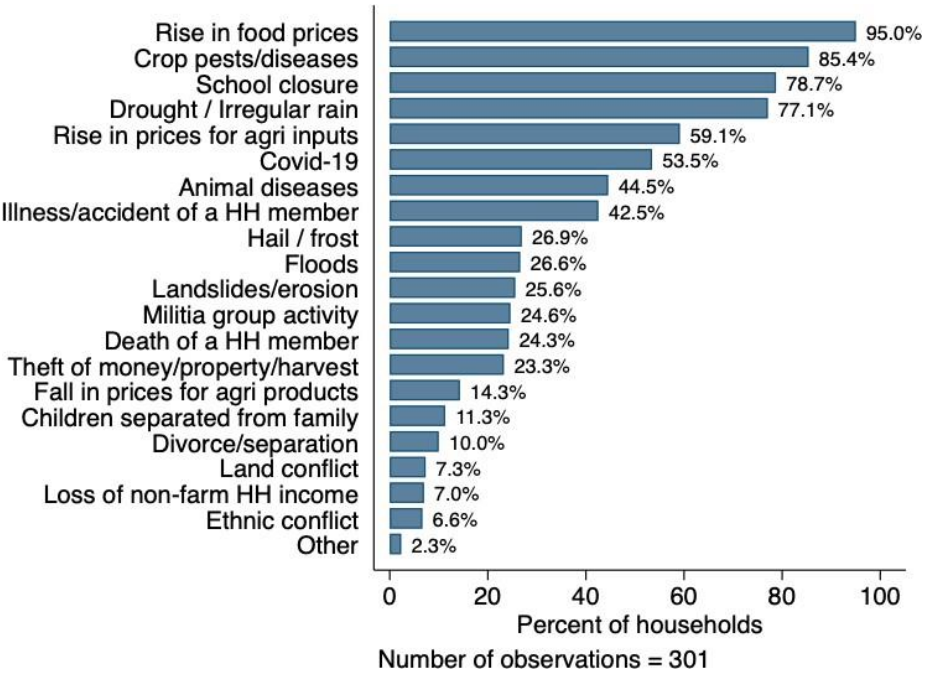
Appendix Figure 19: Women's perceptions on gendered decision making in the household, Juba



Number of observations = 233
The respondent is female HHH, primary female decision maker or other female adult. The respondent was asked who in the household makes decision on the 6 items above: respondent, male decision-maker, jointly or other.

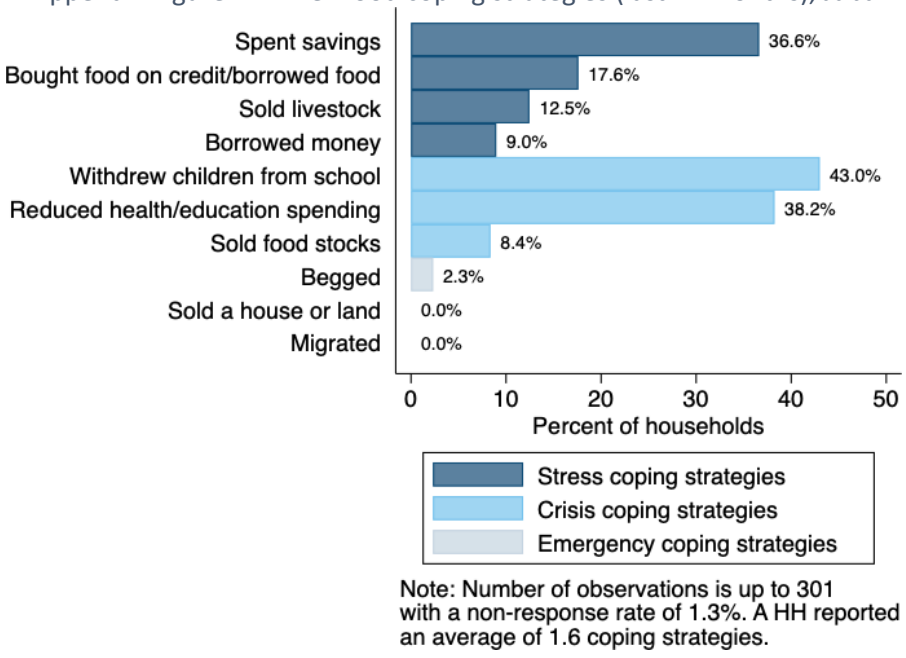
A.2.6 Shocks

Appendix Figure 20: Shocks experienced by households (last 12 months), Juba



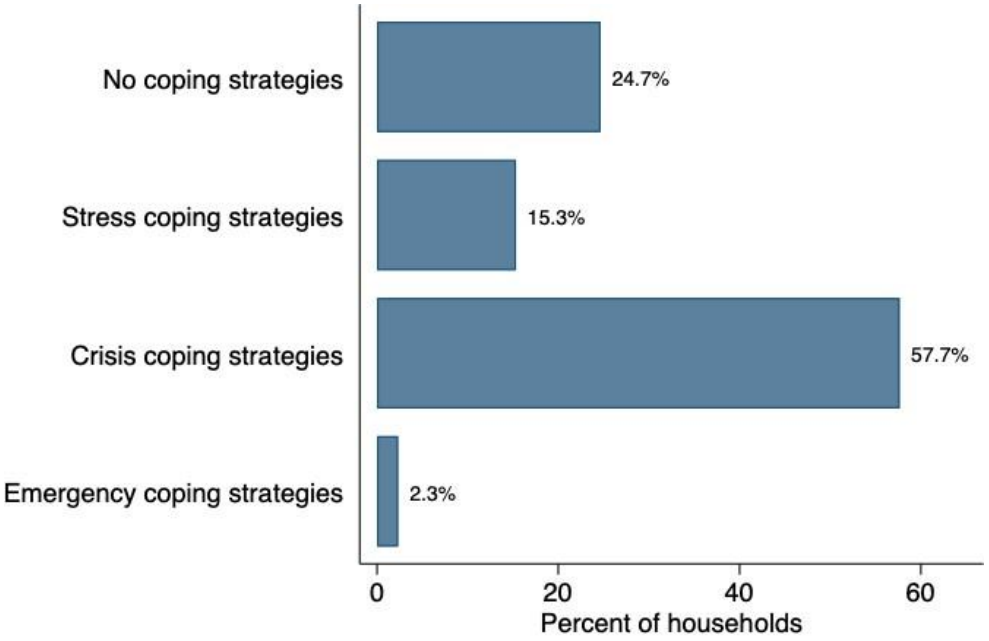
A.2.7 Coping strategies

Appendix Figure 21: Livelihood coping strategies (last 12 months), Juba



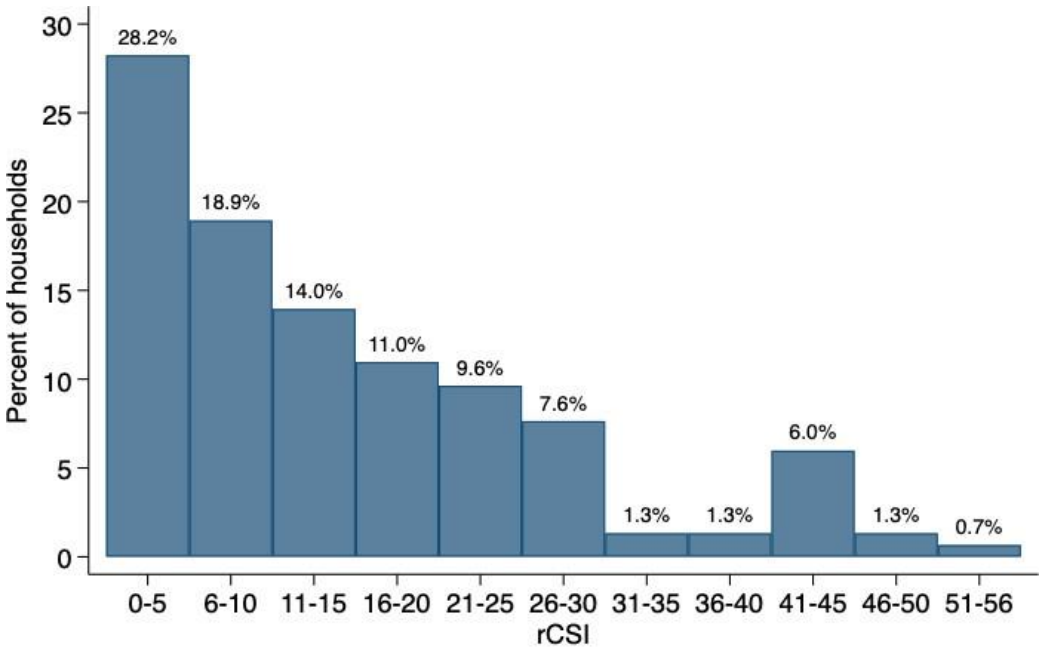
Note: Respondents were asked about 7 coping strategies explicitly and were provided a list of 19 additional coping strategies to choose from. Coping strategies were then grouped into stress, crisis and emergency categories based on guidance from the WFP country office and Consolidated Approach for Reporting Indicators of Food Security (CARI) guidelines. The most commonly reported coping strategies (four stress, three crisis and three emergency) were selected and presented in the graph.

Appendix Figure 22: Percentage of households per coping strategies group (last 12 months), Juba



Number of observations = 301
Note: HHs were categorized based on the most severe coping strategy used.

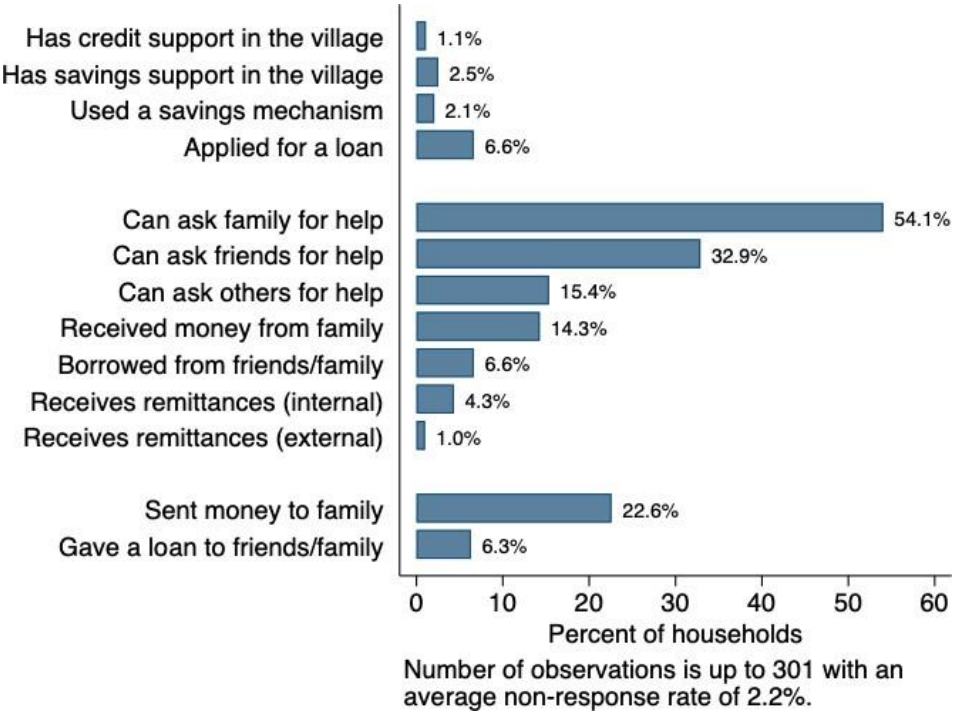
Appendix Figure 23: Reduced consumption-based coping strategies index (last 7 days), Juba



N = 301, mean = 14.54, median = 11, 99th pctile = 46, max = 54.
Note: rCSI considers frequency and severity of 5 coping strategies used in the last 7 days. The lower the score, the more food secure is the household.

A.2.8 Financial outcomes and social capital

Appendix Figure 24: Financial outcomes and social capital, Juba



Note: All values, except for social capital (asking for help) and remittances questions, refer to a period of the last 12 months. A savings mechanism includes a bank, savings bank, formal institution, village savings and loan association (VSLA) or other. Internal migration refers to remittances received from a person who migrated within the country, while external migration defines someone who migrated to another country. Non-responses refer to 'don't know' and 'refuse to respond' answers.

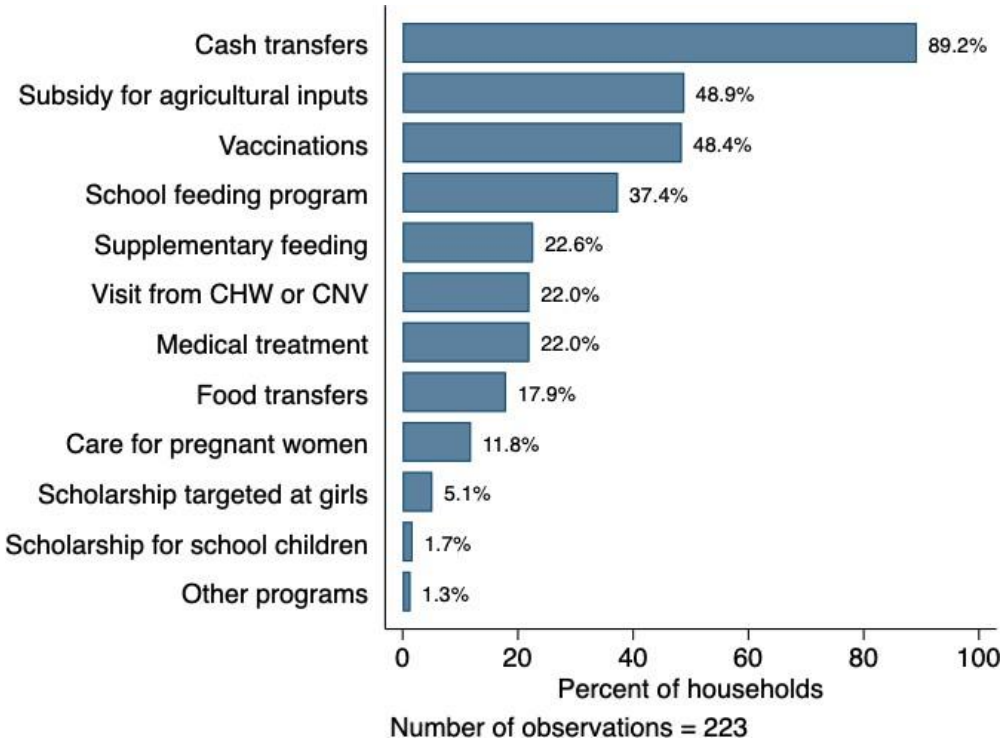
Appendix Table 9: Financial outcomes and social capital, Juba

	Mean	Standard Deviation	N
Savings mechanisms			
Balance of formal savings accounts	50.00	66.83	4
Amount deposited in the last 3 months	10.60	9.32	5
Amount borrowed in the last 12 months	17.25	12.83	20
Amount outstanding on the loan	7.70	11.27	20
Social capital			
Number of friends a household can ask for money	0.69	1.23	295
Number of community members a household can ask for money	0.43	1.13	293
Amount received from family	48.77	151.07	43
Amount borrowed from friends/family	12.34	10.57	19
Amount sent to family	37.57	49.05	65
Amount of the loan to friends/family	17.97	26.60	17

Note: These are household-level summaries for households that reported making a deposit in a savings institution, applied for credit, and made transfers with friends/family. Monetary values are shown in thousand SSP and winsorized at the 2nd and 98th percentiles.

A.2.9 Safety nets, health and livelihoods programmes

Appendix Figure 25: Programme participation (last 12 months), existing Food Assistance for Assets (FFA) villages in Juba



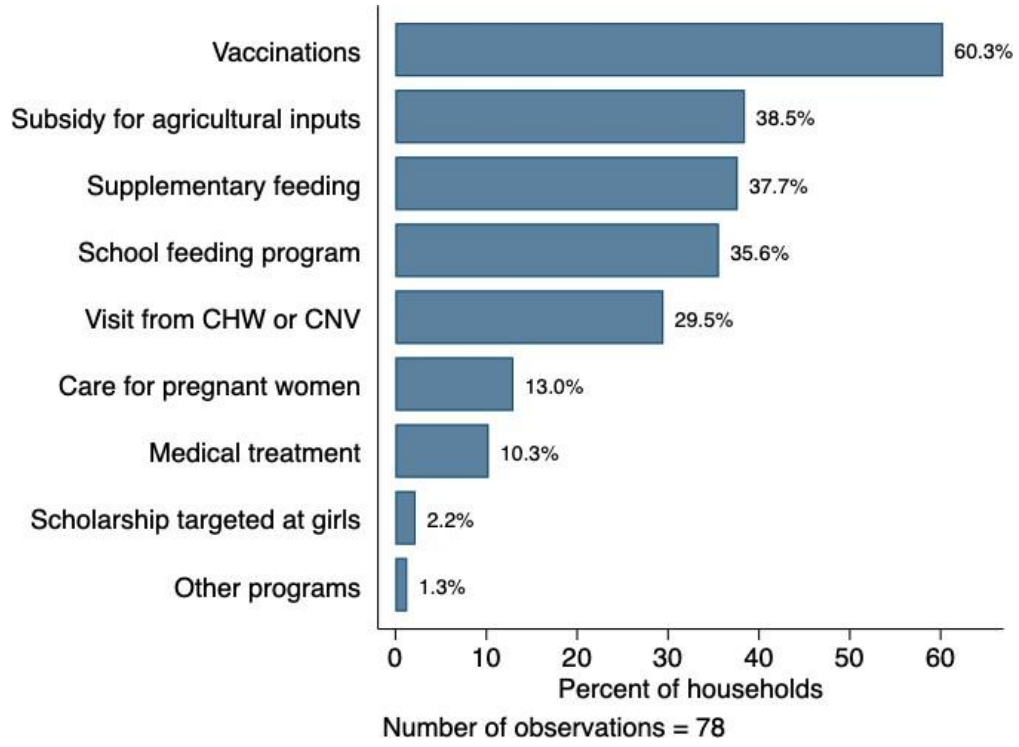
Note: CHWs and CNVs are community health workers and community nutrition volunteers. Supplementary feeding is for children aged under 5 years, and pregnant or lactating women. Medical treatment excludes treatments for pregnant women.

Appendix Table 10: Programme participation details (last 12 months), existing Food Assistance for Assets (FFA) villages

	Mean	Standard Deviation	5%	95%	N
Cash transfers					
Number of transfers	5.13	3.57	1.00	12.00	169
Amount per transfer	12.77	13.54	7.00	17.65	183
Food transfers					
Number of transfers	2.44	1.83	1.00	6.00	39
Amount per transfer	11.82	4.33	7.00	17.60	35

Note: Amounts are shown in thousand SSP and winsorized at the 98th percentile. For in-kind (food) transfers, the amount is the monetary equivalent of the transfer in SSP. Number of observations within the panel relating to a certain programme varies due to 'don't know' and 'refuse to respond' answers.

Appendix Figure 26: Programme participation (last 12 months), newly eligible locations in Juba



Note: CHWs and CNVs are community health workers and community nutrition volunteers. Supplementary feeding is for children aged under 5 years, and pregnant or lactating women. Medical treatment excludes treatments for pregnant women.

A.2.10 Psychosocial

Appendix Table 11: Psychological well-being (last 7 days), Juba

	Mean	Standard Deviation	N
Panel A: Depression scale			
Mental health index: Less depression (0–70)	28.97	12.30	268
Details of daily life bothered you more than usual	2.74	2.37	296
Had trouble concentrating on what you were doing	2.37	2.11	295
Felt sad	2.31	2.17	292
Felt that everything you did took all your energy	3.02	2.21	296
Felt confident in the future (reverse scale)	4.50	2.28	292
Felt nervous, tense or worried	2.35	2.09	292
Had trouble sleeping peacefully	3.11	2.36	297
Felt happy (reverse scale)	3.99	2.43	301
Felt alone	1.93	2.36	292
Felt so tired that you couldn't do anything	2.72	2.13	295
Panel B: Disability scale			
Mental health index: Less disability (0–28)	9.33	6.17	284
Had a headache	2.36	2.06	299
Your digestion was bad	1.40	1.89	293
Had difficulty fulfilling family responsibilities	2.91	2.42	292
Had difficulties in your daily work	2.62	2.27	295

Note: Households were asked ten questions based on the Center for Epidemiologic Studies Short Depression Scale (CES-D-R 10) to measure depression and four questions from the Self-Reporting Questionnaire 20-Item (SRQ-20) to measure mental health disability. The questions were framed: In the last 7 days, how many days you felt a certain way? Higher scores for the Less depression and Less disability indices suggest a higher risk of depression. Number of observations varies due to 'refuse to respond' answers.

A.3 INDICATORS IN YAMBIO COUNTY, PHASE 1 LIVELIHOODS EXPERIMENT

A.3.1 Demographic characteristics

Appendix Table 12: Demographic characteristics, Yambio

	Mean	Standard Deviation	N
Panel A: Head of Household Characteristics			
% female	28.52	45.19	547
Age	39.23	11.84	547
% with primary education	22.61	41.87	544
Panel B: Household Characteristics			
Household size	7.31	3.44	547
% children in school	61.48	40.66	477
Total farm assets owned by household	5.67	3.44	547
Total household assets owned by household	5.57	4.46	547
Number of cars	0.02	0.43	547
Number of trucks	0.00	0.04	547
Number of motorcycles	0.08	0.28	547
Number of televisions	0.00	0.04	547
Number of radios	0.27	0.54	547
Number of mobile phones	0.64	0.90	547
Number of computers or laptops	0.01	0.11	547
Number of mattresses or beds	2.44	2.05	547
Number of mosquito nets	2.11	1.97	547
% of households that have an internal migrant	6.95	25.45	547
% of households that have an external migrant	2.74	16.35	547

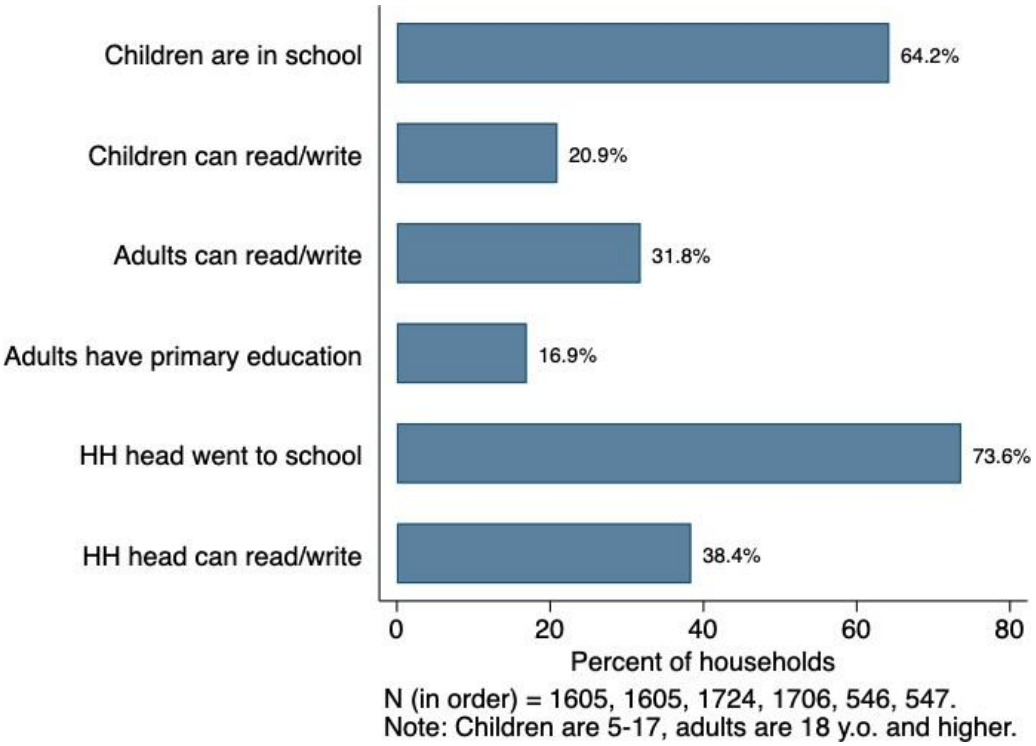
Note: 547 households were interviewed in Yambio: answers such as 'don't know' or 'refuse to respond' occasionally lead to slightly smaller samples when computing summary statistics; 70 households did not report having children. Children are aged between 5 and 17 years. Farm assets include hoe, spade, or axe. No one in Yambio reported having refrigerators. Migration questions refer to anyone in the household migrating in the last two years within the country (internal) or outside of the country (external).

Appendix Table 13: Demographic characteristics disaggregated by sex of the household head, Yambio

Variable	Mean		Difference
	Male	Female	T-test
	(1)	(2)	(1)-(2)
Household head age	39.43	38.71	0.72
	(11.99)	(11.46)	
Household size	7.56	6.69	0.87***
	(3.57)	(3.03)	
% HHH with primary education	29.12	6.41	22.71***
	(45.49)	(24.57)	
% households that cultivated land,	91.56	89.74	1.82
in the last 12 months	(27.83)	(30.44)	
% households that reared livestock,	51.92	33.33	18.58***
in the last 12 months	(50.03)	(47.29)	
Tropical Livestock Unit (TLU),	0.14	0.03	0.11***
all households	(0.30)	(0.07)	
% households that own a business	30.18	29.49	0.69
	(45.96)	(45.75)	
% household heads employed,	11.28	6.45	4.83*
in the last 12 months	(31.68)	(24.65)	
Total household assets	5.93	4.67	1.25***
	(4.70)	(3.68)	
Total farm assets	6.19	4.37	1.82***
	(3.67)	(2.32)	

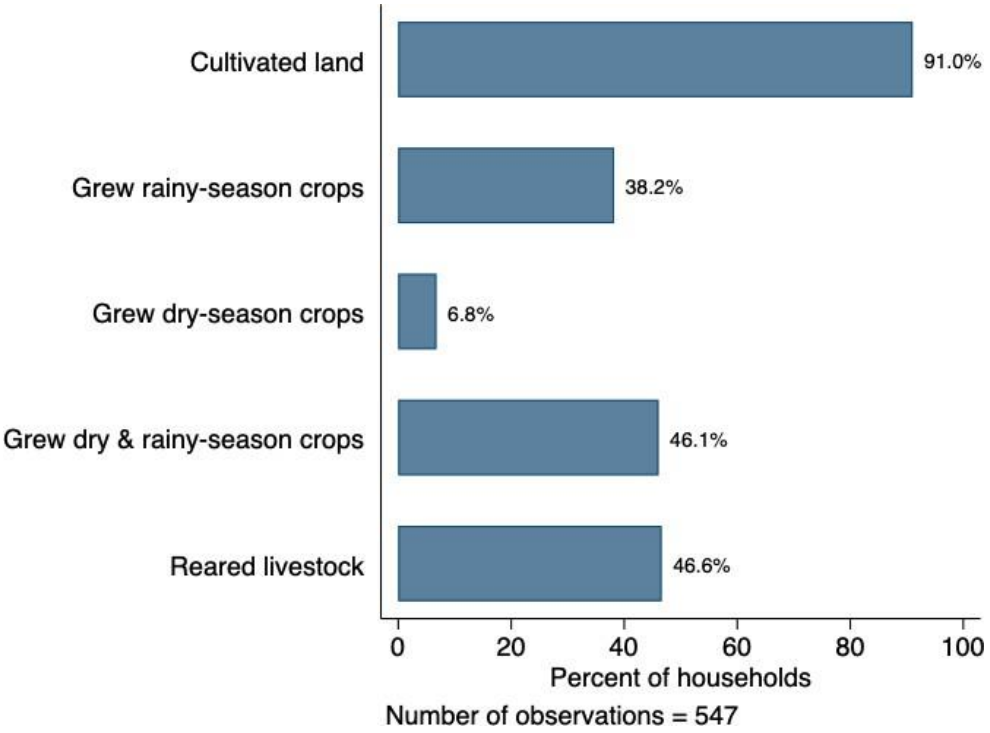
Note: Standard deviations are reported in parenthesis. The number of observations is 391 for the male group and 156 for the female group. The values displayed for t-tests are the differences in the means between male and female-headed households. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Appendix Figure 27: Individual-level education characteristics, Yambio



A.3.2 Livelihood opportunities

Appendix Figure 28: Farming and livestock (last 12 months), Yambio



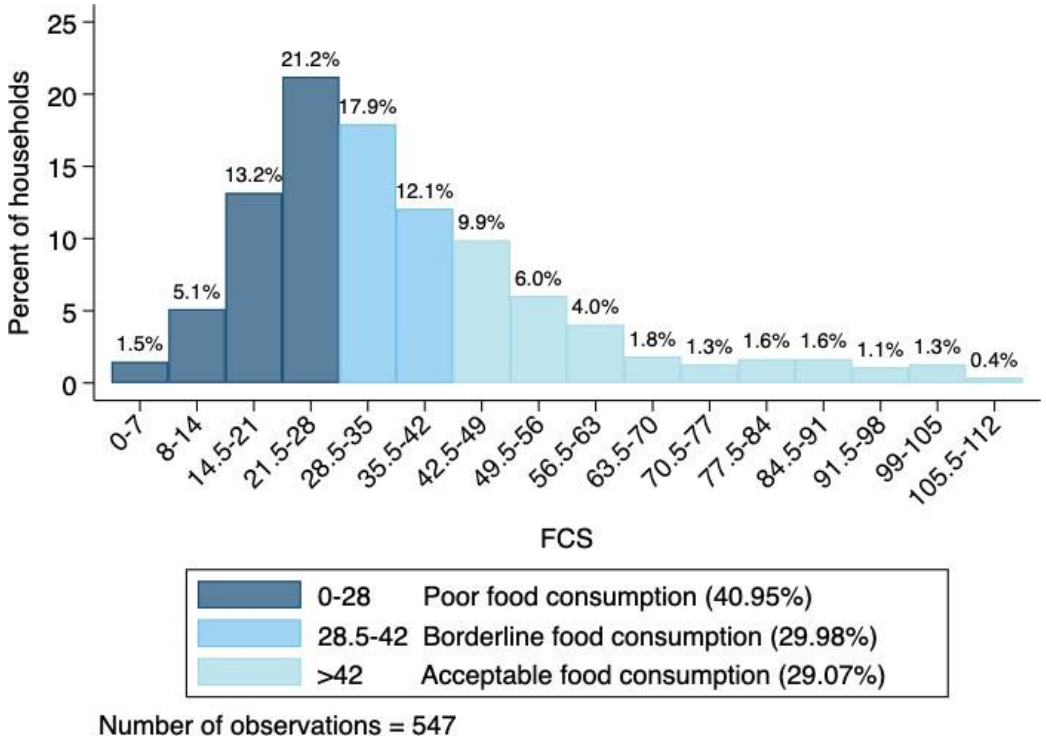
Appendix Table 14: Income-generating activities, Yambio

	Mean	Standard Deviation	N
Panel A: Agriculture			
Number of plots	1.61	0.73	498
Plot size (hectares)	0.48	0.38	498
Farm size (hectares)	0.71	0.50	498
Annual revenue from all crop sales in 2020 (dry and rainy season)	24.91	53.24	498
Panel B: Livestock			
Total livestock count, all households	5.93	9.00	547
Tropical Livestock Unit (TLU), all households	0.11	0.26	547
Total livestock count, households with livestock	12.73	9.36	255
Tropical Livestock Unit (TLU), households with livestock	0.24	0.34	251
Number of chickens	12.31	8.94	233
Number of goats	6.12	3.74	40
Number of sheep	2.00	.	1
Number of other animals	6.50	6.31	14
Profit from sold livestock and products	3.84	7.93	255
Value consumed of livestock and products	1.64	3.79	255
Panel C: Wage Employment			
Monthly household income	22.96	30.97	63
Average monthly wage income per worker	19.02	28.52	63
Panel D: Non-Agricultural Business			
Number of businesses	1.26	0.62	164
Number of months worked by manager last year	7.84	3.84	164
Average number of work days for all household members last month	17.00	8.88	139
Monthly business profit	17.07	15.84	145
Average monthly business profit per worker	13.30	13.24	145

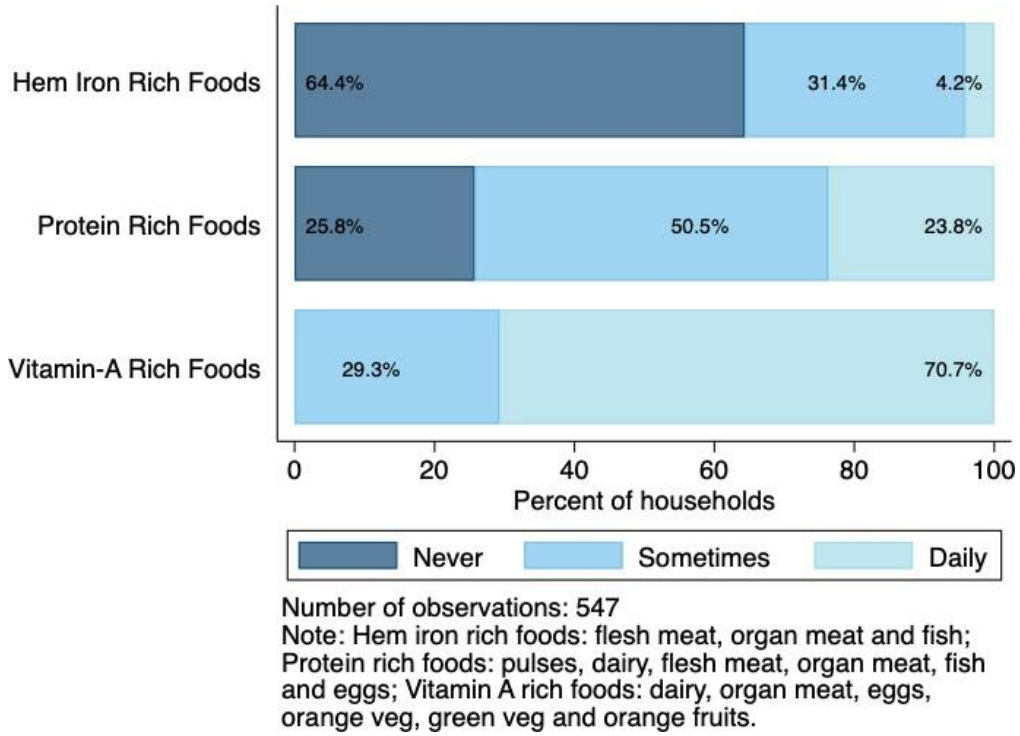
Note: These are household-level summaries for households that report plots, various types of livestock, wage employment and non-agricultural businesses. Farm and plot size as well as revenue, profit and other monetary values are winsorized at the 2nd and 98th percentiles. All monetary values are expressed in thousand SSP. For livestock questions, the survey also asked about the number of cows; however, in South Sudan, households are unlikely to report this type of livestock accurately because it is a sensitive matter. Households report having ducks, pigeons, rabbits and rats as other livestock. A higher number for TLU (common unit for livestock numbers) corresponds with improved food security and household resilience. Profits from sold livestock and monetary value of consumed livestock are reported for the period of the last 6 months as opposed to 12 months to maximize accuracy in memory recall.

A.3.3 Food security

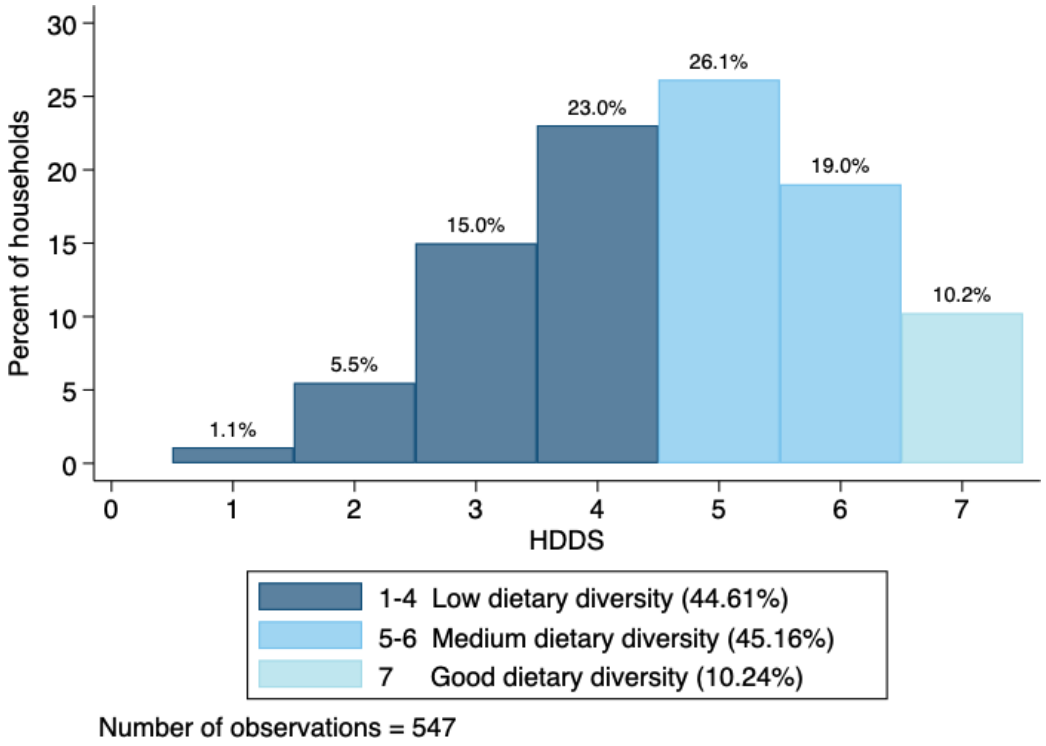
Appendix Figure 29: Food consumption score (FCS) (last 7 days), Yambio



Appendix Figure 30: Food consumption score (FCS) – nutrition (last 7 days), Yambio



Appendix Figure 31: Household dietary diversity score (HDDS) (last 7 days), Yambio



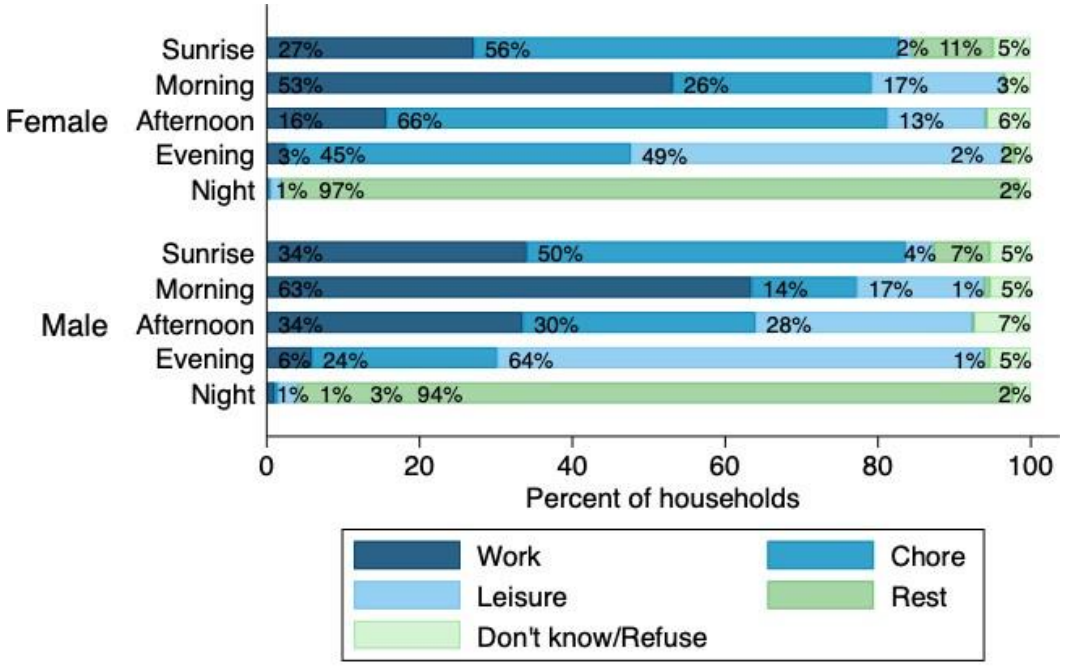
Appendix Table 15: Monthly food and non-food expenditures, Yambio

	Mean	Standard Deviation	5 %	95 %
Food expenditure share	30.35%	-	-	-
Per household				
Food expenditure	12.25	14.48	0.00	43.20
Non-food expenditure	11.49	13.01	0.59	44.13
Total expenditure	23.74	22.31	1.57	71.20
Per household member				
Food expenditure	1.87	2.26	0.00	7.60
Non-food expenditure	1.64	1.79	0.09	5.35
Of which, water bills	0.12	0.08	0.00	0.29
Total expenditure	3.51	3.23	0.29	10.01
Observations	547			

Note: Food expenditure share is defined as percentage of households spending more than 65 percent of their monthly budget on food. Expenditures are presented in thousand SSP. Food and non-food expenditures are winsorized at the 2nd and 98th percentiles. N for monthly water bills = 36. Food expenditure was collected based on the last purchase of the food item and non-food expenditure for the period of the last 30 days and the last year, depending on the item.

A.3.4 Time use

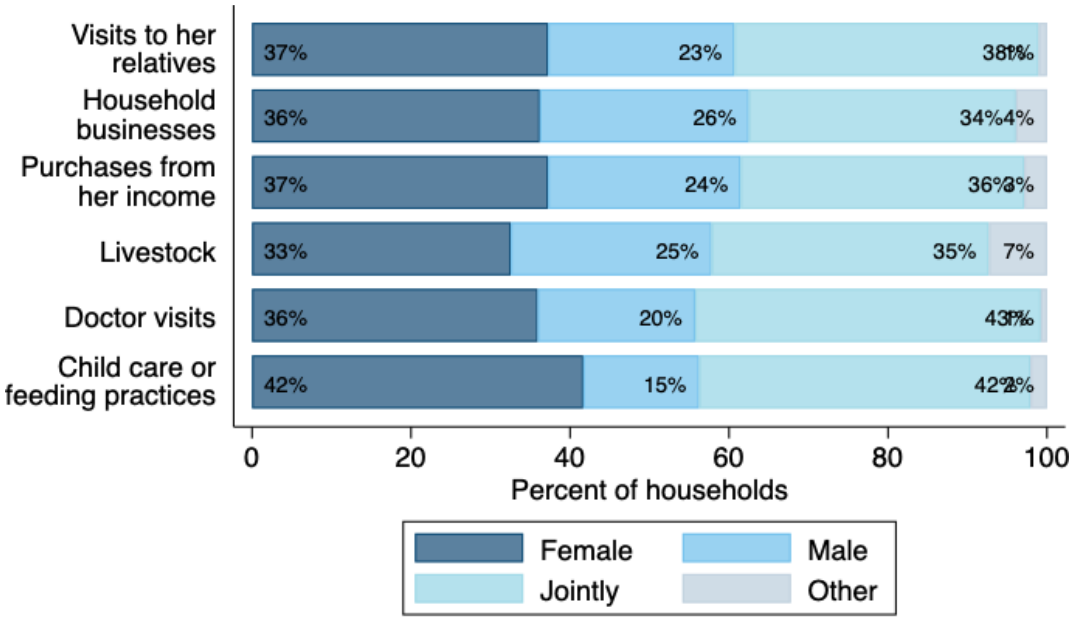
Appendix Figure 32: Time employment by sex (last business day), Yambio



N (male) = 391, N (female) = 384. Male group includes male HHH, and female group includes female HHH, primary female decision maker or other female adult.

A.3.5 Women's empowerment

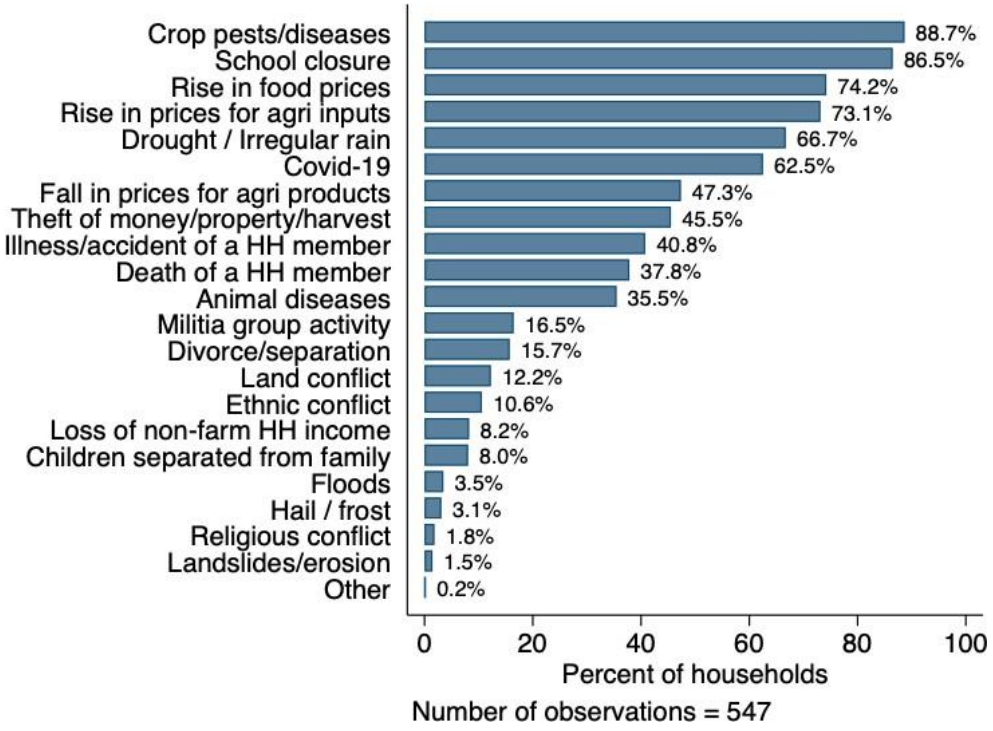
Appendix Figure 33: Women's perceptions on gendered decision making in the household, Yambio



Number of observations = 384
The respondent is female HHH, primary female decision maker or other female adult. The respondent was asked who in the household makes decision on the 6 items above: respondent, male decision-maker, jointly or other.

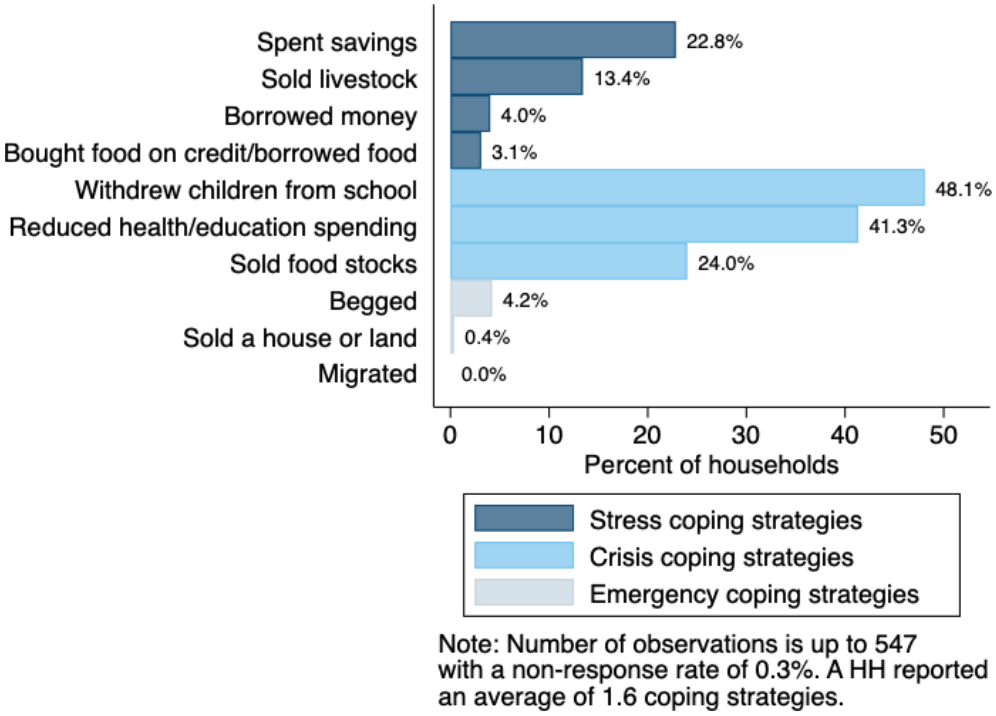
A.3.6 Shocks

Appendix Figure 34: Shocks experienced by households (last 12 months), Yambio



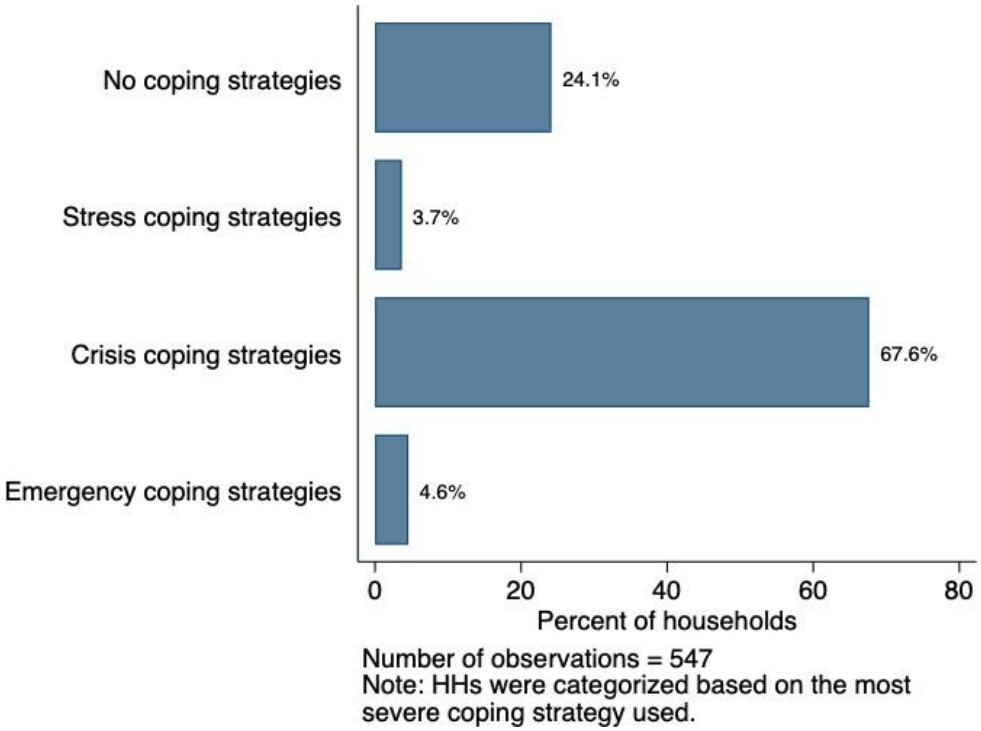
A.3.7 Coping strategies

Appendix Figure 35: Livelihood coping strategies (last 12 months), Yambio



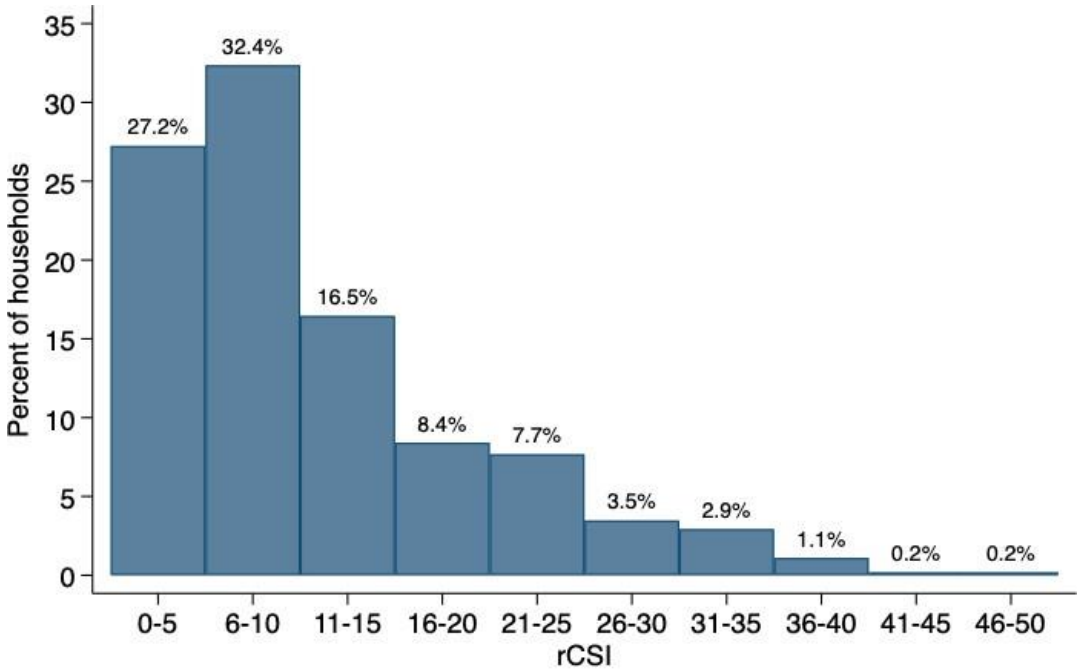
Note: Respondents were asked about 7 coping strategies explicitly and were provided a list of 19 additional coping strategies to choose from. Coping strategies were then grouped into stress, crisis and emergency categories based on guidance from the WFP country office and Consolidated Approach for Reporting Indicators of Food Security (CARI) guidelines. Most commonly reported coping strategies (four stress, three crisis and three emergency) were selected and presented in the graph.

Appendix Figure 36: Percentage of households per coping strategies group (last 12 months), Yambio



Number of observations = 547
Note: HHs were categorized based on the most severe coping strategy used.

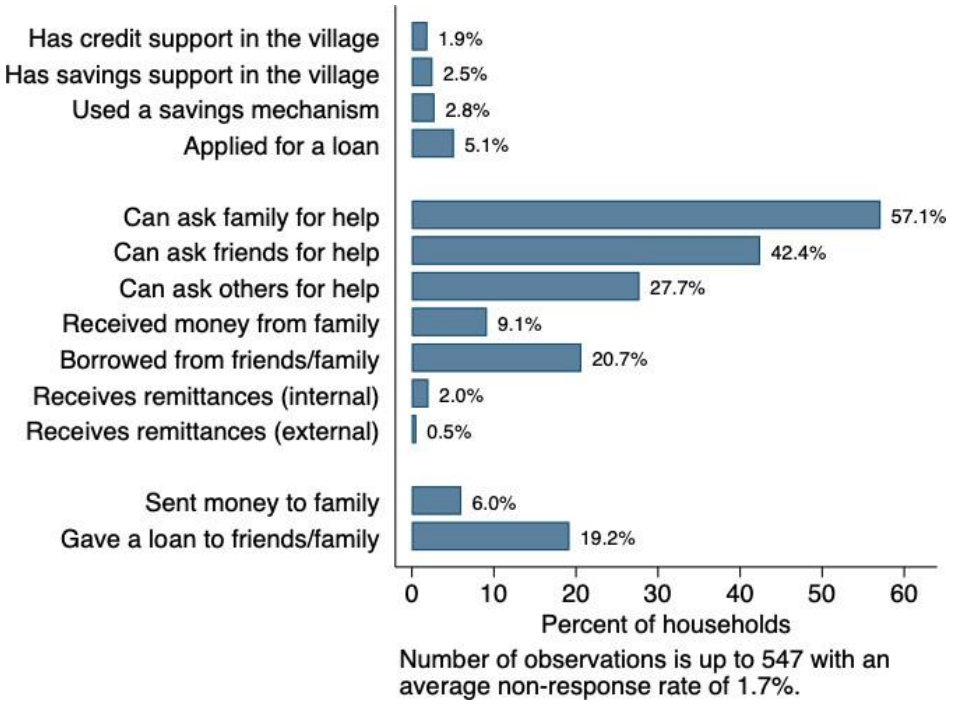
Appendix Figure 37: Reduced consumption-based coping strategies index (last 7 days), Yambio



N = 547, mean = 10.65, median = 9, 99th pctile = 36, max = 46.
Note: rCSI considers frequency and severity of 5 coping strategies used in the last 7 days. The lower the score, the more food secure is the household.

A.3.8 Financial outcomes and social capital

Appendix Figure 38: Financial outcomes and social capital, Yambio



Note: All values, except for social capital (asking for help) and remittances questions, refer to a period of the last 12 months. A savings mechanism includes a bank, savings bank, formal institution, village savings and loan association (VSLA) or other. Internal migration refers to remittances received from a person who migrated within the country, while external migration defines someone who migrated to another country. Non-responses refer to 'don't know' and 'refuse to respond' answers.

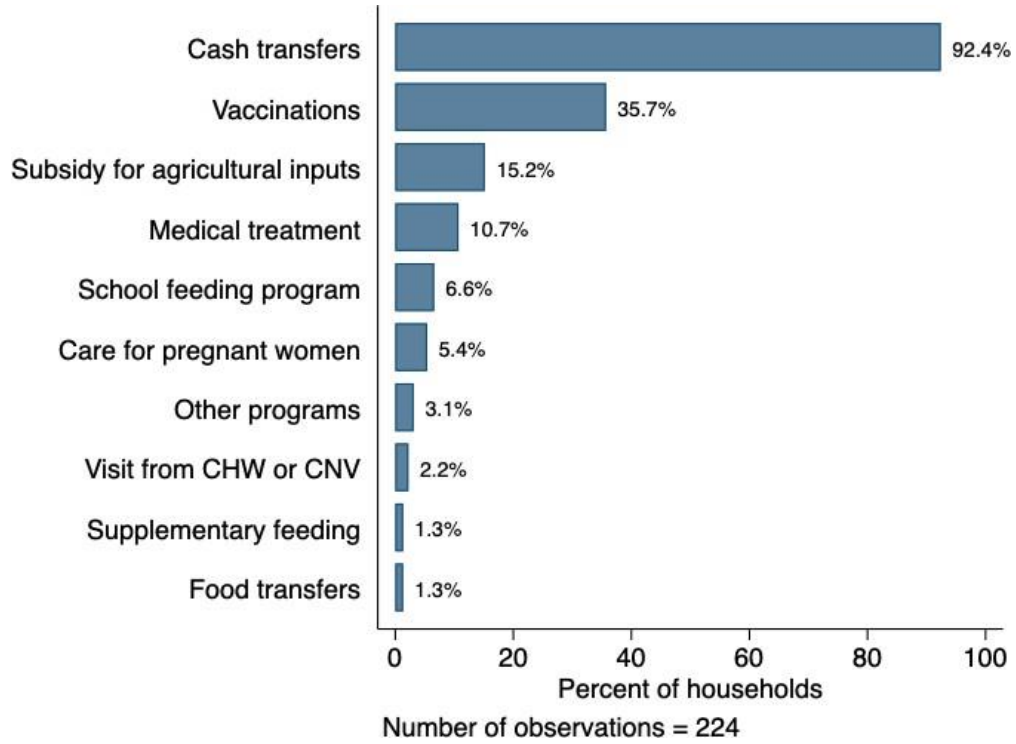
Appendix Table 16: Financial outcomes and social capital, Yambio

	Mean	Standard Deviation	N
Savings mechanisms			
Balance of formal savings accounts	25.20	56.56	15
Amount deposited in the last 3 months	18.50	37.68	15
Amount borrowed in the last 12 months	9.04	10.13	28
Amount outstanding on the loan	5.39	9.77	28
Social capital			
Number of friends a household can ask for money	0.80	1.18	523
Number of community members a household can ask for money	0.60	1.26	523
Amount received from family	16.05	19.61	50
Amount borrowed from friends/family	5.60	6.99	113
Amount sent to family	16.29	21.52	33
Amount of the loan to friends/family	5.82	9.01	104

Note: These are household-level summaries for households that reported making a deposit in a savings institution, applied for credit, and made transfers with friends/family. Monetary values are shown in thousand SSP and winsorized at the 2nd and 98th percentiles.

A.3.9 Safety nets, health, and livelihoods programmes

Appendix Figure 39: Programme participation (last 12 months), existing Food Assistance for Assets (FFA) villages in Yambio



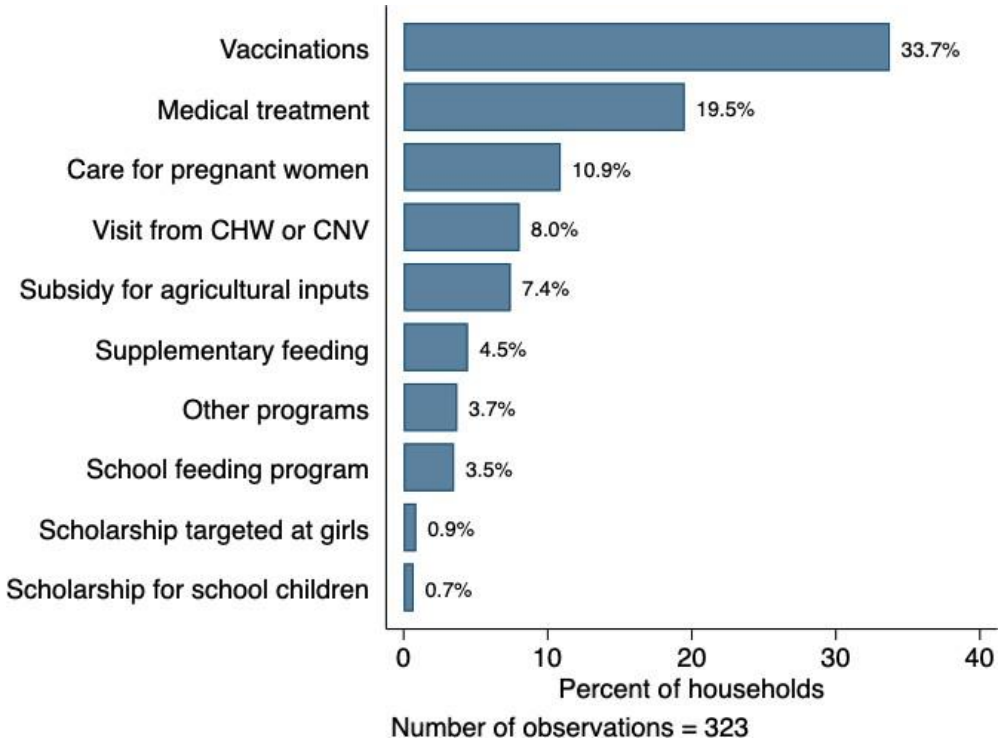
Note: CHWs and CNVs are community health workers and community nutrition volunteers. Supplementary feeding is for children aged under 5 years, and pregnant or lactating women. Medical treatment excludes treatments for pregnant women.

Appendix Table 17: Programme participation details (last 12 months), existing Food Assistance for Assets (FFA) village in Yambio

	Mean	Standard Deviation	5%	95%	N
Cash transfers					
Number of transfers	2.75	1.37	1.00	4.00	206
Amount per transfer	14.70	2.73	12.53	17.62	206
Food transfers					
Number of transfers	3.50	0.71	3.00	4.00	2
Amount per transfer	16.14	0.01	16.13	16.14	3

Note: Amounts are shown in thousand SSP and winsorized at the 98th percentile. For in-kind (food) transfers, the amount is the monetary equivalent of the transfer in SSP. Number of observations within the panel relating to a certain programme varies due to 'don't know' and 'refuse to respond' answers.

Appendix Figure 40: Programme participation (last 12 months), newly eligible locations in Yambio



Note: CHWs and CNVs and community health workers and community nutrition volunteers. Supplementary feeding is for children aged under 5 years, and pregnant or lactating women. Medical treatment excludes treatments for pregnant women.

A.3.10 Psychosocial

Appendix Table 18: Psychological well-being (last 7 days), Yambio

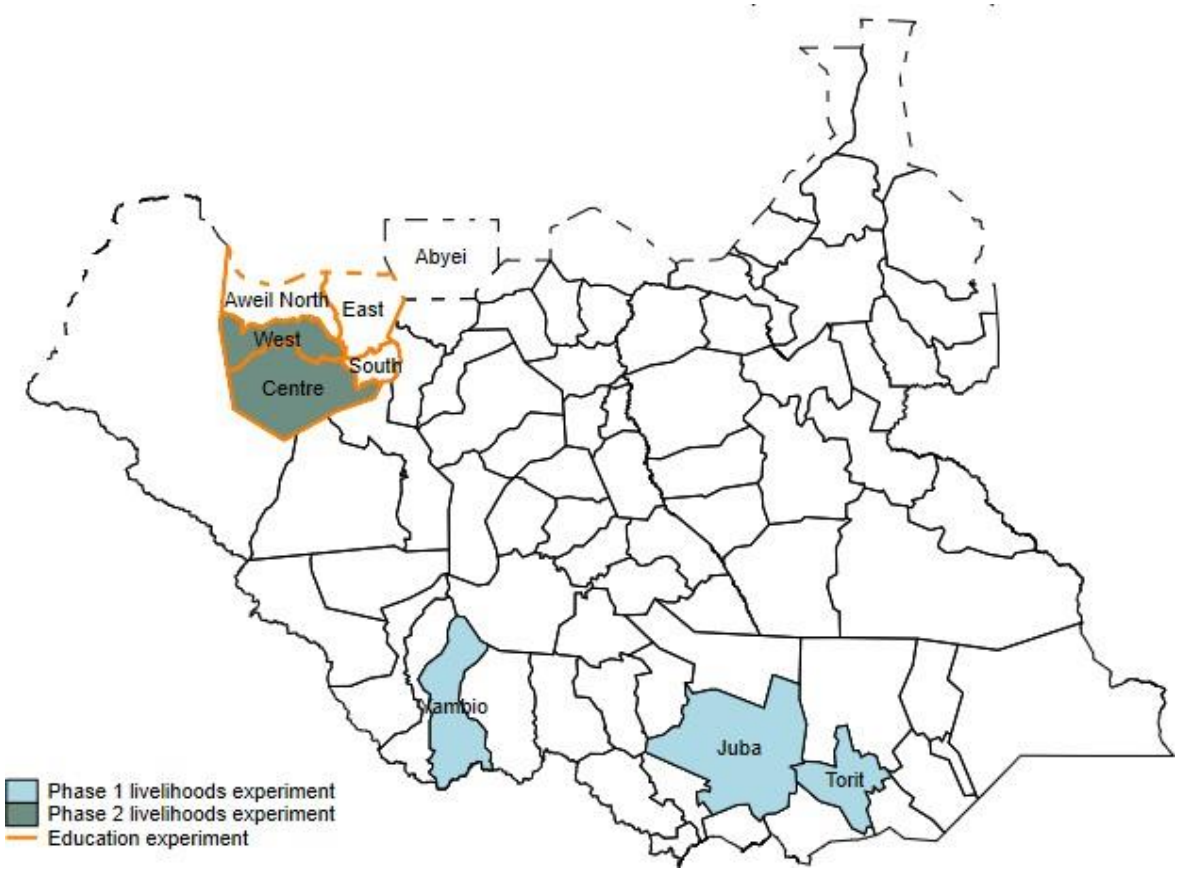
	Mean	Standard Deviation	N
Panel A: Depression scale			
Mental health index: Less depression (0–70)	25.06	9.94	540
Details of daily life bothered you more than usual	2.19	1.79	543
Had trouble concentrating on what you were doing	2.07	1.55	543
Felt sad	2.32	1.74	544
Felt that everything you did took all your energy	2.10	1.51	543
Felt confident in the future (reverse scale)	3.93	2.03	544
Felt nervous, tense or worried	2.24	1.75	541
Had trouble sleeping peacefully	1.92	1.67	544
Felt happy (reverse scale)	4.43	1.53	544
Felt alone	1.86	1.79	544
Felt so tired that you couldn't do anything	2.06	1.43	544
Panel B: Disability scale			
Mental health index: Less disability (0–28)	8.84	5.21	542
Had a headache	1.91	1.42	543
Your digestion was bad	1.49	1.59	543
Had difficulty fulfilling family responsibilities	3.24	2.22	544
Had difficulties in your daily work	2.19	1.68	544

Note: Households were asked ten questions based on the Center for Epidemiologic Studies Short Depression Scale (CES-D-R 10) to measure depression and four questions from the Self-Reporting Questionnaire 20-Item (SRQ-20) to measure mental health disability. The questions were framed: In the last 7 days, how many days you felt a certain way? Higher scores for the Less depression and Less disability indices suggest higher risk of depression. Number of observations varies due to 'refuse to respond' answers.

A.4OVERVIEW OF PHASE 2 OF THE LIVELIHOODS EXPERIMENT

To increase the power of the livelihoods experiment, the impact evaluation required a scale-up. We call the data collected from Juba, Yambio and Torit phase 1 of the livelihoods experiment. The replication of this work in Aweil West and Aweil Centre is referenced as phase 2. See Appendix Figure 41 for a summary of the locations where the experimental components of the research study are implemented.

Appendix Figure 41: Counties where experiments are implemented



Note: The project counties overlap with the data collection counties: Juba, Yambio, Torit, and Aweil Counties. The final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. The final status of the Abyei area is not yet determined.

Baseline data collection for phase 2 took place between 11 April and 12 May 2022. The survey procedures that applied to phase 1 have also been implemented during phase 2, e.g., sampling, survey instruments and protocols.

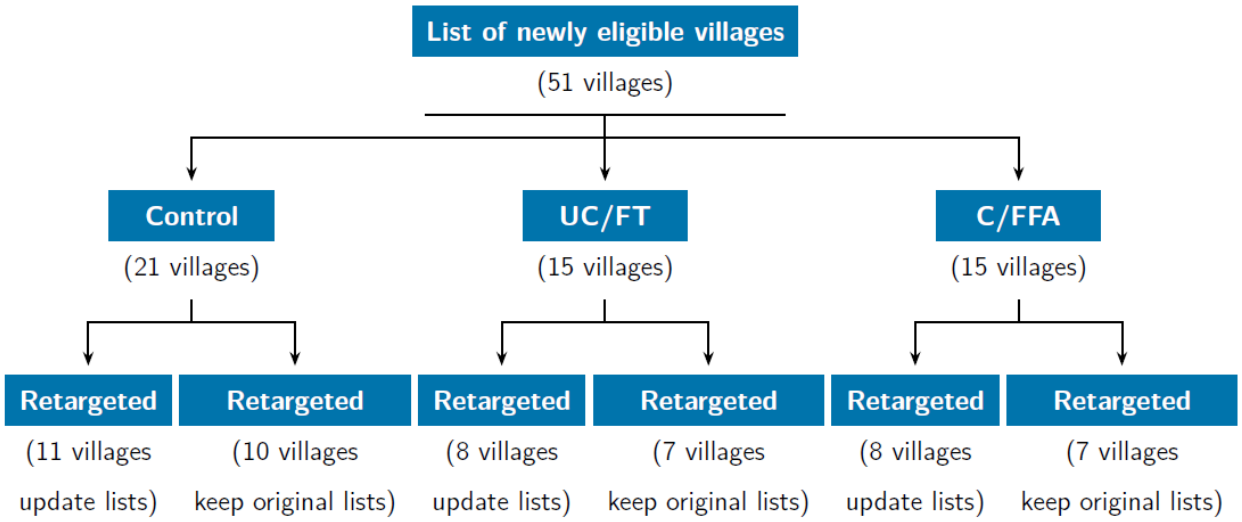
Phase 2 of the livelihoods experiment complements phase 1 to: (i) examine how households are coping with and without livelihoods interventions in the form of cash or food transfers; (ii) estimate the added value of working on community assets over and above the receipt of transfers; and (iii) assess whether updating the village-level beneficiary lists on an annual basis increases average household resilience, as opposed to the current programme cycle which encompasses three programme years.

First, as in the case of phase 1, the impact evaluation compares newly eligible villages that were randomly assigned to three treatment arms: unconditional cash or food transfers (UCT), food or cash transfers for work on assets (FFA), and villages that do not receive support (control).[27] *Second*, across the treatment groups, the evaluation compares the outcomes of a small number of households who reside in villages

[27] UCT/FFA participants are paid the equivalent of USD 40.50 in food per month in Aweil West and USD 27 per month in Aweil Centre. The latter transfer is smaller due to budgetary constraints that applied to Aweil Centre but not Aweil West.

where the experiment simulates the yearly update of beneficiary lists and where a business-as-usual scenario applies, i.e., three-year cycle for beneficiary list updates.[28] The first experiment is used to answer the research questions (i) and (ii), and the second experiment is used to answer question (iii). Appendix Figure 42 gives an overview of the number of villages that are part of phase 2 of the livelihoods impact evaluation.

Appendix Figure 42: Livelihoods design, phase 2



The Appendix Sections A.5–A.7 summarize the household data collected from 51 villages, as presented in Appendix Table 19. WFP pre-selected these villages based on the same set of criteria as for phase 1. While villages were located within approximately 50km from county centres in phase 1, for phase 2, villages may slightly surpass this threshold, and in very few instances, villages may be closer to the 100km mark.

[28] In contrast, in phase 1, this sub-experiment was limited to the FFA treatment arm.

Appendix Table 19: Livelihoods baseline sample size, phase 2

County	Villages	Targeted households	Successful households	Households not visited
Aweil West	39	180	180	0
Aweil Centre	12	585	582	0
Total households	**51**	**765**	**762**	**299**
Success rate			***99%***	

Note: As some village lists were very short, the survey team did not have a sufficient number of backup households to replace three unsuccessful interviews.

Moreover, the procedure to select households in view of interviews has also replicated phase 1 guidelines. First, the impact evaluation team randomly picked ten households from the village-level lists of households eligible to receive WFP livelihoods interventions. Secondly, the village-level sample further included five households in view of the retargeting sub-experiment. The latter households are not beneficiaries as they were just shy of being included in the village caseload. If the village budget had had the funds for five additional households, then these five retargeting households would have been next in line to benefit from livelihoods support.

As was the case of phase 1 data, the survey conducted in Aweil West and Centre will also serve to compile evidence for the water, sanitation, and hygiene (WASH), health and nutrition non-experimental components of the impact evaluation.

Below, the report offers highlights of the information summarized in Appendix Sections A.6 and A.7.

Household characteristics are similar across Aweil West and Centre, although female-led households represent a higher percentage among Aweil West interviewees. The average household size is six to seven members, and the household head is female in roughly 50 percent of the interviewed households in Aweil West and 33 percent in Aweil Centre. Among household heads—female or male—the percentage of those with primary education was similar, namely 9–10 percent.

Livelihood opportunities are also similar across Aweil West and Centre, with households in Aweil West reporting slightly more involvement in agriculture and livestock rearing. Across the counties, between 70 and 80 percent of households are usually involved in agriculture, and 30 to 40 percent have livestock. Households have between one and two plots, and the average size is of 0.5 hectares per plot in both counties. The average monthly household wage income is around SSP 19,000 in Aweil West and SSP 25,000 in Aweil Centre. A similar situation, whereby Aweil Centre is seemingly better off, can be noticed in terms of the monthly average profits from running household businesses during the month prior to the interview taking place, i.e., SSP 4,000 in Aweil West and SSP 9,000 in Aweil Centre. Finally, the sale of agricultural produce from the 2021 rainy and 2021–2022 dry seasons amounted, on average, to only SSP 1,100 in Aweil West and SSP 5,600 in Aweil Centre.

Households have experienced six shocks on average in the year prior to data collection, and the rise in food prices has negatively impacted more than 90 percent of the interviewed households in each of the counties. The second and third most reported shocks in Aweil West were floods (90 percent) and crop pests

and diseases (63 percent). In Aweil Centre, the ranking is flipped: crop pests and diseases rank second (71 percent) and floods rank third (62 percent). Moreover, roughly 55 percent of households have employed coping strategies to mitigate the consequences of the experienced shocks. Specifically, 40 and 45 percent of households have employed crisis-coping strategies in Aweil West and Centre, respectively, which included reductions in health/education spending, withdrawing children from school or selling food stocks.

The percentage of households that exhibit poor food consumption is high: 75 percent in Aweil West and 68 percent in Aweil Centre. Additionally, the meals in 88–89 percent of households have low dietary diversity across the counties. Iron-rich foods appear to be the food group that is least present in household diets.

Access to a clean source of water, though limited, fares better compared to access to proper sanitation facilities. More than 95 percent of households report defecating in the open for lack of access to latrines. Boreholes are the main source of drinking water, with 78 percent of households reporting access in Aweil West and 54 percent in Aweil Centre. Surface water, which is an inferior option for drinking water, is the second and third most reported source of drinking water in Aweil West (8 percent) and Aweil Centre (11 percent), respectively. Importantly, less than 20 percent of households purify the water they drink.

Aweil Centre has slightly better average outcomes compared to Aweil West. Nevertheless, (similar to Juba and Yambio), the observed populations in both counties are highly vulnerable due to their constant exposure to shocks, limited livelihoods opportunities and equally limited support networks. In Aweil West and Centre, only one in two households is able to rely on someone outside their household for financial support. The capacity of households to mitigate the effects of natural disasters, such as flooding, is also limited, despite the fact that floods are a regular occurrence. This, in turn, impacts their livelihoods, and together with limited access to sanitation, health and education services can further reduce the resilience of households in Aweil West and Centre.

A.5 OUTCOME BALANCE ACROSS TREATMENT GROUPS, PHASE 2 LIVELIHOODS EXPERIMENT

Appendix Table 20: Balance test: Control vs. FFA vs. UCT

	Mean			Difference		
	Control	FFA	UCT	T-test		
Variable	(1)	(2)	(3)	(1)-(2)	(1)-(3)	(2)-(3)
% female household heads	44.44	48.43	43.11	-3.99	1.33	5.32
	(49.77)	(50.09)	(49.63)			
Household head age	46.14	43.32	42.28	2.82**	3.86***	1.04
	(15.23)	(13.02)	(12.82)			
Household size	7.06	6.44	6.62	0.61***	0.44**	-0.17
	(2.17)	(2.36)	(2.26)			
% household head with primary education	8.60	7.66	10.27	0.94	-1.67	-2.61
	(28.08)	(26.65)	(30.42)			
% households that cultivated land, in the last 12 months	75.56	84.30	81.78	-8.75**	-6.22*	2.53
	(43.04)	(36.46)	(38.69)			
% households that reared livestock, in the last 12 months	35.87	36.32	41.78	-0.45	-5.90	-5.45
	(48.04)	(48.20)	(49.43)			
Tropical Livestock Unit, (TLU) all households	0.58	0.62	0.49	-0.05	0.09	0.13
	(1.91)	(3.36)	(2.95)			
% households that own a business	15.56	19.28	26.67	-3.73	-11.11***	-7.38*
	(36.30)	(39.54)	(44.32)			
% household heads employed, in the last 12 months	6.03	4.48	4.89	1.55	1.14	-0.40
	(23.85)	(20.74)	(21.61)			
Total household assets	4.40	4.74	5.02	-0.34	-0.62*	-0.28
	(3.35)	(3.25)	(4.25)			
Total farm assets	2.76	2.84	2.70	-0.08	0.06	0.15
	(2.01)	(2.00)	(2.11)			
F-statistic				2.49***	3.80***	1.13
Number of observations				536	538	446

Note: Standard deviations are reported in parenthesis. The number of observations is 315 for Control, 223 for FFA and 225 for UCT. The values displayed for t-tests are the differences in the means across the three treatment arms: FFA, UCT and Control. The F-statistic is calculated for all non-missing observations. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

A.6 INDICATORS IN AWEIL WEST COUNTY, PHASE 2 LIVELIHOODS EXPERIMENT

A.6.3 Demographic characteristics

Appendix Table 21: Demographic characteristics, Aweil West

	Mean	Standard Deviation	N
Panel A: Head of Household Characteristics			
% female	49.06	-	583
Age	44.91	14.38	583
% with primary education	8.59	-	582
Panel B: Household Characteristics			
Household size	6.79	2.21	583
% children in school	27.63	-	542
Total farm assets owned by household	2.85	2.06	583
Total household assets owned by household	4.95	3.59	583
Number of motorcycles	0.01	0.12	583
Number of mobile phones	0.30	0.99	583
Number of mattresses or beds	2.05	1.56	583
Number of mosquito nets	1.80	1.59	583
Number of chairs	0.62	0.99	583
Number of bicycles	0.10	0.30	583
% of households that have an internal migrant	13.04	-	583
% of households that have an external migrant	13.38	-	583

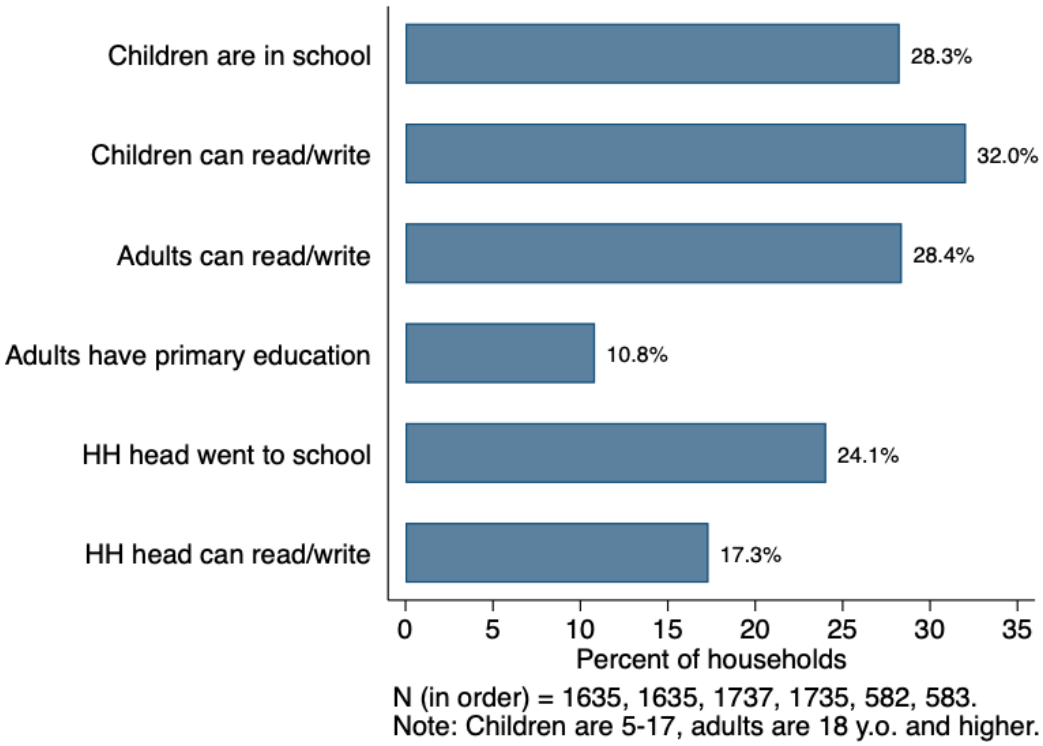
Note: 583 households were interviewed in Aweil West: answers such as 'don't know' or 'refuse to respond' occasionally lead to slightly smaller samples when computing summary statistics; 41 households did not report having children. Children are aged between 5 and 17 years. Farm assets include hoe, spade, or axe. Migration questions refer to anyone in the household migrating in the last two years within the country (internal) or outside of the country (external).

Appendix Table 22: Demographic characteristics disaggregated by sex of the household head, Aweil West

Variable	Mean		Difference
	Male	Female	T-test
	(1)	(2)	(1)-(2)
Household head age	48.22	41.47	6.75***
	(14.91)	(12.97)	
Household size	7.06	6.52	0.54***
	(1.96)	(2.41)	
% household heads with primary education	14.53	2.45	12.08***
	(35.30)	(15.48)	
% households that cultivated land, in the last 12 months	85.19	79.72	5.46*
	(35.58)	(40.28)	
% households that reared livestock, in the last 12 months	39.73	38.11	1.62
	(49.02)	(48.65)	
Tropical Livestock Unit (TLU), all households	0.51	0.65	-0.13
	(2.79)	(2.32)	
% households that own a business	19.53	21.68	-2.15
	(39.71)	(41.28)	
% household heads employed, in the last 12 months	4.71	3.50	1.22
	(21.23)	(18.40)	
Total household assets	5.14	4.76	0.38
	(3.51)	(3.66)	
Total farm assets	3.00	2.69	0.31*
	(2.18)	(1.91)	

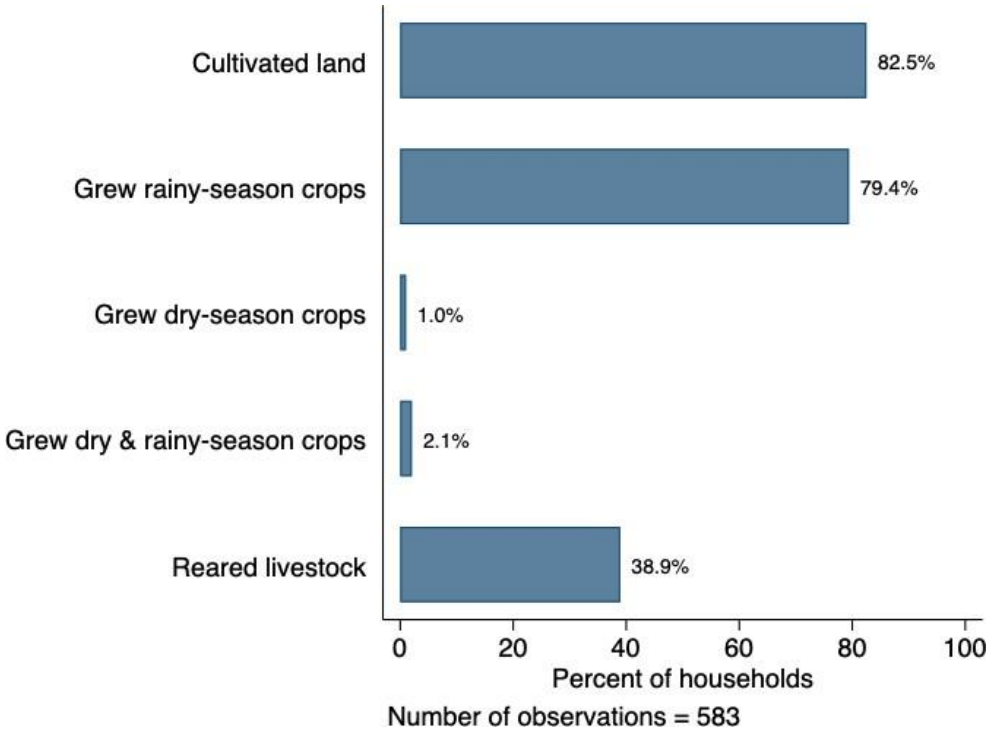
Note: Standard deviations are reported in parenthesis. The number of observations is 297 for the male group and 286 for the female group. The values displayed for t-tests are the differences in the means between male and female-headed households. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Appendix Figure 43: Individual-level education characteristics, Aweil West



A.6.4 Livelihood opportunities

Appendix Figure 44: Farming and livestock (last 12 months), Aweil West



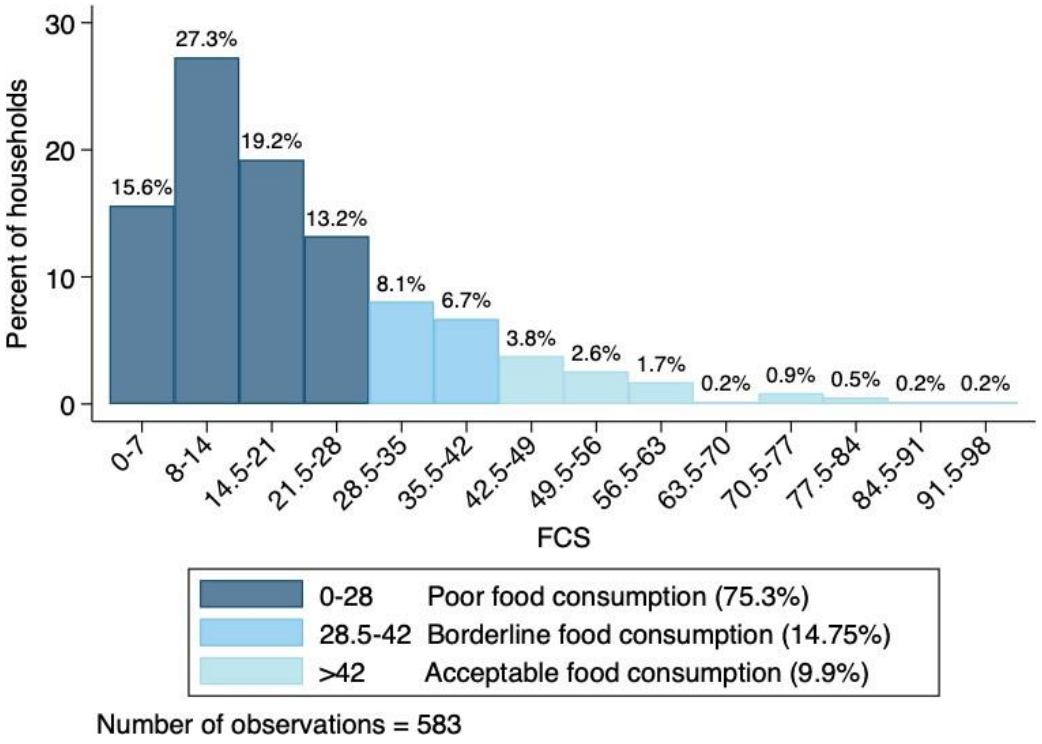
Appendix Table 23: Income-generating activities, Aweil West

	Mean	Standard Deviation	N
Panel A: Agriculture			
Number of plots	1.41	0.74	481
Plot size (hectares)	0.51	0.33	481
Farm size (hectares)	0.72	0.57	481
Annual revenue from all crop sales (dry and rainy season)	1.14	4.28	481
Panel B: Livestock			
Total livestock count, all households	3.46	7.70	583
Tropical Livestock Unit (TLU), all households	0.58	2.57	583
Total livestock count, households with livestock	8.89	10.22	227
Tropical Livestock Unit (TLU), households with livestock	1.49	3.95	227
Number of chickens	4.10	3.14	195
Number of goats	6.61	5.00	111
Number of cows	8.09	9.68	43
Number of sheep	5.90	4.59	21
Number of other animals (pigeons)	6.50	0.71	2
Profit from sold livestock and products	2.35	6.02	227
Value consumed of livestock and products	0.61	2.14	227
Panel C: Wage Employment			
Monthly household income	19.43	33.60	45
Average monthly wage income per worker	15.76	28.82	45
Panel D: Non-Agricultural Business			
Number of businesses	1.12	0.35	119
Number of months worked by manager last year	6.50	3.27	120
Average number of work days for all household members last month	20.76	8.46	100
Monthly business profit	3.86	6.09	89
Average monthly business profit per worker	2.83	4.58	89

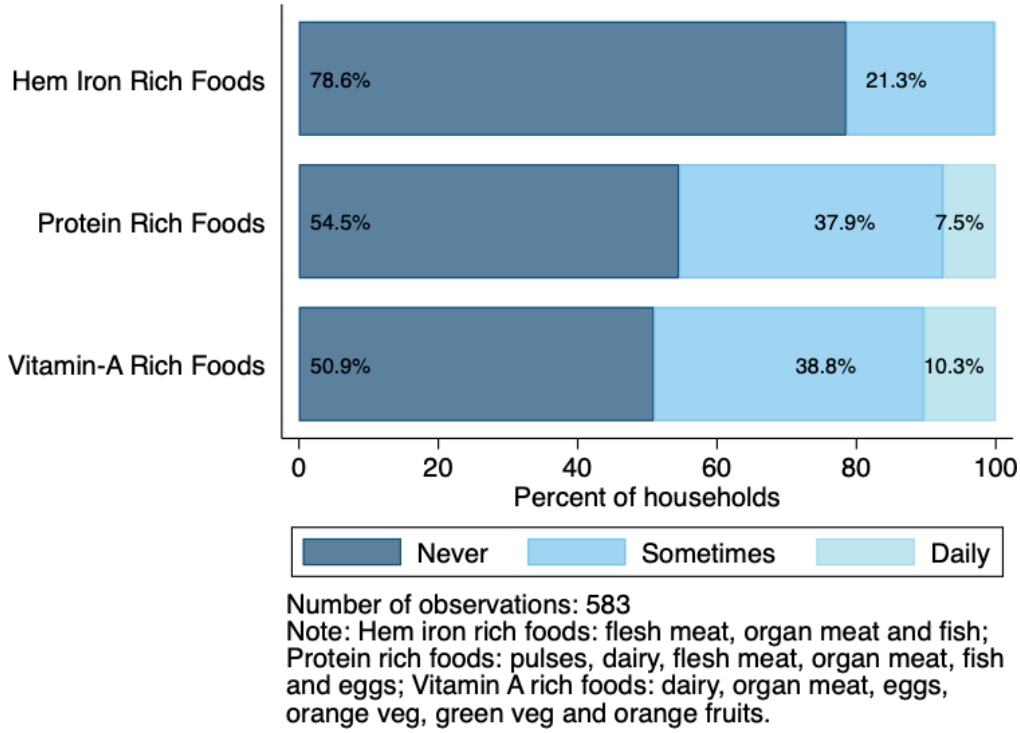
Note: These are household-level summaries for households that report plots, various types of livestock, wage employment and non-agricultural businesses. Farm and plot size, number of plots, as well as revenue, profit and other monetary values are winsorized at the 2nd and 98th percentiles. Number of cows is winsorized at the 97th percentile. Number of businesses is trimmed at the 99th percentile. All monetary values are expressed in thousand SSP. A higher number for TLU (common unit for livestock numbers) corresponds with improved food security and household resilience. Profits from sold livestock and monetary value of consumed livestock are reported for the period of the last 6 months as opposed to 12 months to maximize accuracy in memory recall.

A.6.5 Food security

Appendix Figure 45: Food consumption score (FCS) (last 7 days), Aweil West

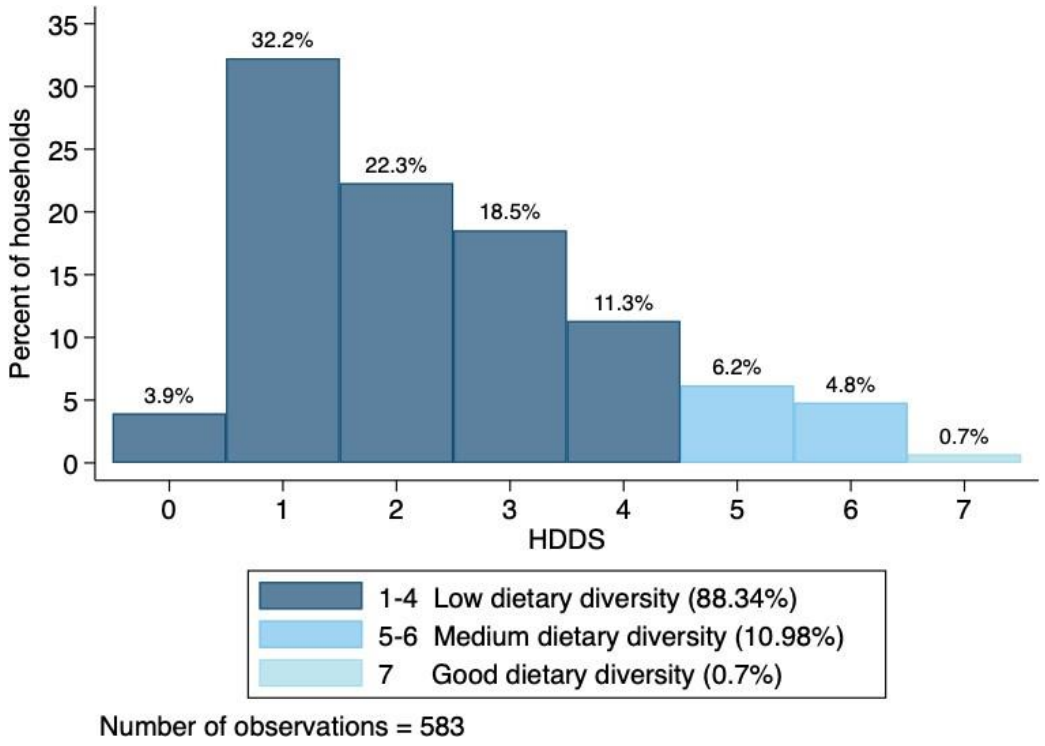


Appendix Figure 46: Food consumption score (FCS) – nutrition (last 7 days), Aweil West



Number of observations: 583
Note: Hem iron rich foods: flesh meat, organ meat and fish; Protein rich foods: pulses, dairy, flesh meat, organ meat, fish and eggs; Vitamin A rich foods: dairy, organ meat, eggs, orange veg, green veg and orange fruits.

Appendix Figure 47: Household dietary diversity score (HDDS) (last 7 days), Aweil West



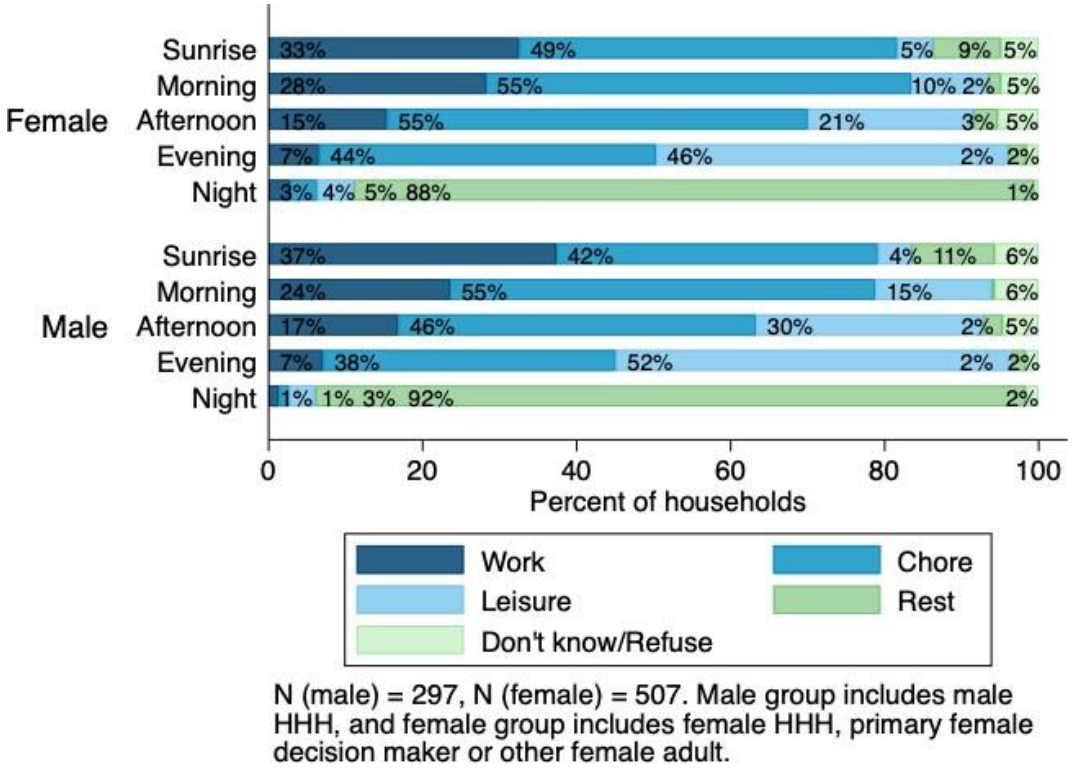
Appendix Table 24: Monthly food and non-food expenditures, Aweil West

	Mean	Standard Deviation	5 %	95 %
Food expenditure share	62.09	-	-	-
Per household				
Food expenditure	6.66	6.88	0.20	20.50
Non-food expenditure	3.00	3.74	0.00	11.75
Total expenditure	9.66	8.99	0.70	27.73
Per household member				
Food expenditure	1.03	0.99	0.03	3.23
Non-food expenditure	0.48	0.64	0.00	1.99
Of which, water bills	0.08	0.05	0.02	0.20
Total expenditure	1.51	1.35	0.10	4.53
Observations	180			

Note: Food expenditure share is defined as percentage of households spending more than 65 percent of their monthly budget on food. Expenditures are presented in thousand SSP. Food and non-food expenditures are winsorized at the 2nd and 98th percentiles. N for monthly water bills = 174. Food expenditure was collected based on the last purchase of the food item and non-food expenditure for the period of the last 30 days and the last year, depending on the item.

A.6.6 Time use

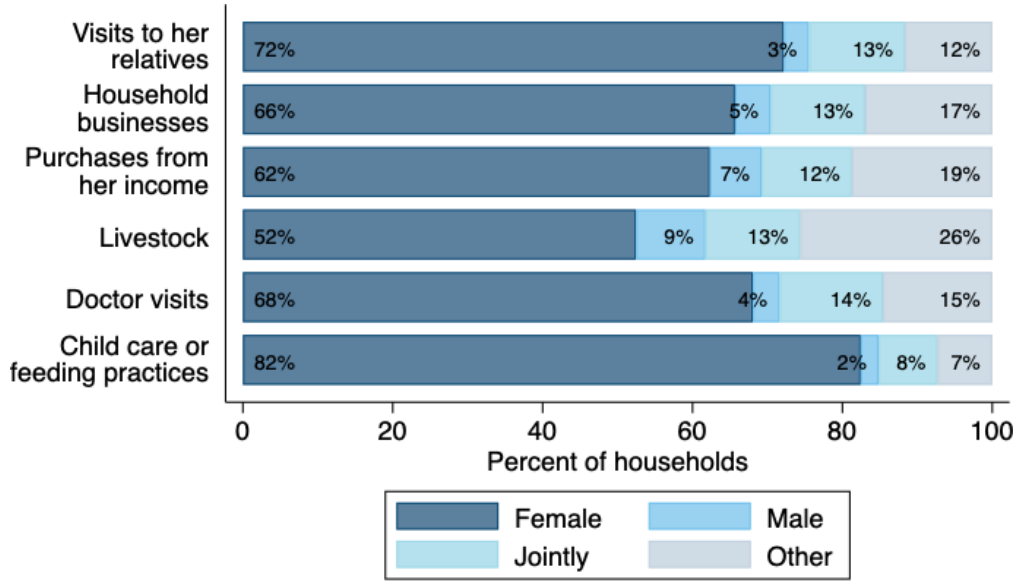
Appendix Figure 48: Time employment by sex (last business day), Aweil West



N (male) = 297, N (female) = 507. Male group includes male HHH, and female group includes female HHH, primary female decision maker or other female adult.

A.6.7 Women's empowerment

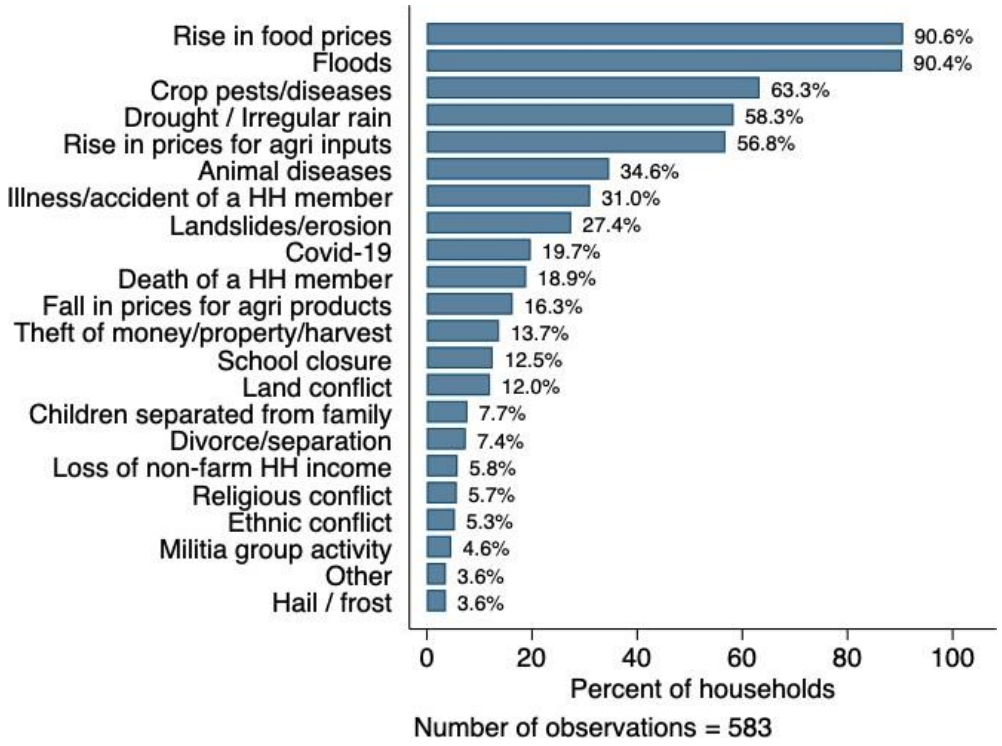
Appendix Figure 49: Women's perceptions on gendered decision making in the household, Aweil West



Number of observations = 507
The respondent is female HHH, primary female decision maker or other female adult. The respondent was asked who in the household makes decision on the 6 items above: respondent, male decision-maker, jointly or other.

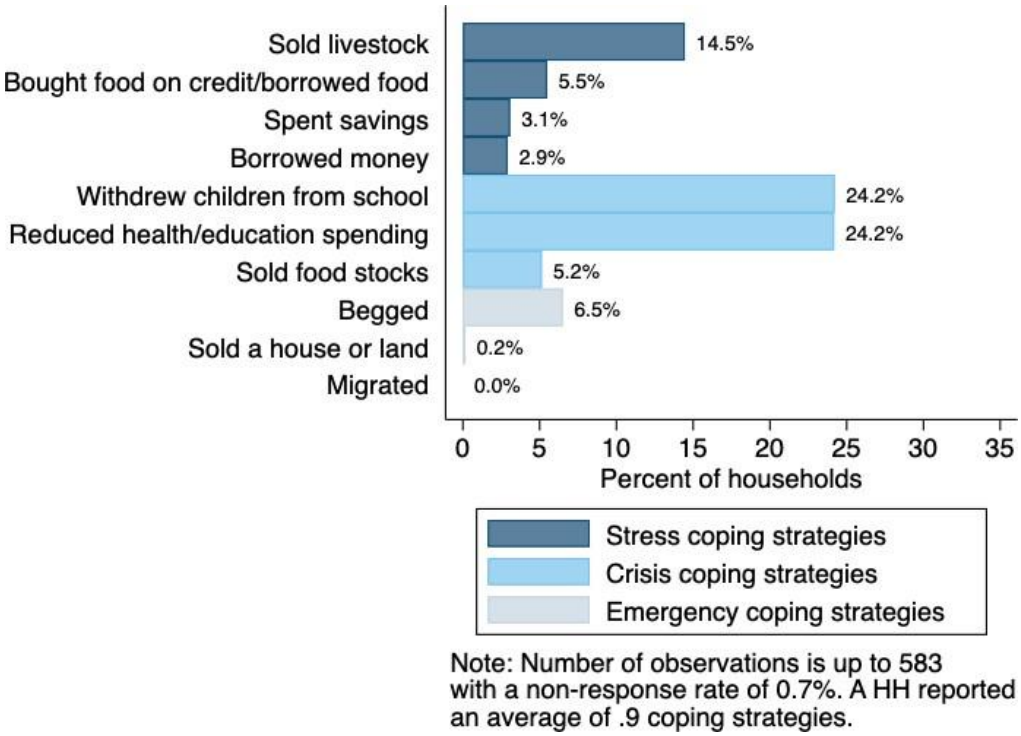
A.6.8 Shocks

Appendix Figure 50: Shocks experienced by households (last 12 months), Aweil West



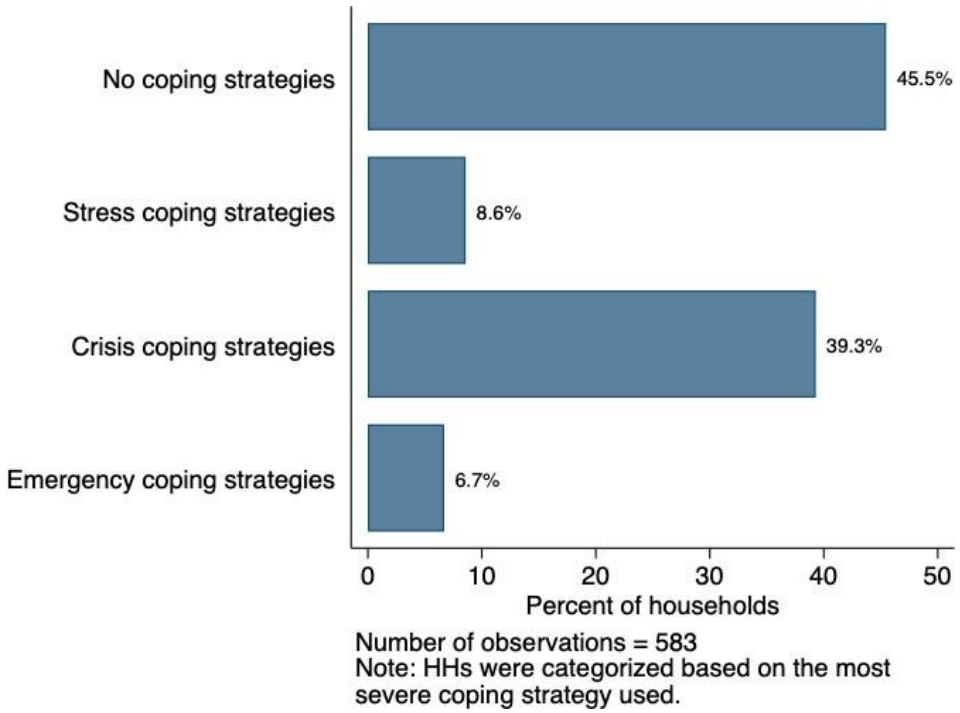
A.6.9 Coping strategies

Appendix Figure 51: Livelihood coping strategies (last 12 months), Aweil West

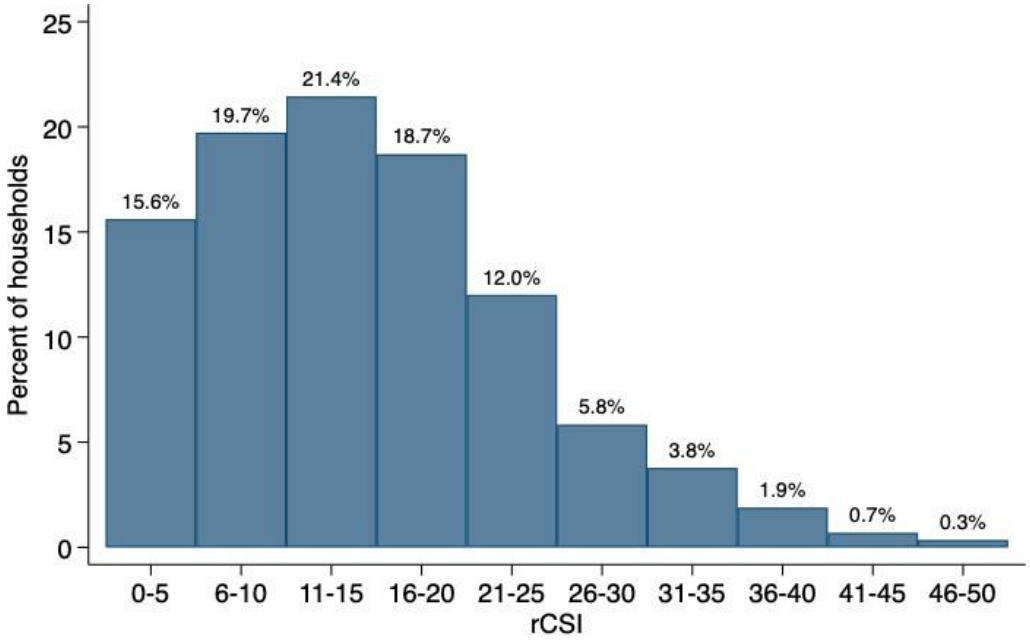


Note: Respondents were asked about 7 coping strategies explicitly and were provided a list of 19 additional coping strategies to choose from. Coping strategies were then grouped into stress, crisis and emergency categories based on guidance from the WFP country office and Consolidated Approach for Reporting Indicators of Food Security (CARI) guidelines. The most commonly reported coping strategies (four stress, three crisis and three emergency) were selected and presented in the graph.

Appendix Figure 52: Percentage households per coping strategies group (last 12 months),



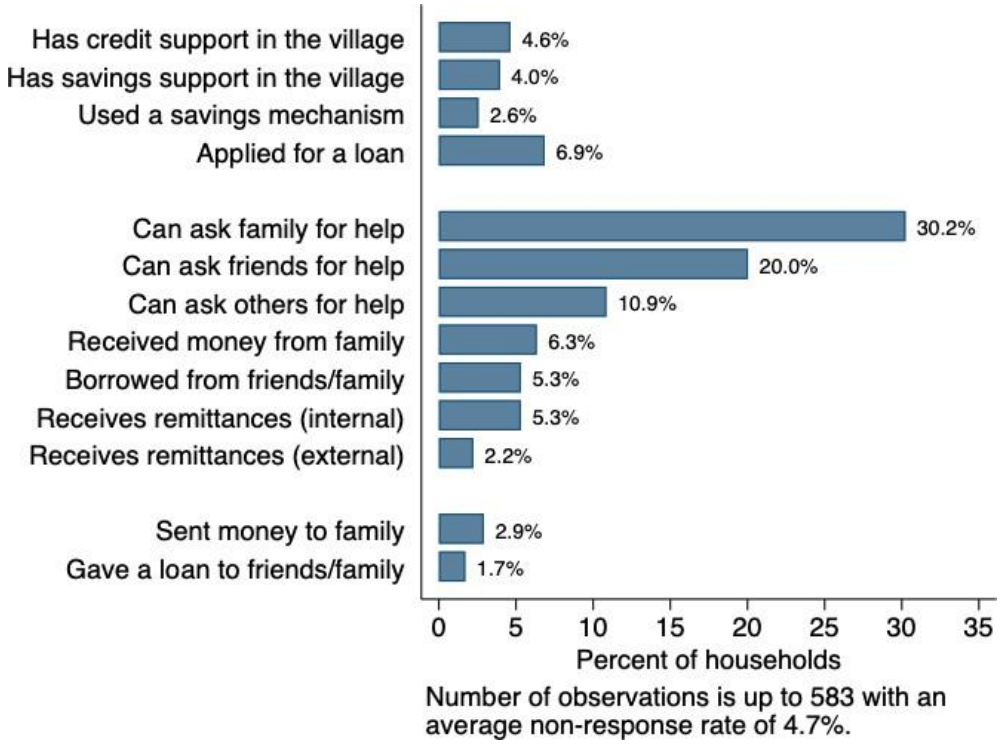
Appendix Figure 53: Reduced consumption-based coping strategies index (last 7 days), Aweil West



N = 583, mean = 14.68, median = 14, 99th pctile = 41, max = 48.
Note: rCSI considers frequency and severity of 5 coping strategies used in the last 7 days. The lower the score, the more food secure is the household.

A.6.10 Financial outcomes and social capital

Appendix Figure 54: Financial outcomes and social capital, Aweil West



Note: All values, except for social capital (asking for help) and remittances questions, refer to a period of the last 12 months. A savings mechanism includes a bank, savings bank, formal institution, village savings and loan association (VSLA) or other. Internal migration refers to remittances received from a person who migrated within the country, while external migration defines someone who migrated to another country. Non-responses refer to 'don't know' and 'refuse to respond' answers.

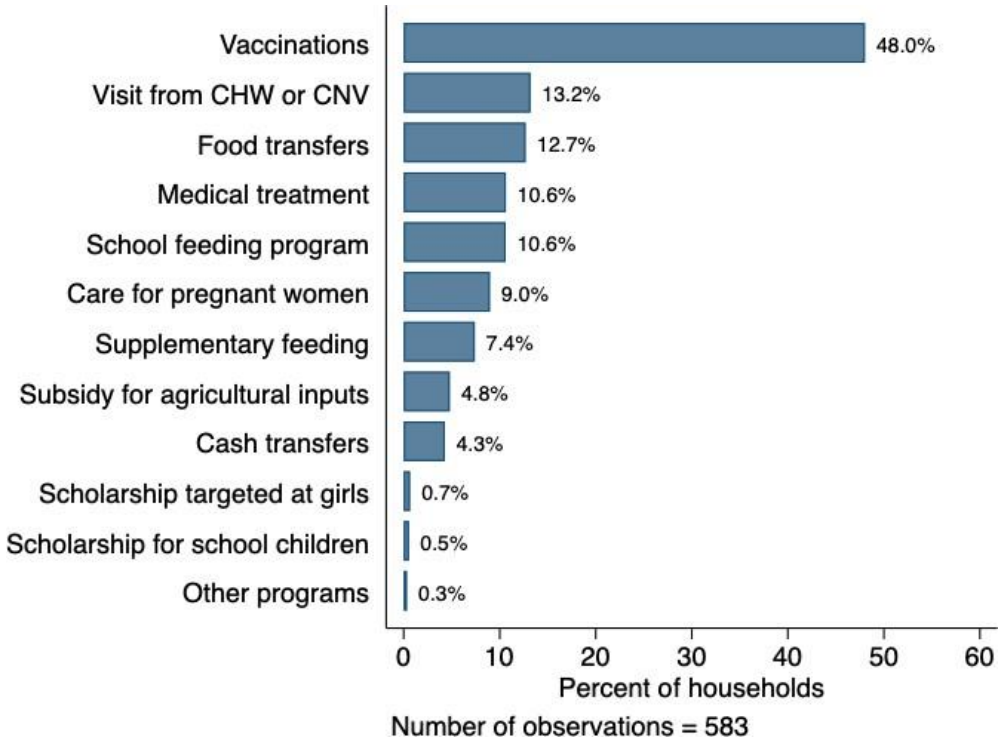
Appendix Table 25: Financial outcomes and social capital, Aweil West

	Mean	Standard Deviation	N
Savings mechanisms			
Balance of formal savings accounts	8.47	8.67	15
Amount deposited in the last 3 months	2.84	3.13	15
Amount borrowed in the last 12 months	4.64	5.48	40
Amount outstanding on the loan	2.04	2.70	39
Social capital			
Number of friends a household can ask for money	0.33	0.77	574
Number of community members a household can ask for money	0.19	0.66	571
Amount received from family	9.80	11.17	34
Amount borrowed from friends/family	4.50	6.06	30
Amount sent to family	17.21	22.42	17
Amount of the loan to friends/family	11.20	13.92	10

Note: These are household-level summaries for households that reported making a deposit in a savings institution, applied for credit, and made transfers with friends/family. Monetary values are shown in thousand SSP and winsorized at the 2nd and 98th percentiles.

A.6.11 Safety nets, health, and livelihoods programmes

Appendix Figure 55: Programme participation (last 12 months), Aweil West



Note: CHWs and CNVs are community health workers and community nutrition volunteers. Supplementary feeding is for children aged under 5 years, and pregnant or lactating women. Medical treatment excludes treatments for pregnant women.

Appendix Table 26: Programme participation details (last 12 months), Aweil West

	Mean	Standard Deviation	5%	95%	N
Cash transfers					
Number of transfers	6.75	11.68	1.00	50.00	16
Amount per transfer	5.86	4.21	0.10	15.00	17
Food transfers					
Number of transfers	4.60	5.98	1.00	8.00	68
Amount per transfer	9.25	12.04	1.00	35.00	63

Note: Amounts are shown in thousand SSP. For in-kind (food) transfers, the amount is the monetary equivalent of the transfer in SSP. Number of observations within the panel relating to a certain programme varies due to 'don't know', 'refuse to respond' and a few instances of misreported answers.

A.6.12 Psychosocial

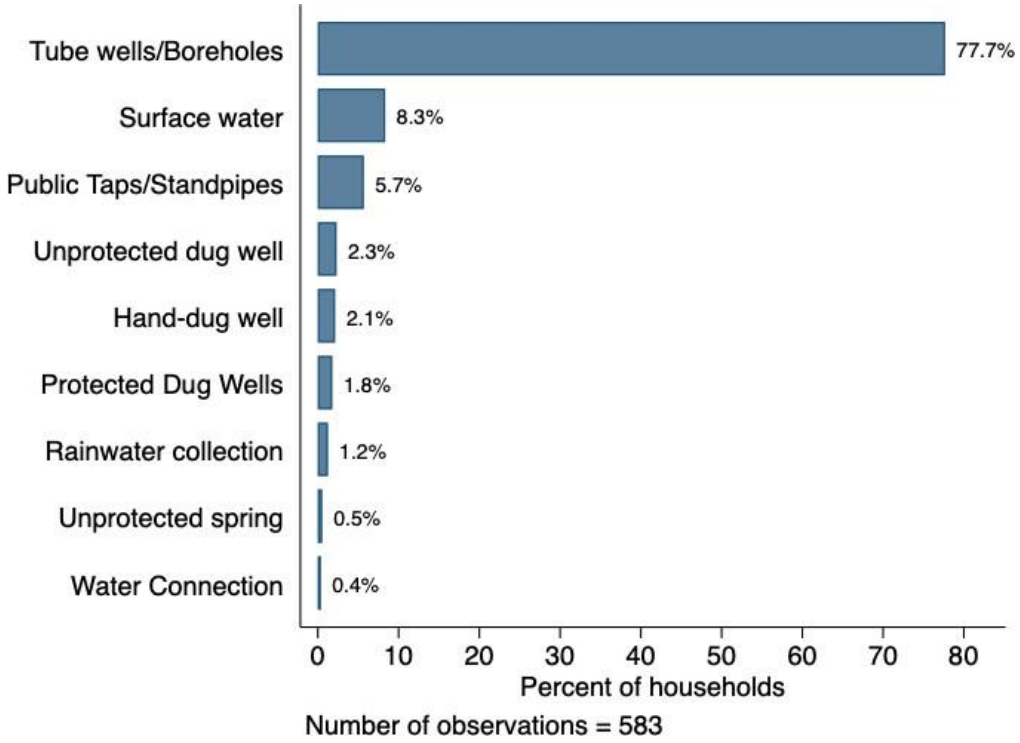
Appendix Table 27: Psychological well-being (last 7 days), Aweil West

	Mean	Standard Deviation	N
Panel A: Depression scale			
Mental health index: Less depression (0–70)	30.08	11.49	579
Details of daily life bothered you more than usual	2.86	2.52	582
Had trouble concentrating on what you were doing	2.64	2.04	582
Felt sad	2.71	2.25	583
Felt that everything you did took all your energy	2.99	2.11	583
Felt confident in the future (reverse scale)	4.54	2.15	582
Felt nervous, tense or worried	2.87	2.34	582
Had trouble sleeping peacefully	2.74	2.02	583
Felt happy (reverse scale)	4.73	2.17	583
Felt alone	1.70	2.06	583
Felt so tired that you couldn't do anything	2.25	1.90	583
Panel B: Disability scale			
Mental health index: Less disability (0–28)	9.59	5.53	581
Had a headache	2.55	2.04	583
Your digestion was bad	1.38	1.75	581
Had difficulty fulfilling family responsibilities	3.00	2.34	583
Had difficulties in your daily work	2.70	2.18	583

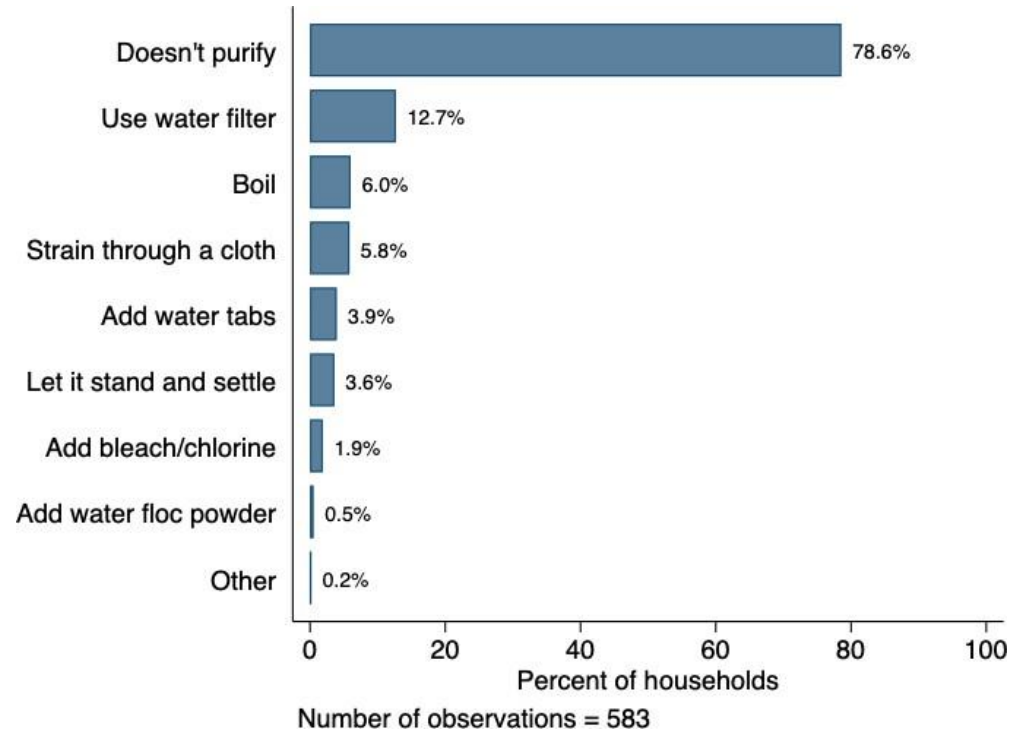
Note: Households were asked ten questions based on the Center for Epidemiologic Studies Short Depression Scale (CES-D-R 10) to measure depression and four questions from the Self-Reporting Questionnaire 20-Item (SRQ-20) to measure mental health disability. The questions were framed: In the last 7 days, how many days you felt a certain way? Higher scores for the Less depression and Less disability indices suggest higher risk of depression. Number of observations varies due to 'refuse to respond' answers.

A.6.13 Water, sanitation, and hygiene (WASH) outcomes

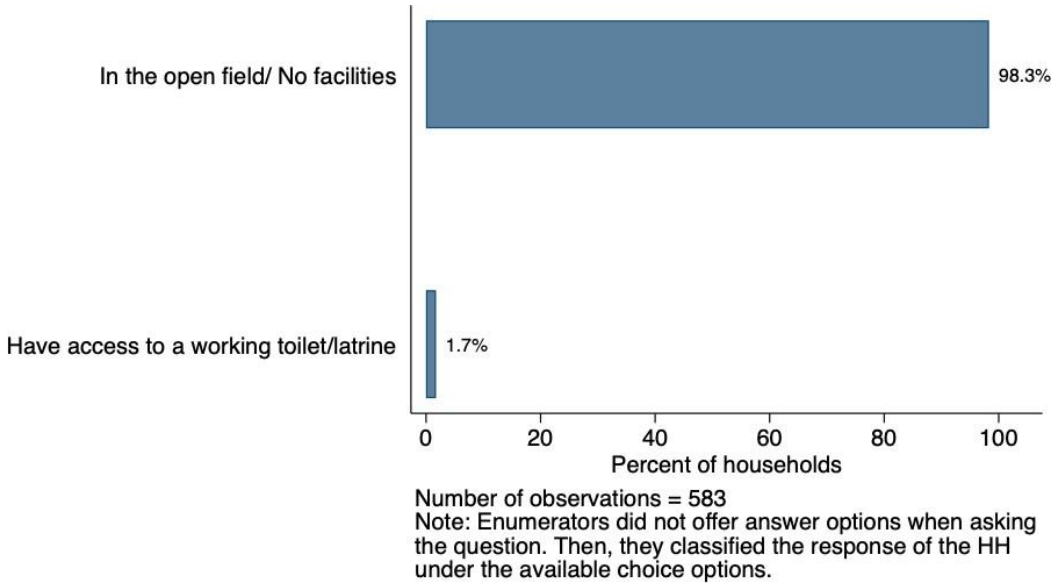
Appendix Figure 56: Main source of drinking water, Aweil West



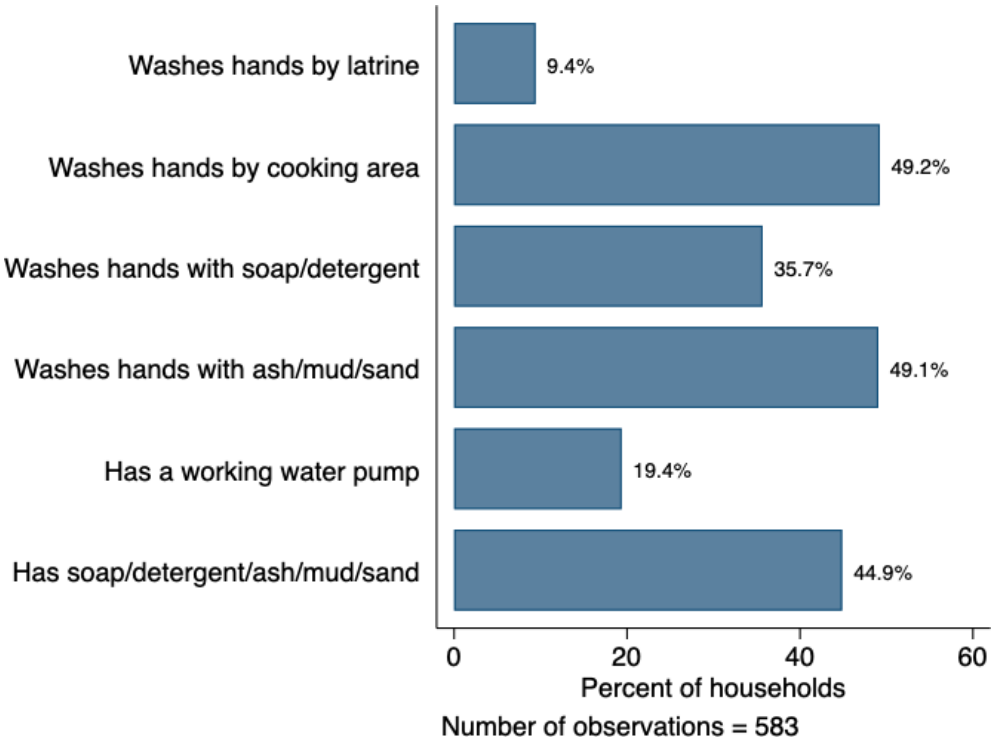
Appendix Figure 57: Methods used to make water safe to drink, Aweil West



Appendix Figure 58: Answer to "Where do you defecate most often" asked to household heads, Aweil West



Appendix Figure 59: Household behaviour, water, sanitation, and hygiene (responses by household head), Aweil West



Note: The last two questions are reported from observation by the enumerator. For the last question (household has soap, detergent, ash, mud, or sand), N = 361.

A.7 INDICATORS IN AWEIL CENTRE COUNTY, PHASE 2 LIVELIHOODS EXPERIMENT

A.6.1 Demographic characteristics

Appendix Table 28: Demographic characteristics, Aweil Centre

	Mean	Standard Deviation	N
Panel A: Head of Household Characteristics			
% female	32.78	-	180
Age	41.79	12.46	180
% with primary education	9.55	-	178
Panel B: Household Characteristics			
Household size	6.60	2.45	180
% children in school	23.48	-	152
Total farm assets owned by household	2.50	1.93	180
Total household assets owned by household	3.82	3.58	180
Number of motorcycles	0.01	0.11	180
Number of mobile phones	0.18	0.45	180
Number of mattresses or beds	1.31	1.57	180
Number of mosquito nets	1.37	1.51	180
Number of chairs	0.84	1.26	180
Number of bicycles	0.08	0.28	180
% of households that have an internal migrant	13.33	-	180
% of households that have an external migrant	2.78	-	180

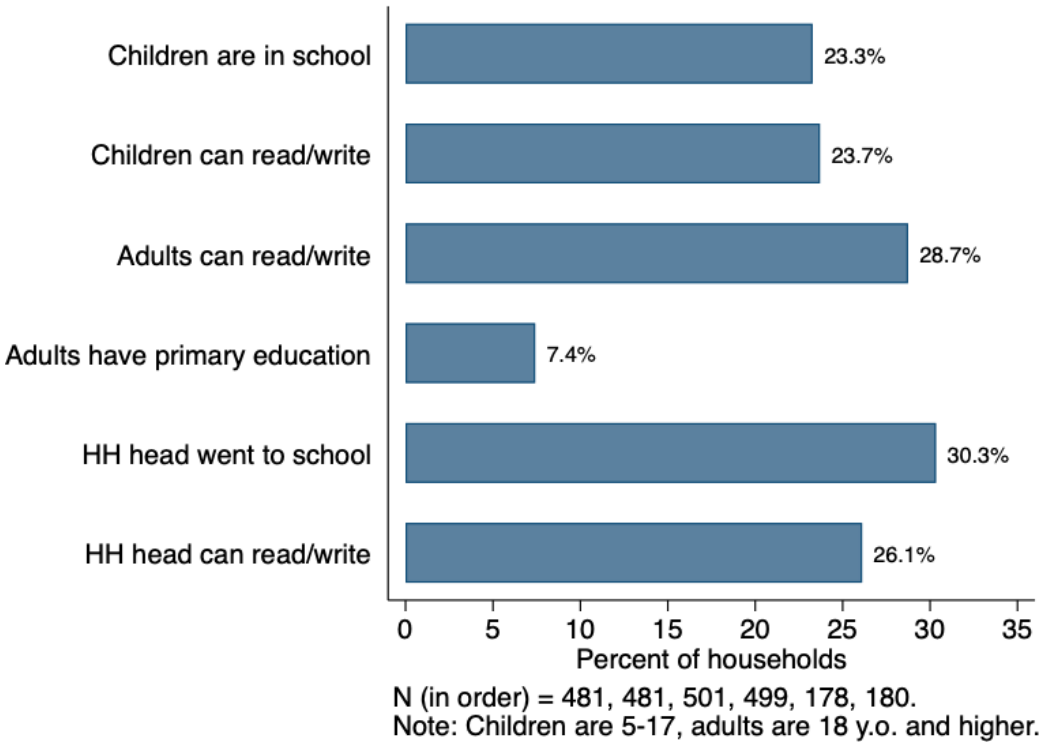
Note: 180 households were interviewed in Aweil Centre: answers such as 'don't know' or 'refuse to respond' occasionally lead to slightly smaller samples when computing summary statistics; 28 households did not report having children. Children are aged between 5 and 17 years. Farm assets include hoe, spade, or axe. Migration questions refer to anyone in the household migrating in the last two years within the country (internal) or outside of the country (external).

Appendix Table 29: Demographic characteristics disaggregated by sex of the household head, Aweil Centre

Variable	Mean		Difference
	Male	Female	T-test
	(1)	(2)	(1)-(2)
Household head age	43.98	37.32	6.65***
	(12.39)	(11.45)	
Household size	6.93	5.92	1.02***
	(2.51)	(2.20)	
% household head with primary education	14.29	0.00	14.29***
	(35.14)	(0.00)	
% households that cultivated land, in the last 12 months	69.42	76.27	-6.85
	(46.27)	(42.91)	
% households that reared livestock, in the last 12 months	37.19	27.12	10.07
	(48.53)	(44.84)	
Tropical Livestock Unit (TLU), all households	0.71	0.11	0.60
	(3.83)	(0.28)	
% households that own a business	14.88	23.73	-8.85
	(35.73)	(42.91)	
% household heads employed, in the last 12 months	10.74	5.08	5.66
	(31.10)	(22.16)	
Total household assets	4.24	2.95	1.29**
	(3.87)	(2.73)	
Total farm assets	2.67	2.15	0.52*
	(2.01)	(1.73)	

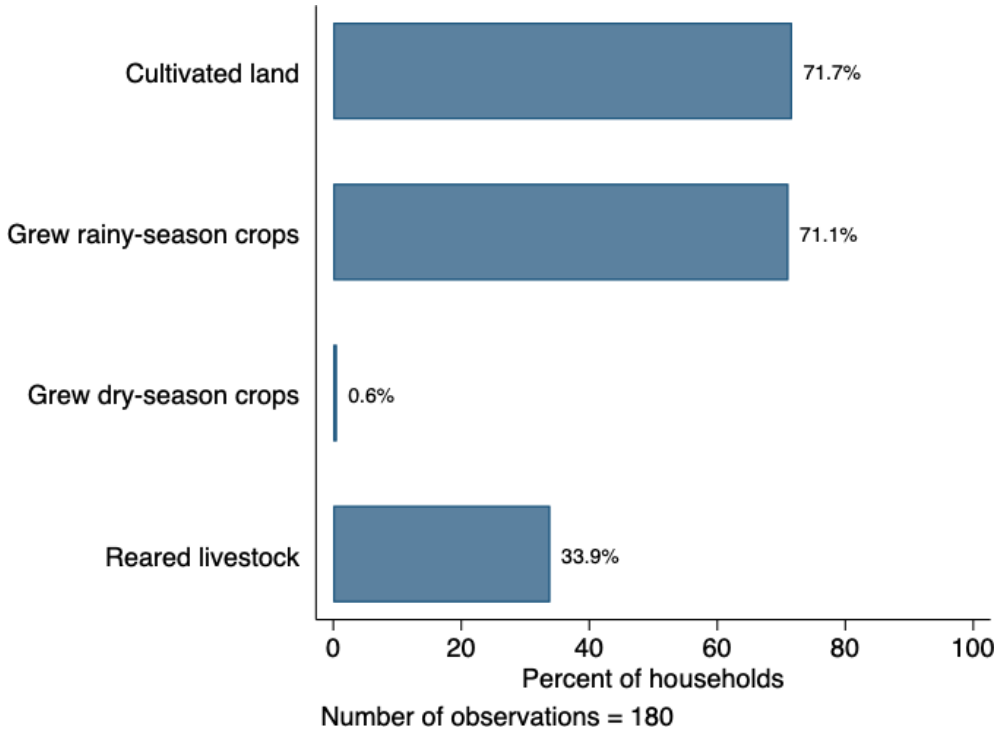
Note: Standard deviations are reported in parenthesis. The number of observations is 121 for the male group and 59 for the female group. The values displayed for t-tests are the differences in the means between male and female-headed households. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Appendix Figure 60: Individual-level education characteristics, Aweil Centre



A.6.2 Livelihood opportunities

Appendix Figure 61: Farming and livestock (last 12 months), Aweil Centre



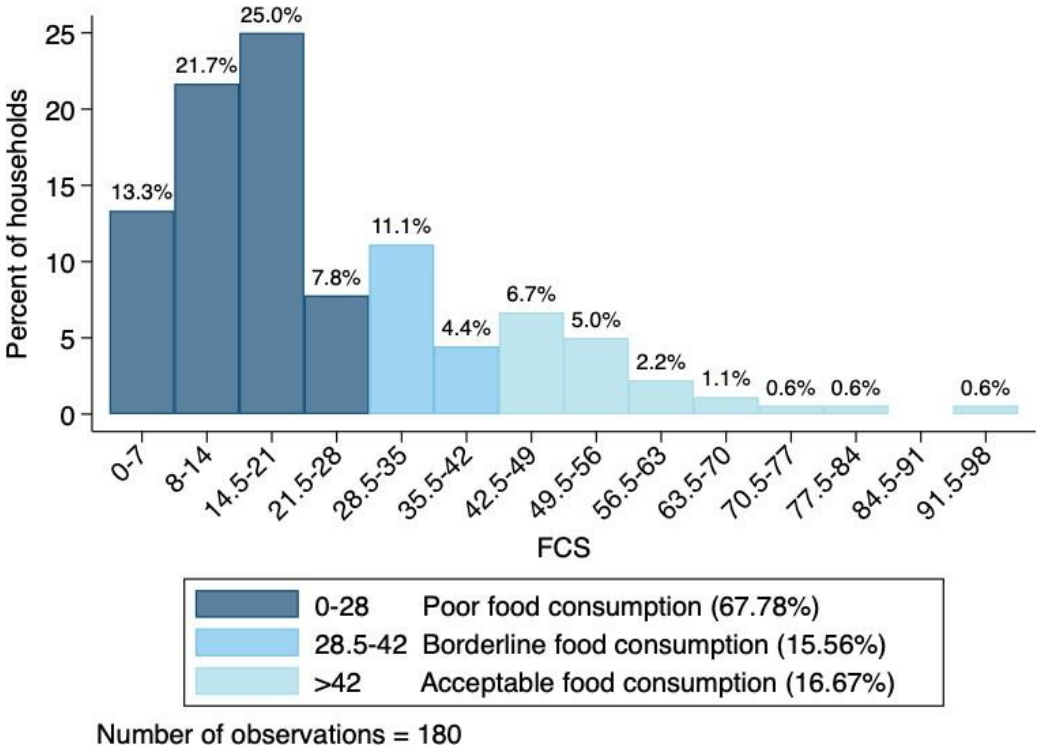
Appendix Table 30: Income-generating activities, Aweil Centre

	Mean	Standard Deviation	N
Panel A: Agriculture			
Number of plots	1.50	0.77	129
Plot size (hectares)	0.52	0.29	129
Farm size (hectares)	0.78	0.57	129
Annual revenue from all crop sales (dry and rainy season)	5.68	15.04	129
Panel B: Livestock			
Total livestock count, all households	5.12	11.01	180
Tropical Livestock Unit (TLU), all households	0.52	3.15	180
Total livestock count, households with livestock	15.10	14.43	61
Tropical Livestock Unit (TLU), households with livestock	1.52	5.30	61
Number of chickens	8.44	5.56	52
Number of goats	10.44	8.79	36
Number of cows	33.50	31.82	2
Number of sheep	5.57	2.70	7
Profit from sold livestock and products	4.39	12.31	61
Value consumed of livestock and products	1.26	3.64	61
Panel C: Wage Employment			
Monthly household income	25.15	30.23	22
Average monthly wage income per worker	17.01	16.19	22
Panel D: Non-Agricultural Business			
Number of businesses	1.16	0.37	32
Number of months worked by manager last year	5.38	3.57	32
Average number of work days for all household members last month	17.94	8.64	24
Monthly business profit	9.26	13.08	26
Average monthly business profit per worker	6.53	8.16	26

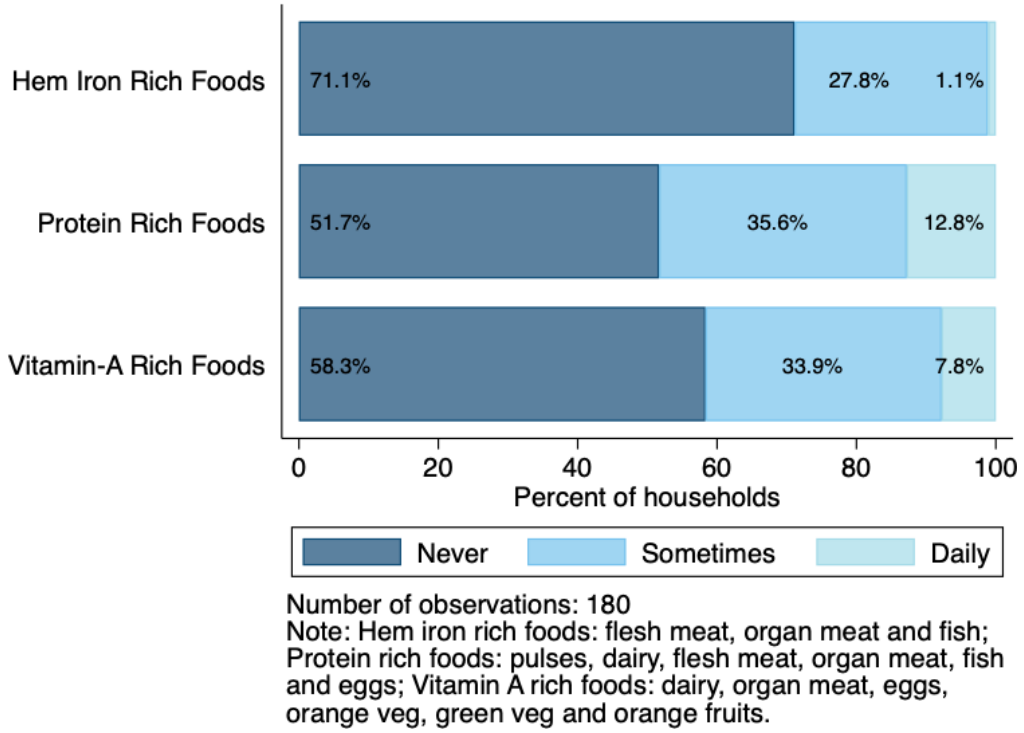
Note: These are household-level summaries for households that report plots, various types of livestock, wage employment and non-agricultural businesses. Farm and plot size, number of plots, as well as revenue, profit and other monetary values are winsorized at the 2nd and 98th percentiles. Number of cows is winsorized at the 97th percentile. All monetary values are expressed in thousand SSP. A higher number for TLU (common unit for livestock numbers) corresponds with improved food security and household resilience. Profits from sold livestock and monetary value of consumed livestock are reported for the period of the last 6 months as opposed to 12 months to maximize accuracy in memory recall.

A.6.3 Food security

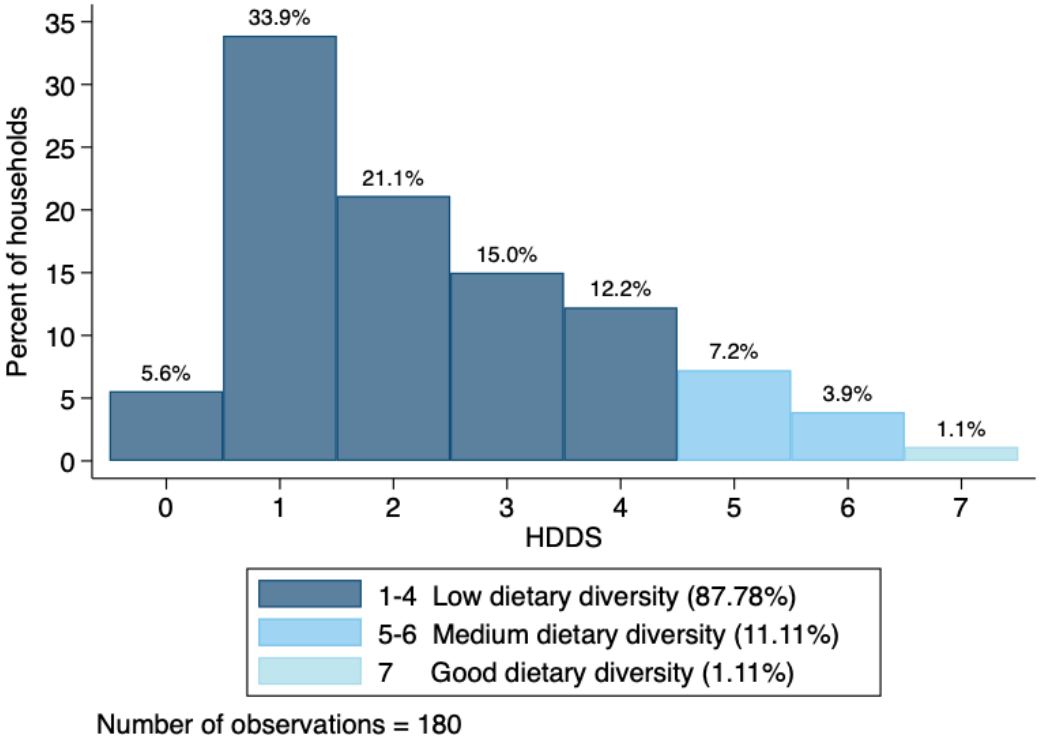
Appendix Figure 62: Food consumption score (FCS) (last 7 days), Aweil Centre



Appendix Figure 63: Food consumption score (FCS) – nutrition (last 7 days), Aweil Centre



Appendix Figure 64: Household dietary diversity score (HDDS) (last 7 days), Aweil Centre



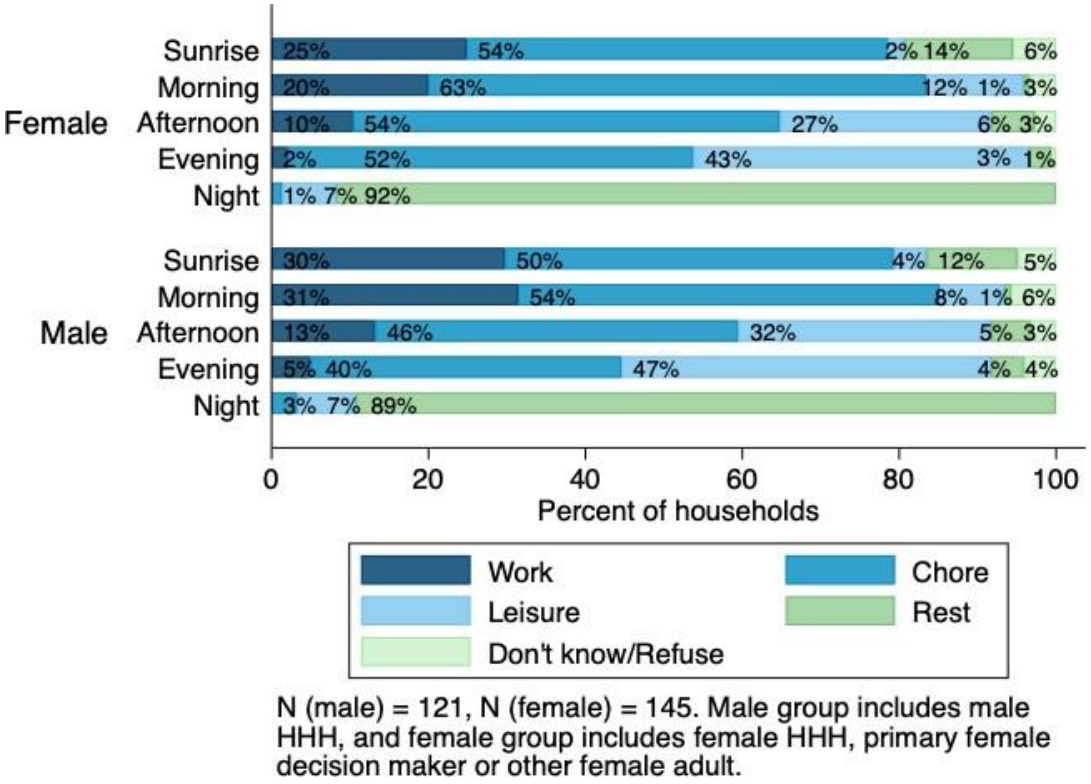
Appendix Table 31: Monthly food and non-food expenditures, Aweil Centre

	Mean	Standard Deviation	5 %	95 %
Food expenditure share	61.11	-	-	-
Per household				
Food expenditure	8.14	9.72	0.00	24.90
Non-food expenditure	4.12	6.11	0.00	17.06
Total expenditure	12.26	12.93	0.10	38.78
Per household member				
Food expenditure	1.41	1.77	0.00	5.24
Non-food expenditure	0.74	1.23	0.00	2.95
Of which, water bills	0.10	0.07	0.02	0.25
Total expenditure	2.14	2.47	0.02	8.24
Observations	180			

Note: Food expenditure share is defined as percentage of households spending more than 65 percent of their monthly budget on food. Expenditures are presented in thousand SSP. Food and non-food expenditures are winsorized at the 2nd and 98th percentiles. N for monthly water bills = 48. Food expenditure was collected based on the last purchase of the food item and non-food expenditure for the period of the last 30 days and the last year, depending on the item.

A.6.4 Time use

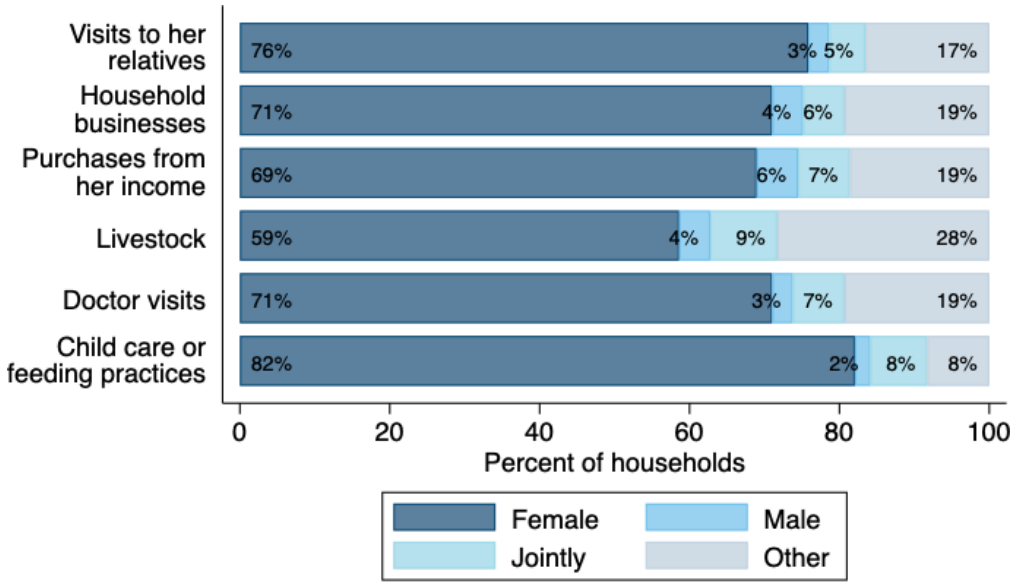
Appendix Figure 65: Time employment by sex (last business day), Aweil Centre



N (male) = 121, N (female) = 145. Male group includes male HHH, and female group includes female HHH, primary female decision maker or other female adult.

A.6.5 Women's empowerment

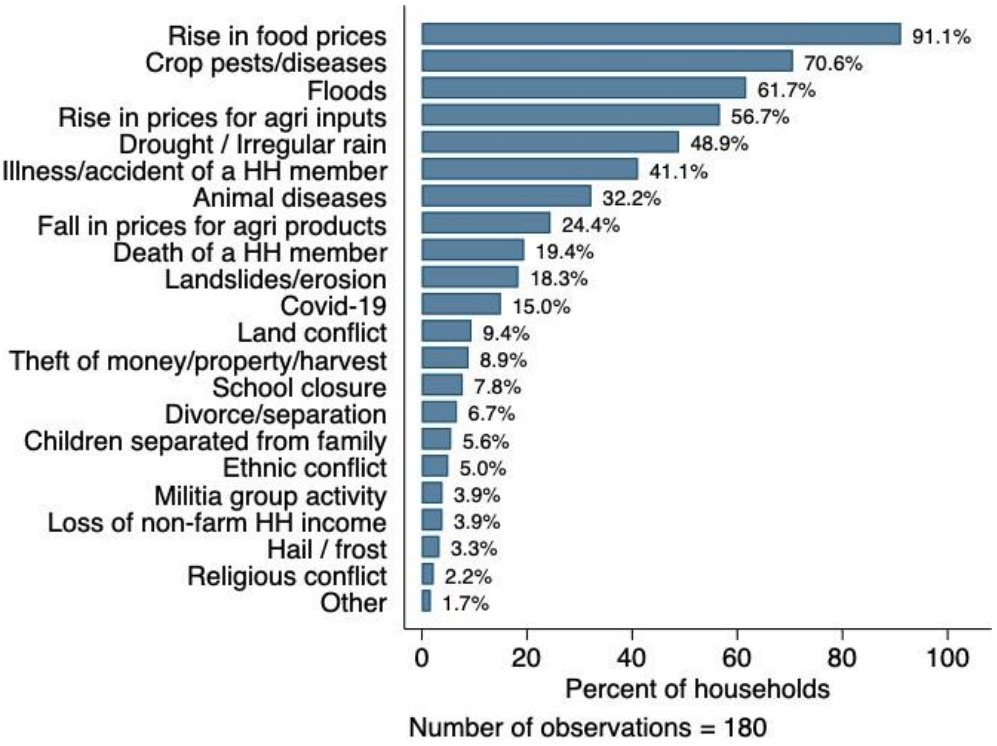
Appendix Figure 66: Women's perceptions on gendered decision making in the household, Aweil Centre



Number of observations = 145
The respondent is female HHH, primary female decision maker or other female adult. The respondent was asked who in the household makes decision on the 6 items above: respondent, male decision-maker, jointly or other.

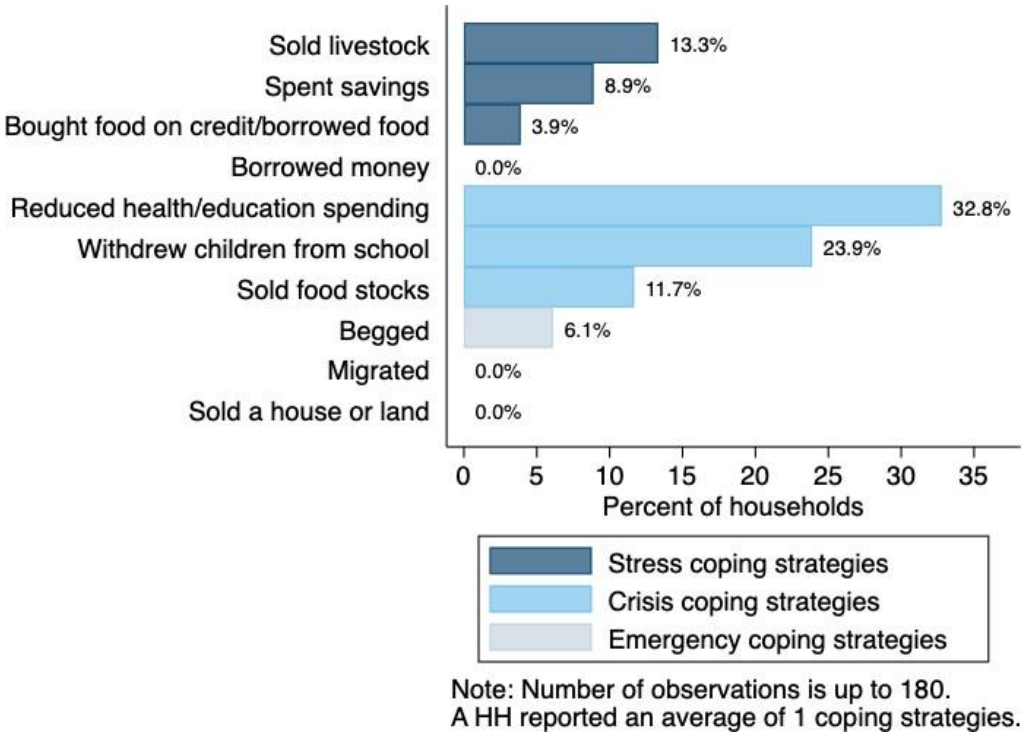
A.6.6 Shocks

Appendix Figure 67: Shocks experienced by households (last 12 months), Aweil Centre



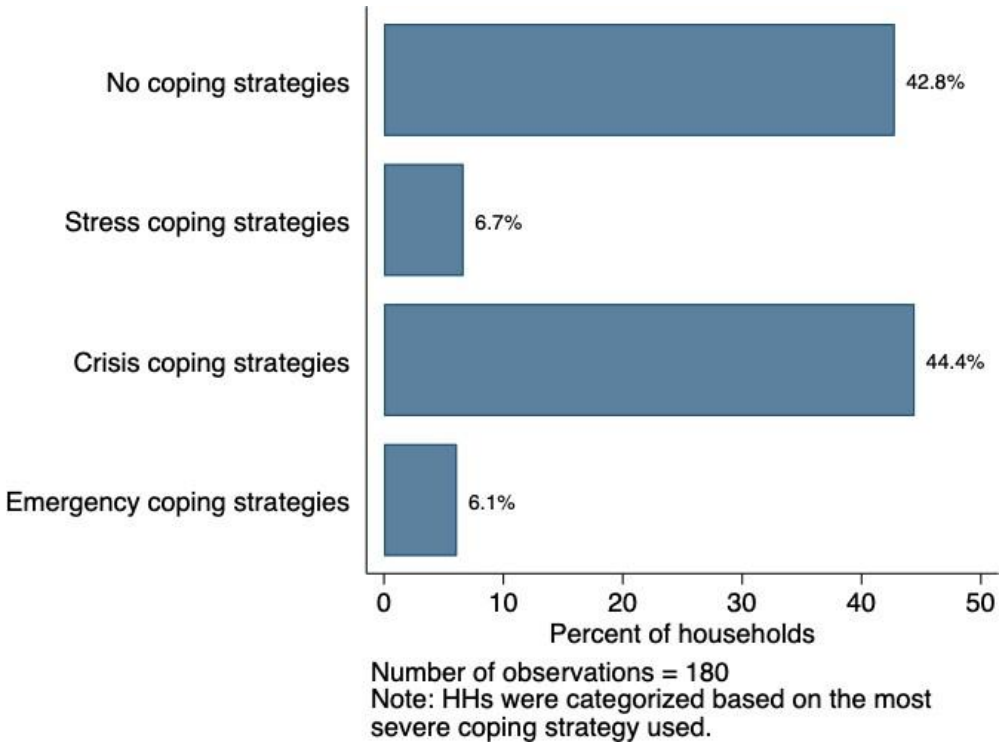
A.6.7 Coping strategies

Appendix Figure 68: Livelihood coping strategies (last 12 months), Aweil Centre

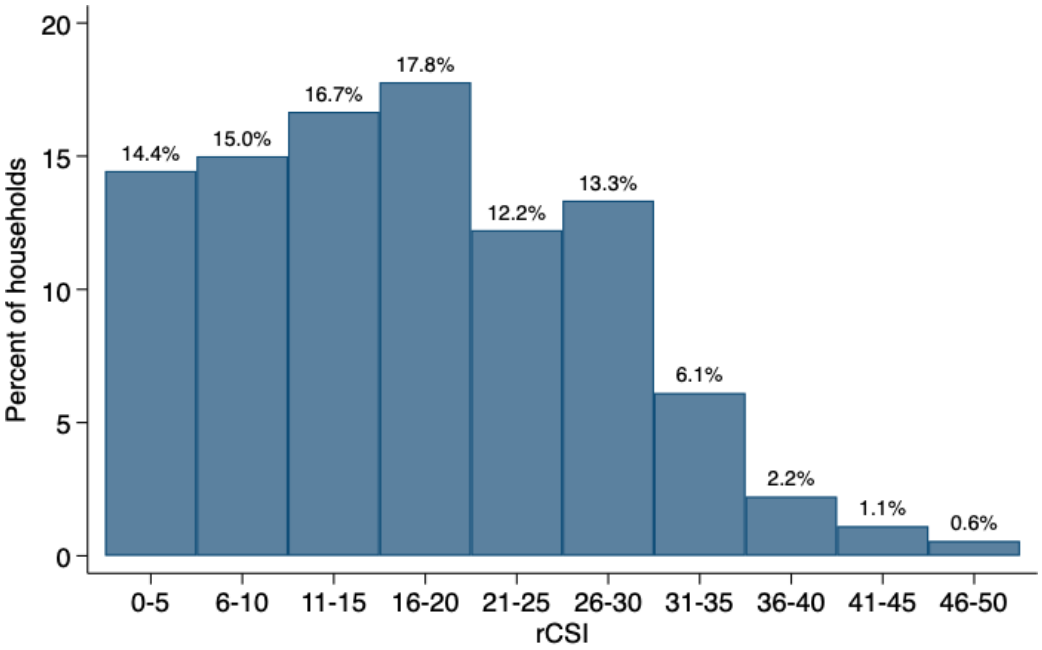


Note: Respondents were asked about 7 coping strategies explicitly and were provided a list of 19 additional coping strategies to choose from. Coping strategies were then grouped into stress, crisis and emergency categories based on guidance from the WFP country office and Consolidated Approach for Reporting Indicators of Food Security (CARI) guidelines. The most commonly reported coping strategies (four stress, three crisis and three emergency) were selected and presented in the graph.

Appendix Figure 69: Percentage households per coping strategies group (last 12 months),



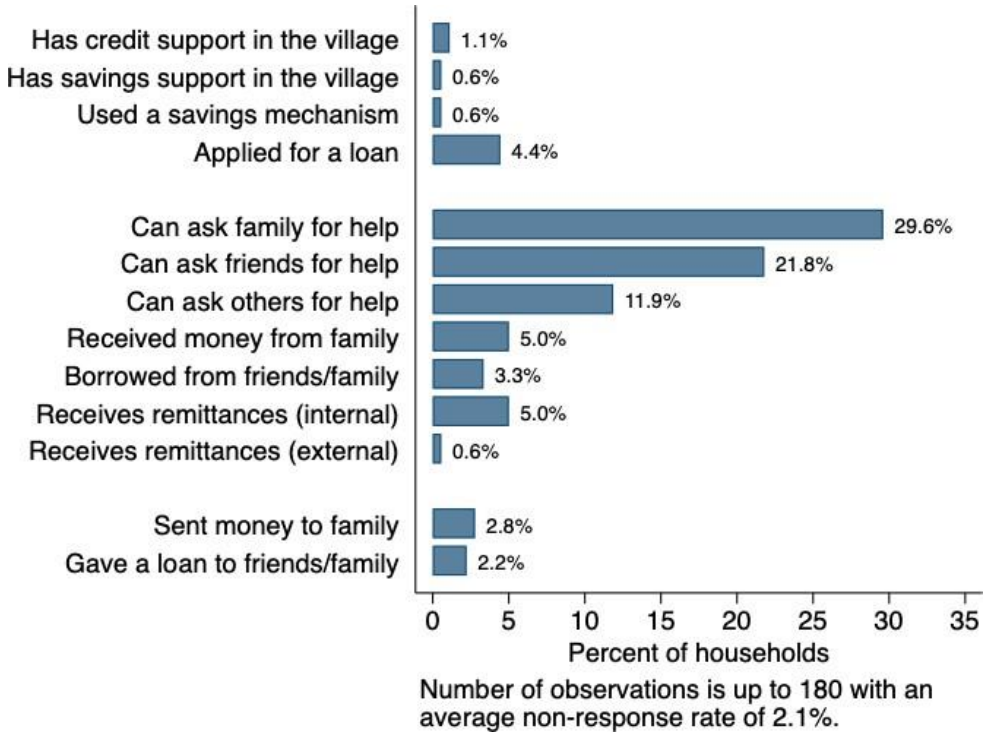
Appendix Figure 70: Reduced consumption-based coping strategies index (last 7 days),



N = 180, mean = 17.32, median = 17, 99th pctile = 50, max = 56.
Note: rCSI considers frequency and severity of 5 coping strategies used in the last 7 days. The lower the score, the more food secure is the household.

A.6.8 Financial outcomes and social capital

Appendix Figure 71: Financial outcomes and social capital, Aweil Centre



Number of observations is up to 180 with an average non-response rate of 2.1%.

Note: All values, except for social capital (asking for help) and remittances questions, refer to a period of the last 12 months. A savings mechanism includes a bank, savings bank, formal institution, village savings and loan association (VSLA) or other. Internal migration refers to remittances received from a person who migrated within the country, while external migration defines someone who migrated to another country. Non-responses refer to 'don't know' and 'refuse to respond' answers.

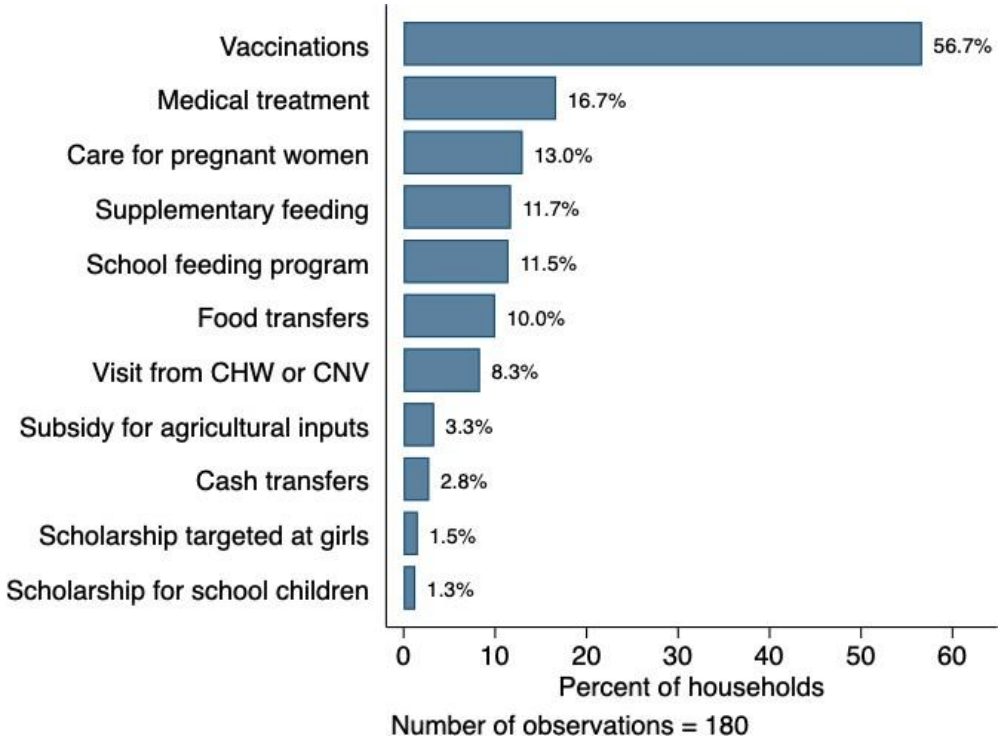
Appendix Table 32: Financial outcomes and social capital, Aweil Centre

	Mean	Standard Deviation	N
Savings mechanisms			
Balance of formal savings accounts	2.50	-	1
Amount deposited in the last 3 months	1.50	-	1
Amount borrowed in the last 12 months	12.50	17.92	8
Amount outstanding on the loan	1.26	1.34	8
Social capital			
Number of friends a household can ask for money	0.45	0.99	179
Number of community members a household can ask for money	0.33	1.10	177
Amount received from family	17.25	17.98	8
Amount borrowed from friends/family	4.60	2.47	6
Amount sent to family	22.00	17.38	4
Amount of the loan to friends/family	3.65	4.37	4

Note: These are household-level summaries for households that reported making a deposit in a savings institution, applied for credit, and made transfers with friends/family. Monetary values are shown in thousand SSP and winsorized at the 2nd and 98th percentiles.

A.6.9 Safety nets, health and livelihoods programmes

Appendix Figure 72: Programme participation (last 12 months), Aweil Centre



Note: CHWs and CNVs are community health workers and nutrition volunteers. Supplementary feeding is for children aged under 5 years, and pregnant or lactating women. Medical treatment excludes treatments for pregnant women.

Appendix Table 33: Programme participation details (last 12 months), Aweil Centre

	Mean	Standard Deviation	5%	95%	N
Cash transfers					
Number of transfers	3.00	0.00	3.00	3.00	2
Amount per transfer	8.67	5.69	4.00	15.00	3
Food transfers					
Number of transfers	3.56	2.99	1.00	12.00	16
Amount per transfer	8.75	5.35	1.50	21.00	15

Note: Amounts are shown in thousand SSP. For in-kind (food) transfers, the amount is the monetary equivalent of the transfer in SSP. Number of observations within the panel relating to a certain programme varies due to 'don't know', 'refuse to respond' and a few instances of misreported answers.

A.6.10 Psychosocial

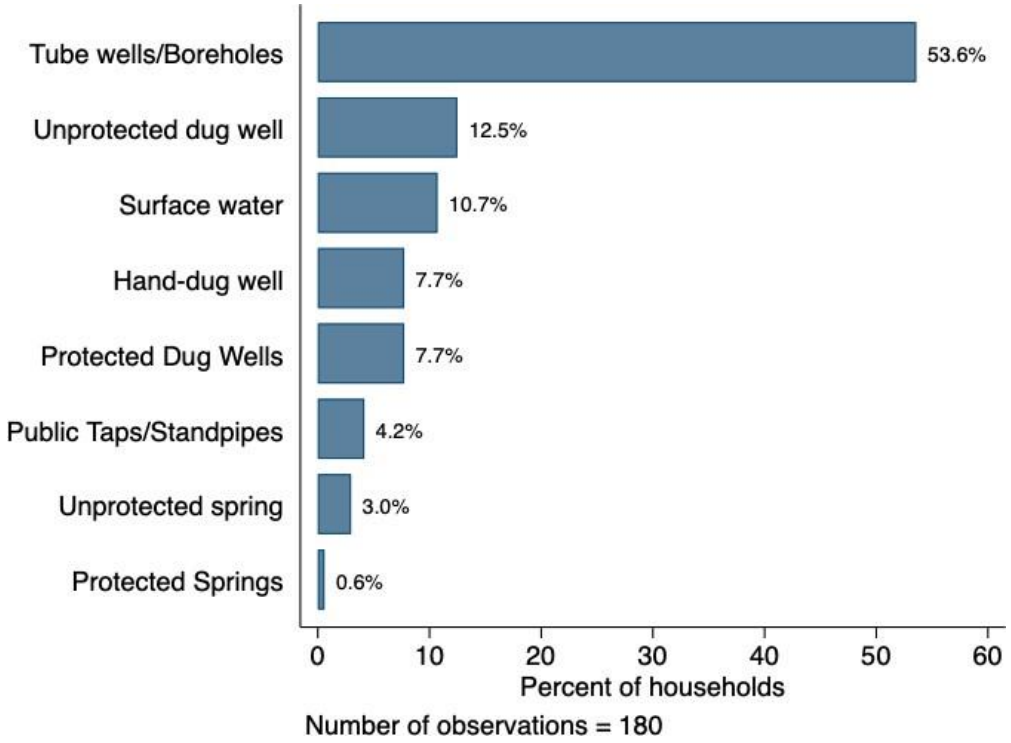
Appendix Table 34: Psychological well-being (last 7 days), Aweil Centre

	Mean	Standard Deviation	N
Panel A: Depression scale			
Mental health index: Less depression (0–70)	29.93	10.88	179
Details of daily life bothered you more than usual	2.68	2.47	180
Had trouble concentrating on what you were doing	2.37	2.07	180
Felt sad	2.84	2.25	180
Felt that everything you did took all your energy	3.25	2.11	180
Felt confident in the future (reverse scale)	4.24	2.29	180
Felt nervous, tense or worried	3.22	2.21	180
Had trouble sleeping peacefully	2.76	2.07	180
Felt happy (reverse scale)	4.59	2.09	180
Felt alone	1.96	2.23	180
Felt so tired that you couldn't do anything	2.02	1.86	179
Panel B: Disability scale			
Mental health index: Less disability (0–28)	9.26	5.22	180
Had a headache	2.46	2.08	180
Your digestion was bad	1.27	1.73	180
Had difficulty fulfilling family responsibilities	3.00	2.54	180
Had difficulties in your daily work	2.53	2.15	180

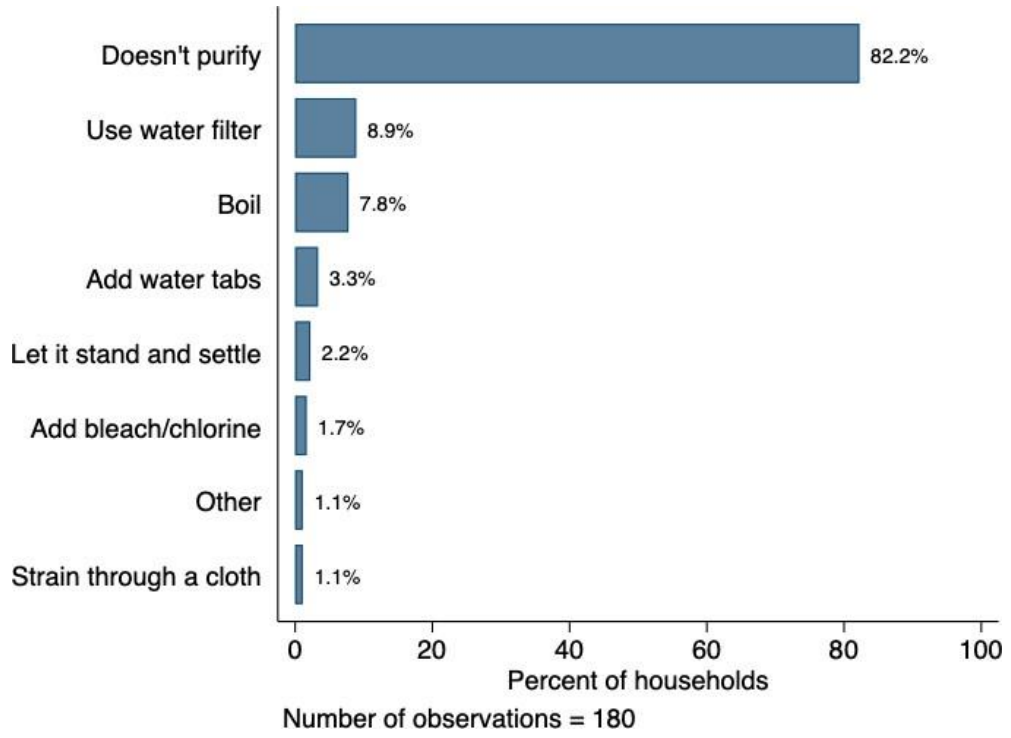
Note: Households were asked ten questions based on the Center for Epidemiologic Studies Short Depression Scale (CES-D-R 10) to measure depression and four questions from the Self-Reporting Questionnaire 20-Item (SRQ-20) to measure mental health disability. The questions were framed: In the last 7 days, how many days you felt a certain way? Higher scores for the Less depression and Less disability indices suggest higher risk of depression. Number of observations varies due to 'refuse to respond' answers.

A.6.11 Water, sanitation, and hygiene (WASH) outcomes

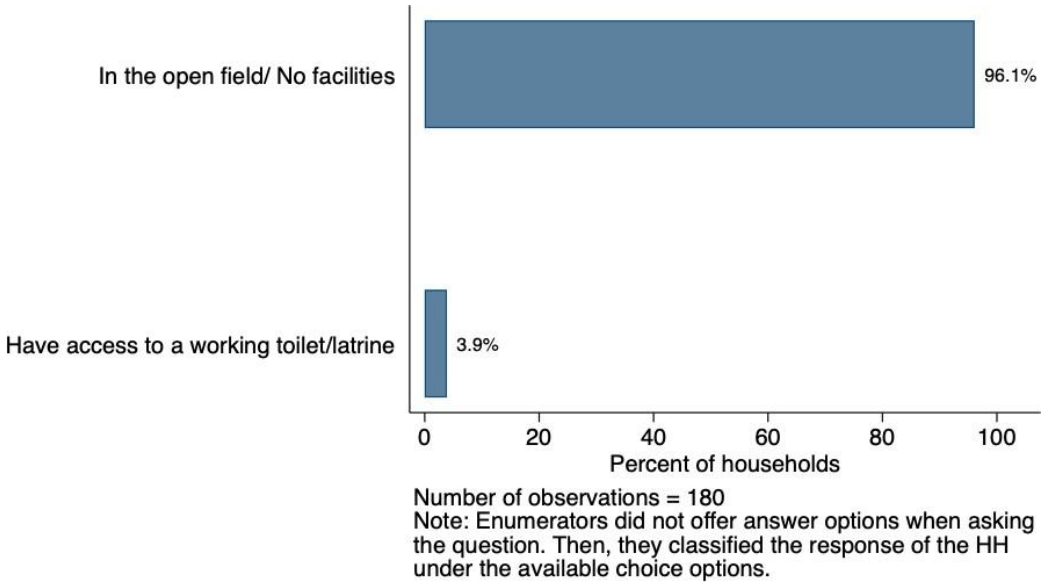
Appendix Figure 73: Main source of drinking water, Aweil Centre



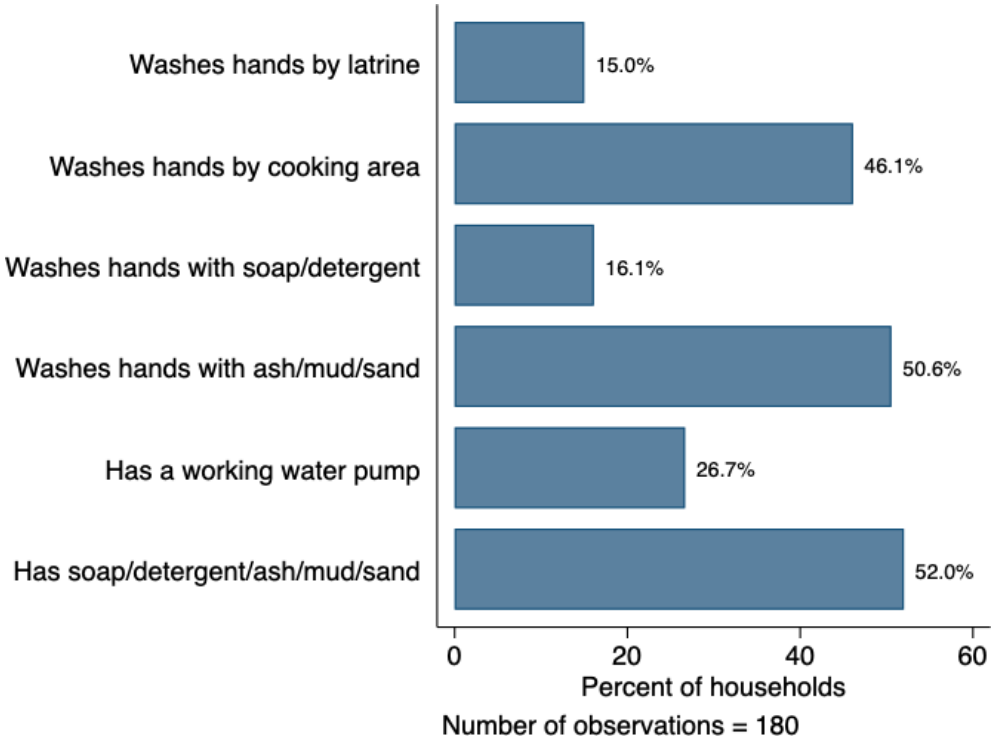
Appendix Figure 74: Methods used to make water safe to drink, Aweil Centre



Appendix Figure 75: Answer to "Where do you defecate most often" asked to HHH, Aweil Centre



Appendix Figure 76: Household behaviour, water, sanitation, and hygiene (responses by HH head), Aweil Centre



Note: The last two questions are reported from observation by the enumerator. For the last question (household has soap, detergent, ash, mud or sand), N = 100.

Acronyms

OEV	Office of Evaluation
AAA	Acronyms Acronyms Acronyms
CSP	Country strategic plan
DIME	Development Impact Evaluation Unit (World Bank)
FFA	Food-for-assets
IE	Impact evaluation
IRB	Institutional review board
RCT	Randomized controlled trial

Office of Evaluation

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