WFP EVALUATION

Resilience Learning in South Sudan

Impact evaluation endline report of a resilience programme jointly implemented by UNICEF and WFP

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Disclaimer

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Executive summary

1. In 2022, 349 million people were identified as "acutely food-insecure", with most of them (84 percent) living in countries where extreme weather events or conflict were the primary drivers of food insecurity.[1] In South Sudan, the number amounted to over 7.7 million people.[2] Four consecutive years of record flooding, alongside devastating drought, have led to widespread displacement, the destruction of livelihoods and the loss of arable land, which have all contributed to rising food insecurity. The effects of these concurrent climate shocks are compounded by rising food and fuel prices, and ongoing conflict.

2. Against this background, the World Food Programme (WFP) and the United Nations Children's Fund (UNICEF) have promoted an integrated approach to resilience building through a joint programme in South Sudan. Under this programme, communities and households are provided with sustained support in the form of a bundle of activities over four years with the aim of strengthening the ability of beneficiaries to withstand shocks. Programme activities are aimed at (i) meeting immediate food needs; (ii) increasing agricultural production; (iii) promoting livelihood support and diversification; and (iv) developing and increasing demand for services and building environments that foster resilience. The Joint Resilience Programme (JRP) in South Sudan consists of a range of components, including access to water, sanitation and hygiene, nutrition and health interventions, cash or food transfers for community asset creation, education programming, skills development and agricultural production.

3. The JRP has benefited from an impact evaluation that is part of the Climate and Resilience Impact Evaluation Window created by the WFP Office of Evaluation – Impact Evaluation Unit, the WFP Asset Creation and Livelihood Unit, and the Climate and Disaster Risk Reduction Unit in partnership with the World Bank's Development Impact Evaluation (DIME) department. South Sudan is unique in the Window in that the project and impact evaluation were implemented jointly with UNICEF.

4. This impact evaluation examines the impacts of the UNICEF-WFP JRP on household resilience. Taking resilience as a household's ability to adapt to its environment, absorb shocks and stressors and transform its capacity, the evaluation combines detailed baseline and follow-up data, covering broad household capacities, with high-frequency data, measuring food security and well-being dynamics over time.

5. The inception[3] and baseline reports[4] were published in 2022 and 2023, respectively. The impact evaluation was designed as a cluster randomized controlled trial (RCT) comparing 76 communities (encompassing 1,050 households) across three groups:

    I. Conditional support in 24 communities: Households received either cash or food transfers for work on community assets (WFP's "Food Assistance for Assets", or FFA).
    II. Unconditional support in 23 communities: Households received either cash or food transfers without any labour commitments (unconditional cash/food transfers, or UCTs).
    III. Comparison group in 29 communities: Households in this group did not receive cash or food transfers. These communities were not prevented from getting any other sources of support, but the joint programme did not have sufficient funding to cover them at the time.

6. The impact measurement strategy includes a baseline survey that was implemented before the intervention, four to six rounds of high-frequency surveys every two months during the intervention and an endline survey after the 2022 programme cycle ended. The impact evaluation also benefited from qualitative data that were collected in March–April 2023 as well as administrative records from programme teams.

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1 WFP. 2022. *Global Report on Food Crises: Joint analysis for better decisions*. World Food Programme.
2 WFP. 2021. WFP South Sudan Situation Report #294. World Food Programme.
3 WFP. 2022. *Impact Evaluation for Resilience Learning in South Sudan Inception Report*. World Food Programme.
4 WFP. 2023. *Impact Evaluation for Resilience Learning in South Sudan Baseline Report*. World Food Programme.

Highlighted results

7. **The livelihood intervention improved food security outcomes of participants, especially when measured by the Food Insecurity Experience Scale (FIES).** These findings imply that households mostly improved their ability to consume sufficient food and avoid negative events like skipping meals, but the impact evaluation observes less overall impact on improving overall dietary diversity.

8. **Livelihood improvements are significant and happen through various channels rather than a single income source.** Some programme households grew more food and earned more income from agriculture than similar households in comparison communities, while others invested in livestock or earned more wage income. Due to this diversified activity, the impact evaluation finds small improvements in multiple dimensions of income and assets rather than large improvements in any single income source.

9. **Food security impacts associated with livelihood activities are biggest after the harvest rather than during the lean season, when transfers take place.** The impact evaluation shows that households produce an additional 60 kg of food per year, or 8.5 kg per household member. This may be enough to boost food security in the period immediately after the harvest, but possibly not enough to boost food security for the whole year, as this translates to only an additional 0.7 kg of food per member per month. Future programming should consider ways to help households not just improve, but also smooth their consumption over the year – for example, by helping participants budget their income, access savings and loans or link with markets, or by experimenting with changes to the timing of transfers.

10. **FFA and UCT had a similar contribution to increased food security, but FFA had a stronger impact on agricultural production, while UCT was more effective at increasing asset ownership and wage labour outside of the household.** Given that FFA interventions are more costly to implement, tracking livelihood strategies over a longer term would be important to understand the future returns from the increases in agricultural productivity.

11. **The UNICEF education package had a sizeable and statistically significant impact on retention rates among eligible children.** Children going to a UNICEF-supported school during the 2021 academic year were 15 percentage points more likely to still be in school at the start of the 2022 academic year, as compared to children going to comparison schools. Nevertheless, this impact became smaller and consequently statistically insignificant when measured again at the start of the 2023 academic year. There was no observed impact on test scores. At the same time, children's education outcomes improved as a result of livelihood programming (FFA). Children living in a household receiving livelihood support are about 12 percent more likely to be in school as compared to their counterparts in households that do not benefit from livelihood support.

12. **While nutritional and health interventions could not be randomized, we observe correlations between nutritional and health outcomes and the distance to nutrition facilities and health centres.** The negative correlation between nutrition and health outcomes and distance to facilities suggests that there may be room to increase the mobility of such services to reach more households if the catchment area of a clinic is too large. This can be achieved through more community nutrition volunteers or better incentives to help them reach the farthest-away households.

13. **These results can feed into the design of upcoming cash transfer programming in South Sudan** and inform the implementation of the current Country Strategic Plan,[5] which focuses on the achievement of zero hunger objectives while contributing to peace and climate resilience, as well as of South Sudan's UNICEF Country Programme, which promotes inclusive and quality learning, among other objectives.[6]

5 WFP. 2022. *South Sudan Country Strategic Plan (2023–2025)*. World Food Programme.
6 UNICEF. 2023. *South Sudan Country Programme 2023–2025.* United Nations International Children's Emergency Fund.

1. Introduction

14. The Climate and Resilience Impact Evaluation Window establishes portfolios of impact evaluations across a series of countries, utilizing the same or very similar designs to increase generalizability of results. The first round of impact evaluations aims to understand how World Food Programme (WFP) Food Assistance for Assets (FFA), or integrated programming layered on FFA activities (depending on the country), contributes to resilience.

15. The concept of resilience has gained attention because it recognizes the importance of addressing shorter-term humanitarian needs while simultaneously supporting communities in their efforts to cope with future crises induced by climate change, conflict and other factors. Many institutions, including the WFP, have increasingly used this concept of resilience as a basis for their programming. In addition, United Nations Children's Fund (UNICEF) supports South Sudan's efforts to advance maternal, newborn, child and adolescent health and nutrition, invest in climate-resilient water, sanitation and hygiene (WASH), promote inclusive and quality learning, protect children from violence, abuse and exploitation, and support child-sensitive social policies, public finance management and social protection measures. The goal is to ensure that children not only survive but thrive.

16. In December 2019, UNICEF and WFP signed a multi-year agreement with Germany's Development Bank, KfW, for the implementation of a three-year resilience project to be funded by the German Federal Ministry for Economic Cooperation and Development (BMZ). In December 2020, the project was extended until December 2023 and additional funds were released. Given this context, UNICEF, WFP and the World Bank's Development Impact Evaluation (DIME) department, with support from BMZ through KfW, have collaborated to build evidence on how multiple interventions can boost the resilience of vulnerable households in South Sudan.

17. The report begins by describing the country context and the programme itself. This is followed by a discussion on the evaluation methodology and design, limitations and ethical considerations. The report then describes the different data sources and tools used, and moves on to a discussion of project implementation. It then presents the results, combining findings from endline and high-frequency surveys to conduct regression analysis on key pre-specified outcome variables. Lastly, the report discusses the main findings and lays out conclusions and considerations that follow on from the results.

Country context

18. South Sudan became an independent country in 2011 following decades of war and conflict. Independence was followed by a return to widespread armed conflict and insecurity, which has resulted in poor economic growth, displacement and worrying development trends. The security situation remains fragile, and subnational conflict continues to disrupt humanitarian operations across the country. For instance, there has been an increase in the number of violent incidents perpetrated by young men across South Sudan due to grievances related to a lack of employment opportunities, which disrupted humanitarian access and operations in Renk, Torit and the Greater Pibor Administrative Area.[7]

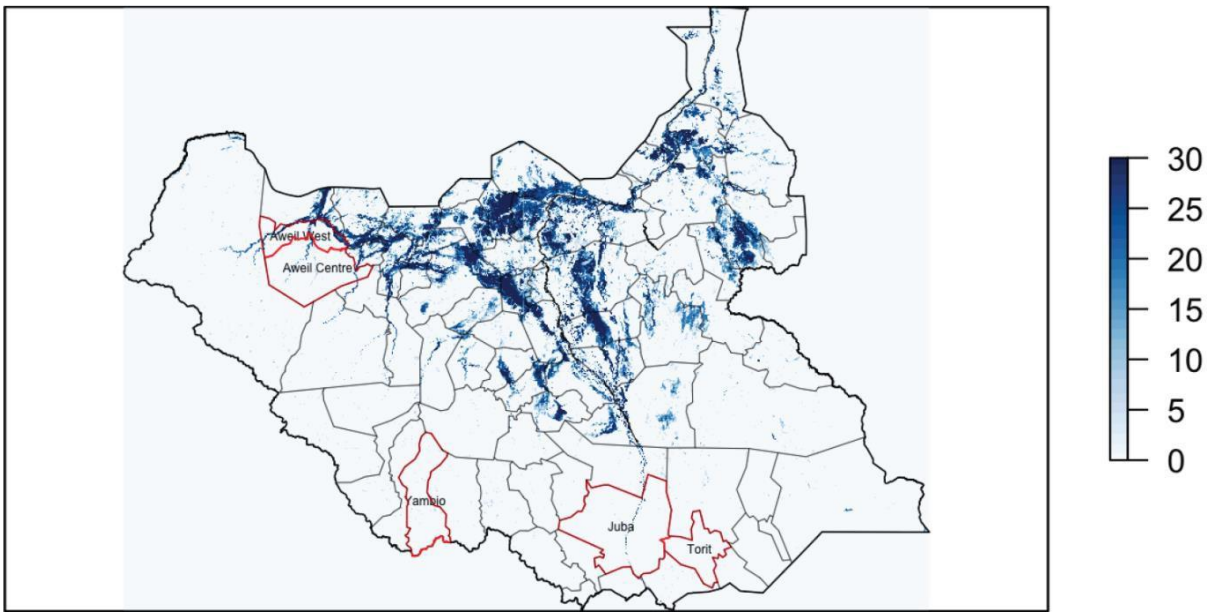
19. The number of people requiring humanitarian assistance has almost doubled in the last decade, from 4.6 million in 2013 to 8.9 million in 2022, while the population of the country has remained relatively stable at around 11 million.[8] Based on the Integrated Food Security Phase Classification, at least 7.7 million people, including refugees, faced severe food insecurity (IPC 3 and above) during the 2022 lean season.[9] In 2021, 7.2 million were in a similar situation.[10] Moreover, 302,078 children and 675,548 pregnant and lactating women were at risk of severe acute malnutrition, and 1 million children faced

7 WFP. 2021. *South Sudan Annual Country Report*. World Food Programme.
8 WFP. 2022. *South Sudan Annual Country Report*. World Food Programme.
9 WFP. 2022. *South Sudan Annual Country Report*. World Food Programme.
10 WFP. 2021. *South Sudan Annual Country Report*. World Food Programme.

moderate acute malnutrition in 2022, which represented an increase of 100,000 individuals as compared to 2021.[11]

20. Importantly, 2022 was the fourth consecutive year when South Sudan faced widespread flooding.[12] Severe floods affected 1.1 million people from 39 of the 79 counties starting in August 2022. The worst affected were the Northern Bahr el Ghazal, Warrap, Unity, Upper Nile and Western Equatoria states (as can be observed in Figure 1). Among the affected, 600,000 were children.[13] WFP and UNICEF have highlighted that the exceptional 2022 flooding destroyed homes, livelihood assets, food crops and livestock, water infrastructure and other essential services such as education, health and nutrition facilities. In turn, these events have diminished people's ability to recover from natural shocks or other socioeconomic shocks. UNICEF further argues that flood-induced temporary school closures have not only disrupted learning for approximately 430,000 children, but they have also exposed them to a variety of other risks such as early marriage, child labour and other forms of abuse.[14]

Figure 1: Worst flood month, days of flooding in October 2022



Disclaimer: The designations employed and the presentation of material in the map in Figure 1 do not imply the expression of any opinion whatsoever on the part of WFP concerning the legal or constitutional status of any country, territory or sea area or concerning the delimitation of frontiers. The final boundary between the Sudan and South Sudan has not yet been determined. Authors' processing of publicly available shapefiles and flooding Advanced Disaster Analysis and Mapping data (https://gis.wfp.org/adam). Scale is days of flooding experienced in October 2022. Data collection counties are outlined in red on the map.

21. In 2022, WFP reported that 65 percent of all school-aged children remain out of school.[15] In fact, South Sudan has the highest proportion of out-of-school children in the world.[16] High levels of poverty, years of conflict, the impact of COVID-19 and recurrent climate-related crises have left approximately 2.8 million girls and boys out of school.[17]

11 WFP. 2022. *South Sudan Annual Country Report*. World Food Programme.
12 WFP. 2021. *South Sudan Annual Country Report*. World Food Programme; WFP. 2022. *South Sudan Annual Country Report*. World Food Programme.
13 UNICEF. 2022. *South Sudan Annual Country Report*. United Nations Children's Fund.
14 UNICEF. 2022. *South Sudan Annual Country Report*. United Nations Children's Fund.
15 WFP. 2022. *South Sudan Annual Country Report*. World Food Programme.
16 WFP. 2022. *South Sudan Annual Country Report*. World Food Programme.
17 WFP. 2022. *South Sudan Annual Country Report*. World Food Programme.

22. Inflation also continues to be a prominent problem in South Sudan. According to the International Monetary Fund, the average consumer prices in South Sudan had increased in 2021 by 30.3 percent to 2020, compared with an average increase of 12.8 percent for the Africa region as a whole.[18] Moreover, inflation has a broad approach to tracking the prices of goods and services. The average cost of the Minimum Expenditure Basket, what a household strictly needs to meet its essential food and nutrition needs, increased by 108 percent in December 2022 as compared to December 2021.[19]

23. A key focus of WFP's CSP in South Sudan (2023–2025) is to address inequality and isolation by scaling up resilience-building activities in food insecurity hotspots, reducing organized violence and mitigating the impacts of climate shocks. WFP targets several outcomes, including saving lives, protecting the livelihoods of crisis-affected populations, and supporting and safeguarding human capital gains via integrated nutrition, health and education services.

24. In parallel, UNICEF supports South Sudan's efforts to advance maternal, newborn, child and adolescent health and nutrition, invest in climate-resilient water, sanitation and hygiene (WASH), promote inclusive and quality learning, protect children from violence, abuse and exploitation, and support child-sensitive social policies, public finance management and social protection measures. These efforts are highlighted in the Country Programme Document (2023–2025). The goal is to ensure that children not only survive but thrive.

25. Given this context, UNICEF, WFP and the World Bank DIME team, with support from BMZ through KfW, have collaborated to build evidence on how multiple interventions can boost the resilience of vulnerable households in South Sudan. More details on the evaluation background and design can be found in the inception report.

18 Data retrieved as of December 2023 from the IMF DATAMAPPER, https://www.imf.org/external/datamapper/PCPIPCH@WEO/VEN/IRN/ARG/SSD/SDN/AFQ, (accessed on 25 July 2024).
19 WFP. 2022. *South Sudan Annual Country Report*. World Food Programme.

2. Programme description

26. The WFP-UNICEF Joint Resilience Programme (JRP) in South Sudan provides a platform for enhanced impact through a comprehensive package of services delivered to vulnerable communities in urban and peri-urban settings. It also supports the enhancement of community resilience to shocks and stressors by increasing access to services in different thematic areas, such as education and child protection, health, WASH, nutrition, food security and livelihoods. By providing a full package of services, the JRP aims to build the absorptive, adaptive and transformative capacities of vulnerable communities overall, which can translate into improved resilience in the long run. The first phase of the JRP started in January 2020 with the implementation of activities in the (peri-)urban settings of the Juba, Torit and Yambio counties. In January 2021, the project was extended to include the Northern Bahr el Ghazal state.[20]

27. The JRP includes a range of interventions that fall under three broad categories, which have also been used to shape the structure of the impact evaluation: (i) livelihood activities; (ii) school-based programming; and (iii) health, nutrition, water, sanitation and hygiene activities. The planning of these interventions is supported through the community-based participatory planning (CBPP) process. Livelihood interventions are intended to catalyse growth, while the schooling and health facilities ensure access to basic services.

Livelihoods component

28. **The livelihoods component** uses villages as entry points for interventions. The central activity within this component is the FFA implemented by WFP.[21] It is intended to meet the immediate food needs of households (through different transfer modalities) while restoring degraded landscapes, improving water harvesting, reducing the risk of environmental disasters and creating community assets to secure ecosystems. At the same time, FFA activities are also done to increase agricultural and pastoral productivity and yields, support economic development, and strengthen social ties between community members and villages. Given that most people in the areas where the programme takes place rely on subsistence agriculture to cover their food needs, supporting this livelihood is one of the main objectives of the programme. Normally, FFA activities support beneficiaries on a three-year cycle with six months of food or cash transfers per year, which generally coincides with the lean season. Importantly, as part of the impact evaluation, not all beneficiary households were required to work to receive their transfers. The distinction between conditional and unconditional support is further developed in section 3, which describes the impact evaluation designs.

29. **Assets** are selected using a CBPP,[22] which is done at the level of the boma (a set of villages). A group of people convenes to (i) outline the assets communities will work on; (ii) recommend vulnerability criteria; (iii) identify livelihood groups and whether they shift across seasons (fishers, farmers); (iv) identify wealth groups; (v) discuss risks faced by the community and opportunities around livelihoods; and (vi) identify the main problems faced by the various wealth groups. Some of the assets identified

20 Data retrieved as of December 2023 from the IMF DATAMAPPER, https://www.imf.org/external/datamapper/PCPIPCH@WEO/VEN/IRN/ARG/SSD/SDN/AFQ, (accessed on 25 July 2024).

21 FFA was renamed "Asset Creation and Livelihoods (ACL)" in 2023. For consistency, we refer to the programme as "FFA" throughout the report.

22 WFP, government technical services, local authorities and local communities contribute to the identification of sites. Once sites have been identified, a group of surrounding villages participates in the CBPP process to identify which priority interventions, including the livelihood assets, the communities will build. This provides a platform for inclusive community engagement, in which the most vulnerable, marginalized and disempowered have a voice in community decisions. Participatory planning facilitates agreements for access to land and water resources for women's groups, youth, refugees, the internally displaced, returnees and the very poor.

during the CBPP are built jointly by a set of villages.

30. Table 1 includes the inventory of assets that were implemented in 2022 in the counties of interest. Asset work is typically scheduled between April and September, with several exceptions that are context specific. See Figure 2 for the calendar.

Table 1: Examples of assets

Location	Examples of assets implemented during the 2022 livelihoods programme
Juba	Land clearing and plantation, vegetable gardening, tree nurseries, seedling production and plantation. Community access road construction or rehabilitation, pit latrine construction.
Yambio	Land clearing and plantation, vegetable gardening, tree nurseries, seedling production and plantation, fishpond excavation. Community access road and shallow well construction or rehabilitation.
Torit	Land clearing and plantation. Community access road construction or rehabilitation.
Aweil West and Centre (Northern Bahr el Ghazal)	Land clearing and plantation, vegetable gardening, weeding, harvesting, tree nurseries, seedling production and plantation. Community access road construction or rehabilitation, water channels, dike construction and maintenance.

31. **Household targeting** is done at three different levels: county, payam and boma (a set of villages). Beneficiary households within an asset site are identified using a household-level targeting exercise. Households are categorized into four socioeconomic groups: very poor, poor, medium to well-off and better-off. Once bomas are chosen, WFP uses the output of the CBPP process (i.e. the wealth classifier) to target the very poor and poor.[23]

32. **Level of support:** In South Sudan, beneficiaries are paid approximately USD 40.5 per month for six months. There was one exception in Aweil Centre, whereby the overall support was halved due to budgetary constraints. The level of support is determined to enable households to meet their minimum food and nutritional needs, which often depend on meeting other essential needs.[24]

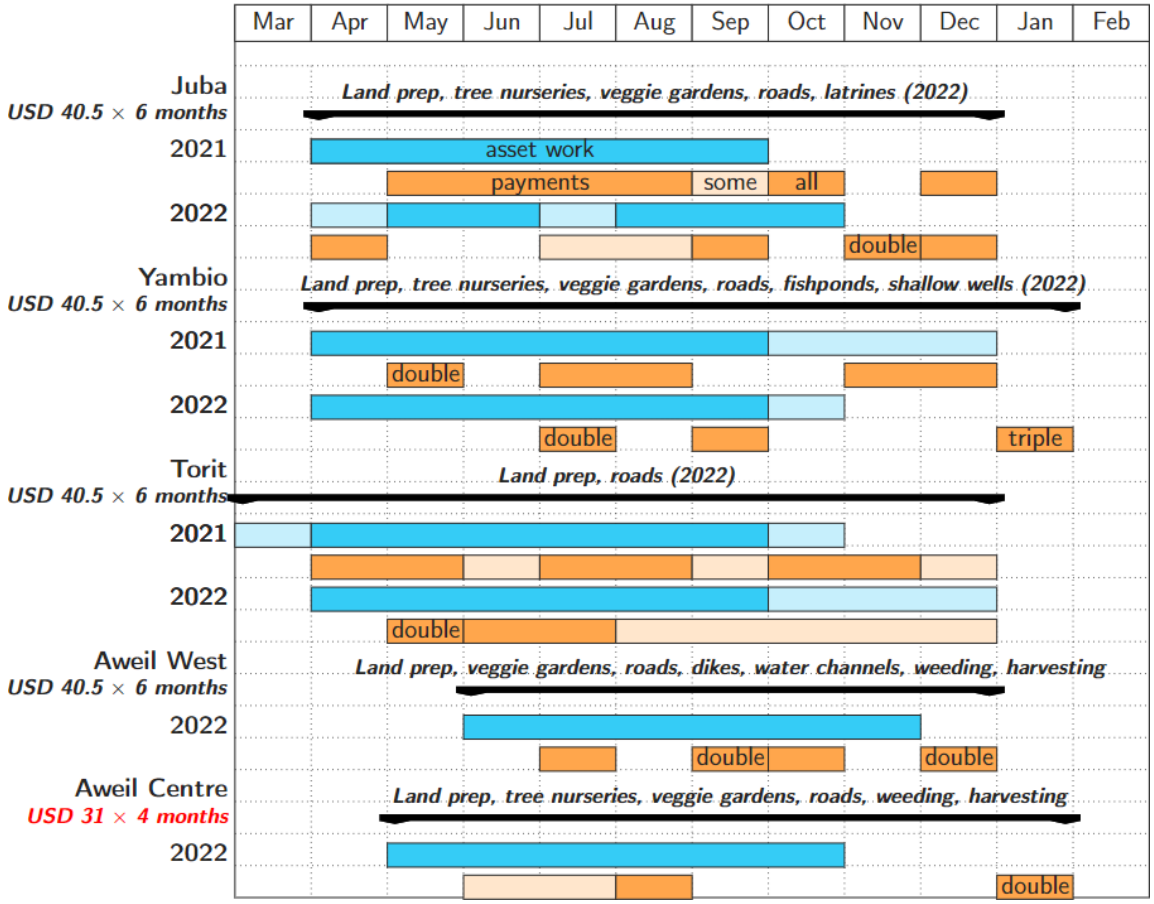
Table 2: County-specific transfer modalities

Transfer modality	Counties where transfer modality applies
Cash support	Juba, Yambio, Aweil Centre
In-kind support	Torit, Aweil West

23 It can happen that the targeted individuals come from all villages within the boma, but it can also happen that not all villages within a boma are targeted. For instance, if one village is better off compared with neighbouring villages in the boma, then individuals from this better-off village will not qualify for WFP support.

24 WFP defines essential needs as the essential goods and services required by households to ensure long-term survival and minimum living standards, without resorting to negative coping. To inform the level of support, two main sources of information are used: (i) household surveys with a consumption module and (ii) market surveys with price data. The data is analysed to describe the cost of the average, typical and recurrent consumption pattern for those who are just able to meet their essential needs. Thereafter, the gap between (i) the cost of meeting these minimum food and nutrition needs and (ii) what households can pay for themselves is calculated. The value of this gap then informs the level of support to bring households to the point where they can meet their essential needs.

Figure 2: Observed asset and transfer (cash and in-kind) schedules



Note: Juba, Yambio and Torit were part of the impact evaluation for two consecutive years (programme cycles): 2021 and 2022. In contrast, the counties of Aweil West and Centre in Northern Bahr el Ghazal were observed once during the 2022 programme cycles. Blue is for the schedule of asset activities, and orange is for the schedule of transfers. Light-shaded cells denote transfers or assets that happen in some (but not most) of the villages in each county. Dark-shaded cells indicate transfers and asset activities that happen for most (or all) villages during the observed month. There are instances of multiple transfers – i.e. double or triple – whereby more than one month of benefits was paid at the same time. Lastly, villages in Aweil Centre were affected by budget cuts, resulting in transfers being half of what the other counties received. While the rounded average was of USD 31/transfers in Aweil Centre, the exact transfer figures were as follows: USD 40.5, USD 27, USD 23 and USD 35.

33. **Cash versus in-kind support:** The transfer modality is county specific, and it was not randomized. Some counties received cash and others food (e.g. sorghum, beans, oil and salt). See Table 2. The payment modality is chosen after the context of each county is carefully explored to conclude whether local markets can meet the additional demand for the commodities that cash transfers may cause. Additionally, food support is also occasionally preferred to cash in the context of South Sudan to avoid tense situations or conflict within households. Regarding the cash modality, the conversion from USD to South Sudan Pounds (SSP) is done at the United Nations exchange rate on the month of the transfer. Each month, households receive a different SSP amount depending on the rate on the day of the payment.

Education component

34. The education component uses schools as entry points for interventions. The school-based activities are implemented by both UNICEF and WFP and are intended to create safe, healthy and productive learning spaces for children. There are three broad activities: (i) ensuring food security and nutrition through school feeding, (ii) offering educational activities focusing on technical, psychosocial and vocational capacity building, and (iii) behavioural interventions to improve the well-being and resilience of children and youth.

35. While UNICEF and WFP have both implemented school-based activities, the focus of this evaluation falls on the UNICEF package, as access to this package was randomized to be part of the impact evaluation. WFP interventions are largely present in all UNICEF-supported schools, as the programme implementation strategy prioritized co-location of activities, so this analysis estimates the impact of integrating UNICEF interventions into existing WFP ones.

36. **Context:** Schools resumed teaching in May 2021 after they were closed for longer than a year due to COVID-19. The 2021 academic year ended in March 2022. Then schools reconvened in April 2022, and the 2022 academic year ended in January 2023. The 2023 academic year was ongoing at the time of endline data collection. According to the Ministry of General Education and Instruction, the recommended class size for primary education is 50 learners in South Sudan.[25] The medium of instruction in pre-primary and from Primary 1 to Primary 3 is a national language selected by the school. Thereafter, instruction is in English. There are approximately 5,000 primary schools in South Sudan. Not all of them offer all grades from Primary 1 to Primary 8. On the one hand, few children reach the upper grades: low demand. On the other, teachers may not always be available to teach the higher grades: low offer. As of 2023, primary school fees have been eliminated.

Table 3: Number of programme-targeted schools

County or state	Number of schools
Juba	21
Yambio	21
Torit	21
Northern Bahr el Ghazal	22
Total	**85**

37. **Targeting:** The programme initially identified 53 schools for the co-location of UNICEF and WFP school-based interventions. As the project was scaled up, 85 schools were targeted as of January 2023.

38. **UNICEF interventions:** UNICEF packages in the 85 targeted schools include: back-to-school campaign, school and education supplies (e.g. literacy, numeracy and learning materials, teachers' kits, recreational kits and dignity kits), training for parent–teacher associations (e.g. management of meetings, community resource mobilization for school development and advocacy skills), training and mentoring for teachers (e.g. training on literacy and numeracy, national language, basic pedagogy and peacebuilding skills), the creation of peace clubs, lessons on life skills and peacebuilding, and capacity building for school management. Moreover, UNICEF has assessed the infrastructure needs of schools and built classroom and latrine blocks where necessary and dug boreholes for access to clean water.

39. **WFP interventions:** In parallel, WFP implemented the following package of interventions: school feeding (either take-home rations or on-site meals), deworming and the creation of school gardens, the latter of which has also served as a platform to discuss dietary diversity and good nutrition.

25 Government of the Republic of South Sudan. 2021. *Reopening Guidelines for Schools in South Sudan*.

Health, nutrition and WASH components

40. The health, nutrition and WASH components use health, nutrition and school facilities as entry points for interventions. For instance, WASH interventions have been implemented in either primary health-care facilities or schools based on assessments of the existing infrastructure. The interventions include: (i) activities for improving health facilities (e.g. support for routine immunization services delivery, vaccination campaigns including fixed and outreach vaccination sessions, provision of cold chain equipment for vaccine storage, training of vaccinators, supportive supervision, and rehabilitation and construction of state vaccine stores and health facilities); (ii) awareness activities to support households and caregivers to adopt best practices in child feeding, childcare, hygiene and sanitation, health and nutrition; and (iii) improving access to water and latrines on the premises of schools and primary health-care units.

Table 4: Number of targeted health and nutrition facilities

County or state	Targeted health facilities	Targeted nutrition facilities
Juba	15	37
Yambio	15	9
Torit	15	20
Aweil Centre	1	8
Aweil West	1	
Aweil East	2	
Aweil North	1	
Total	**50**	**74**

Note: The health and WASH subcomponents were mainly led by UNICEF, while the nutrition activities were a joint UNICEF-WFP effort. The programme reached 50 health-care facilities and 74 nutrition facilities.

3. Evaluation design and methodology

41. This impact evaluation estimates the impacts of the UNICEF-WFP JRP on household well-being, livelihoods, education and ultimately resilience.

Evaluation theory

42. The concept of resilience has gained attention because it recognizes the importance of addressing shorter-term humanitarian needs while simultaneously supporting communities in their efforts to cope with future crises induced by climate change, conflict and other factors. Many institutions, including WFP and UNICEF, have increasingly used this concept of resilience as a basis for their programming.

43. A growing literature documents positive welfare gains from integrated resilience and livelihood programmes at a single point in time (Banerjee et al., 2021; Haushofer and Shapiro, 2018; Macours et al., 2022). Much of this evidence focuses on only a single welfare measure and very few studies come from the most shock-prone and high-poverty countries. There is particularly a lack of evidence on whether these interventions can help households cope with seasonality and shocks, and transition more permanently out of poverty.

44. The resilience impact evaluation in South Sudan is part of a window of coordinated impact evaluations of WFP programming aiming to fill this gap. WFP and its partners are implementing the same RCT across four countries (South Sudan, Niger, Mali and Rwanda) to estimate the impact of integrated

resilience programmes – with FFA as the entry point – on welfare dynamics. The theory of change for the resilience programme assumes that supporting communities through multiple activities focusing on various outcomes will: (i) support people to ensure their short-term well-being; and (ii) enhance people's capacity to maintain and improve well-being while facing shocks and stressors.

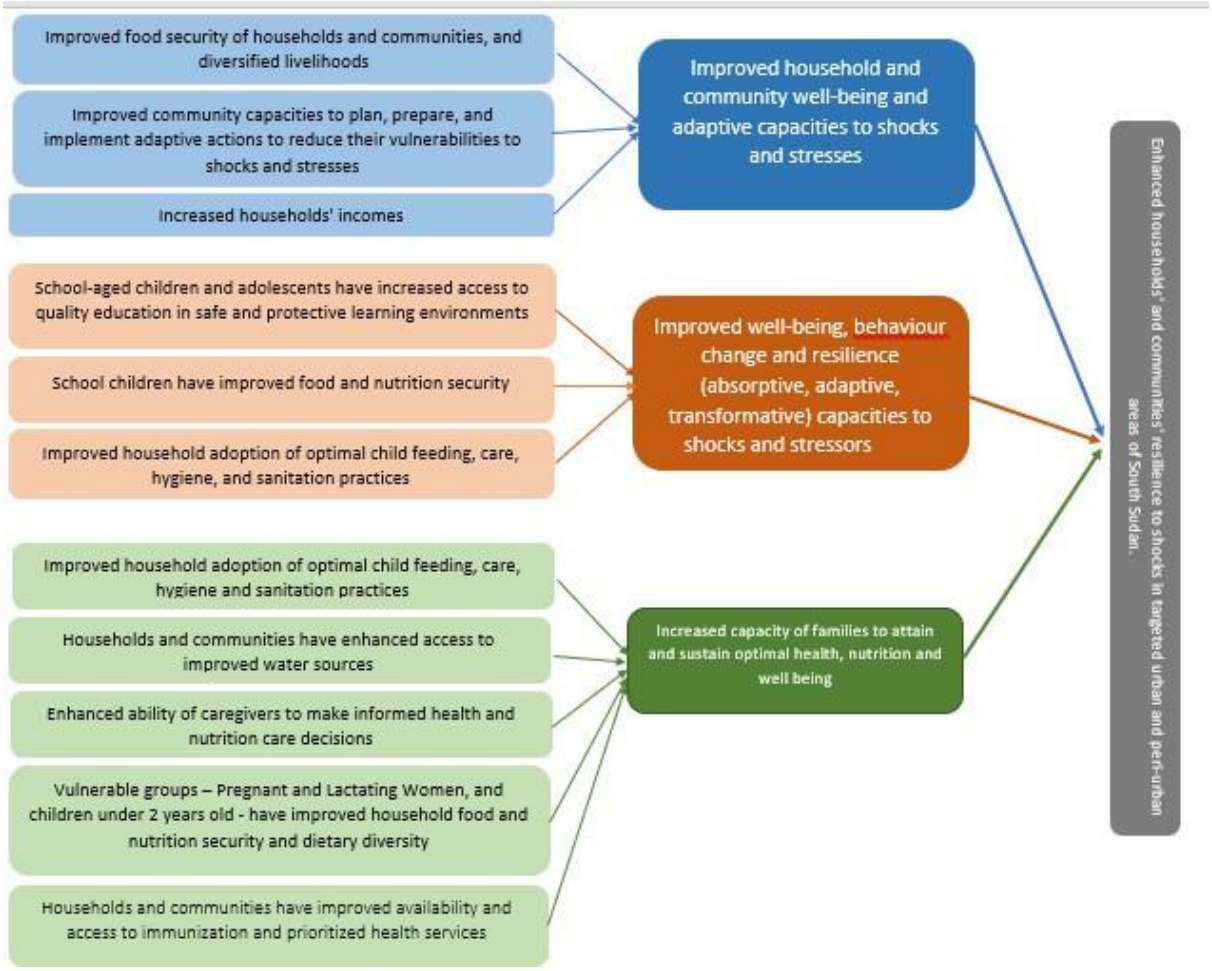
45. The resilience impact evaluation in South Sudan aims to test the following hypotheses:

    - **Hypothesis 1:** The programme will support people to maintain their food security by meeting a household's immediate needs through food or cash transfers. The effects of activities focused on meeting immediate needs are reflected mainly in:
        - household-level food consumption;
        - household-level health and nutrition outcomes; and
        - the coping strategies of households.

    - **Hypothesis 2:** The resilience programme will support households experiencing multiple and/or recurring shocks and stressors by improving capacities that are associated with maintaining and/or improving food security and health/nutrition. These capacities ultimately drive the effect on household consumption, nutrition and health detailed above. They include, but are not limited to:
        - livelihood activities (how income-generating opportunities and labour market opportunities change, with a focus on agriculture, livestock, non-farm business and wage labour);
        - time use (how households allocate their time across productive activities);
        - educational outcomes (how educational needs within the household are met);
        - household assets (how assets are accumulated);
        - financial outcomes (how loans, savings and expenses fluctuate); and
        - variations in food consumption over time.

46. Additionally, the impact evaluation in South Sudan examines questions that were not studied in other countries. Building on the programme's own theory of change, shown in Figure 3, the impact evaluation was able to design arms isolating the impact of particular combinations of programme components. This included testing the value added of asset creation activities beyond cash/food transfers alone, the integration of UNICEF and WFP education interventions, and descriptive analysis examining the integration of livelihood interventions and health, WASH and nutrition interventions.

Figure 3: Programme theory of change



Evaluation questions

47. The following were primary evaluation questions (EQs) drawn from the cross-country resilience Window:

    EQ 1: What is the impact of livelihood programmes on household resilience (e.g. by comparing households receiving any programme support with a comparison group)?
    EQ 2: What is the added value of asset activities beyond the impact of transfers alone (e.g. by comparing FFA with UCT)?

48. In addition, through consultations with the WFP and UNICEF country offices, the following questions were added to the evaluation in South Sudan:

    EQ 3: What is the impact of the UNICEF education package on top of WFP school programming?

    EQ 4: Does integrated programming lead to better resilience outcomes?

    EQ 5: How does distance from health, WASH and nutrition facilities influence take-up and use of the assistance provided?

Several additional questions were initially included in the evaluation, but implementation challenges made it impossible to answer them:

EQ 6: Can de-linking the timing of FFA cash and food transfers and asset-building activities improve the benefit for communities?[26]

EQ 7: If communities have the opportunity to update lists of targeted beneficiaries, how do newly selected households compare with those selected through the current targeting process?[27]

EQ 8: How do community nutrition volunteers (CNVs) and access to nutrition facilities relate to child outcomes?[28]

49. Where possible, subgroup analysis was done to examine the differential impacts of the programme by important demographic characteristics. Particular focus was given in South Sudan to the gender of the household head and whether a household cultivated land.

Evaluation designs

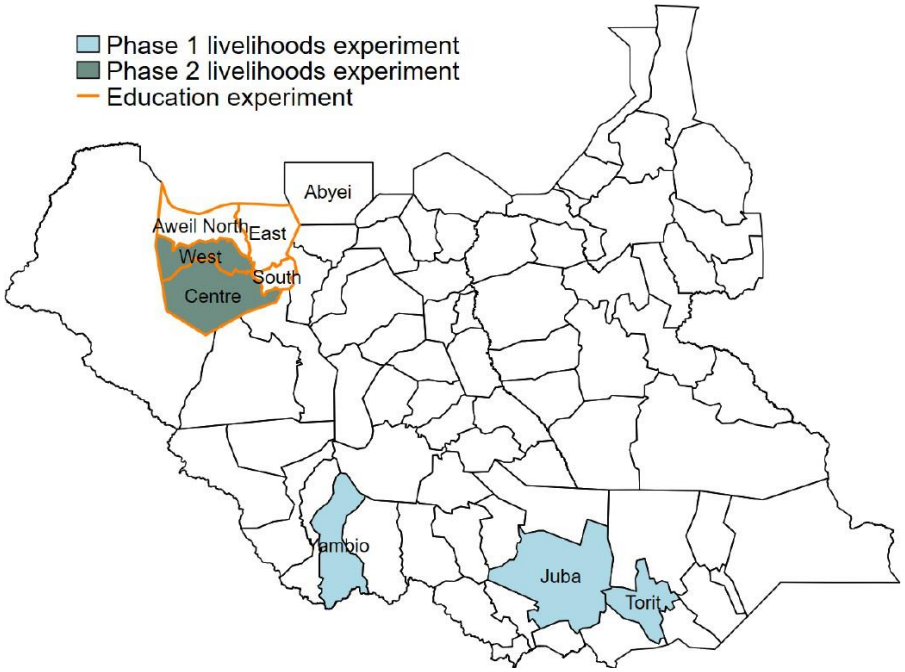
50. The impact evaluation of the JRP in South Sudan includes experimental and non-experimental methods to answer the EQs. The experimental method – that is, RCTs – compares groups of households that were randomly assigned to treatment with control groups (thereafter referred to as "programme" and "comparison" groups) to estimate the causal effects of project interventions.[29] Meanwhile, non-experimental methods are used to describe the correlation between interventions and the outcomes of interest.

51. The impact evaluation in South Sudan comprises (i) an experimental livelihoods component to estimate the impact of the cash and food assistance interventions implemented by WFP; (ii) an experimental education component to evaluate the impact of the UNICEF education package; and (iii) several non-experimental explorations to assess the importance of having access to health and nutrition facilities as well as to ascertain if the inclusion of interventions creates additional value.

52. Figure 4 maps the locations where the experimental designs (the livelihoods and education RCTs) were implemented. The non-experimental component of the impact evaluation is based on data collected for the experimental designs. Figure 4 also shows how the livelihoods RCT was scaled up from 25 villages in Juba, Yambio and Torit in 2021 (Phase 1) to include 51 additional villages from Aweil West and Aweil Centre (Northern Bahr el Ghazal state) in 2022 (Phase 2). The expansion provided the opportunity to increase the statistical power of the experiment to detect impacts.

26 A de-linking pilot was conducted in Juba, Yambio and Torit in 2021, but proved to be challenging for programme teams to implement in a way that adhered to the research design. This pilot was not scaled up in 2022, leading to this evaluation question (EQ) being dropped from the study.
27 A retargeting experiment was also conducted in Juba, Yambio and Torit in 2021, but proved to be infeasible to implement in practice. It was later dropped from the study.
28 The evaluation team spoke at length with the UNICEF nutrition team about designing experiments to test this, but it was decided that the programme could not vary the number of CNVs or their activities in a way that would result in programme learning without increasing resources. This EQ was therefore dropped from the study.
29 Control groups are used to construct credible counterfactuals, estimating what would have happened in the absence of an intervention. Households assigned to control do not benefit from the randomized intervention.

Figure 4: Counties covered by the impact evaluation (by phases of programme expansion)



Disclaimer: The designations employed and the presentation of material in the map in Figure 4 do not imply the expression of any opinion whatsoever on the part of WFP concerning the legal or constitutional status of any country, territory or sea area or concerning the delimitation of frontiers. The final boundary between the Sudan and South Sudan has not yet been determined.

53. For the experimental components, there were two primary entry points and units of randomization: villages for the livelihoods intervention and schools for the education package. WFP and UNICEF pre-selected villages and schools that meet the eligibility criteria for the JRP. The selection included a vulnerability and technical assessment. Equally eligible villages and schools were then randomly assigned to multiple comparison groups, which eliminated any systematic differences between the treatment and comparison groups at baseline, thus enabling the compilation of a valid counterfactual.

54. Not all resilience activities were suitable for random assignments. Questions related to health and nutrition interventions could not be experimentally tested, as the location of nutrition and health centres was pre-determined. Given these constraints, a heterogeneity analysis was used to examine evidence of contributions to programme impact. Heterogeneity analyses are based on the comparison of health and nutrition outcomes between different groups of households. In this case, households were grouped based on their distance to health and nutrition facilities.

55. Finally, qualitative data were collected in the form of focus group discussions (FGDs) to complement the livelihoods experimental evidence. The main objective was twofold. First, the FGDs built on the quantitative data to allow for a more detailed understanding of household livelihoods in the various counties of interest across the programme and comparison arms of the RCT. Second, the qualitative insights served to cross-check the conclusions of the quantitative data collection and identify programme-related issues as well as other factors that may have affected the power of the RCT.

Cluster randomized controlled trials

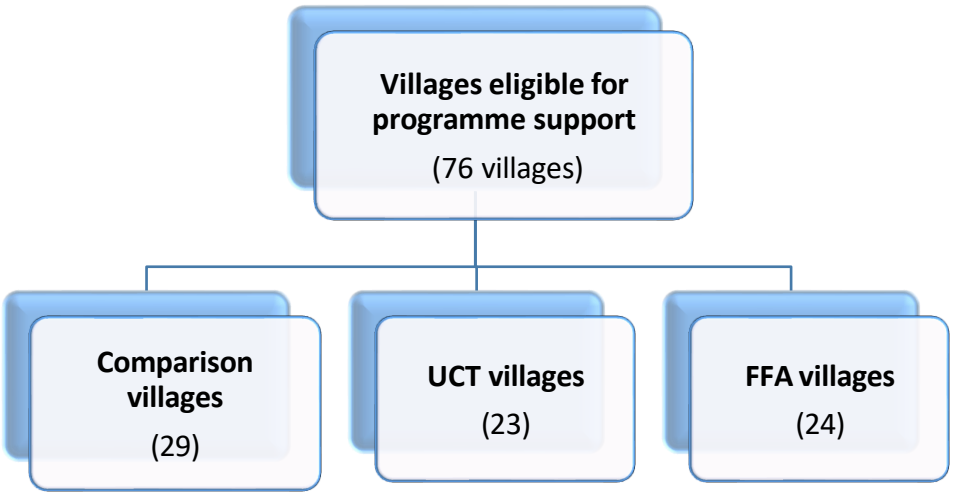
Livelihoods randomized controlled trials

56. The livelihoods RCT includes 76 villages that were eligible to benefit from the JRP at the time the project started and had not benefited from any WFP support in the recent past. These villages came from across five counties, as detailed in Table 5. Data were collected from 550 randomly selected beneficiaries in Juba, Yambio, and Torit during two programme cycles, 2021 and 2022. Then, data were also collected from 500 households in Aweil West and Centre during the 2022 programme cycle only.

Table 5: Number of villages in the livelihoods RCT per county

County	Number of villages (households per village)
Juba	4 villages (20 to 25 households/village)
Yambio	14 villages (20 to 25 households/village)
Torit	7 villages (20 to 25 households/village)
Aweil West	39 villages (15 households/village)
Aweil Centre	12 villages (15 households/village)

Figure 5: Livelihoods RCT design

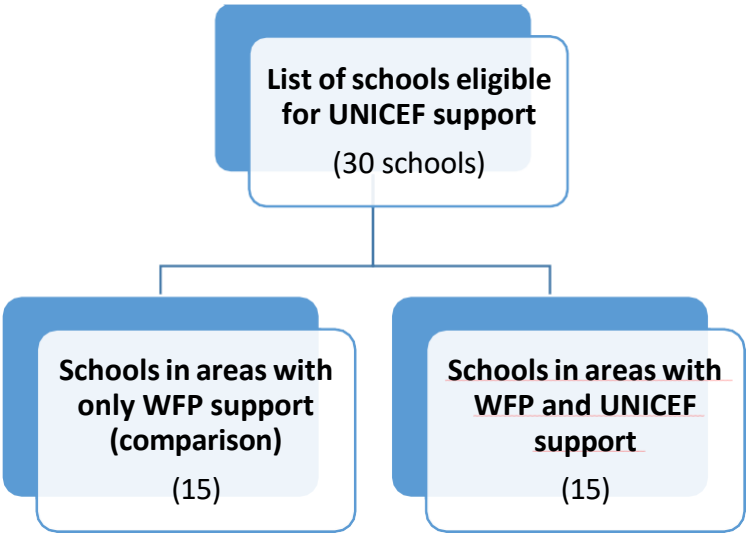


57. The livelihoods component of the impact evaluation aimed to: (a) explore how households cope with and without livelihood interventions in the form of cash or food transfers, and (b) estimate the value of working on community assets over and above the receipt of transfers. In this regard, the impact evaluation compares households in newly eligible villages that were randomly assigned to three arms: (i) unconditional cash or food transfers (UCTs); (ii) food or cash transfers for work on assets (FFA); and (iii) comparison: villages that do not receive UCTs or FFA. This design is shown in Figure 5. The answer to question (a) above is based on the comparison of FFA and UCTs pooled together against comparison. The answer to question (b) is based on the comparison of FFA and UCTs.

Education RCT

58. The education RCT examines the impact of the UNICEF package of interventions integrated into existing WFP school-based interventions. The education design included 30 WFP-supported schools from Northern Bahr el Ghazal that were eligible to receive support from UNICEF. However, the budget was only sufficient to reach 15 schools. Consequently, half of these schools were randomly assigned to receive the UNICEF package in addition to WFP support (programme), and half only received WFP support during the 2021 and 2022 academic years (comparison, only WFP support) (Figure 6). Data were collected from 15 randomly selected households whose children were on the enrolment lists of each of the 30 schools at the beginning of the 2021 academic year (450 households: 30 schools × 15 households/school).

Figure 6: Education RCT design



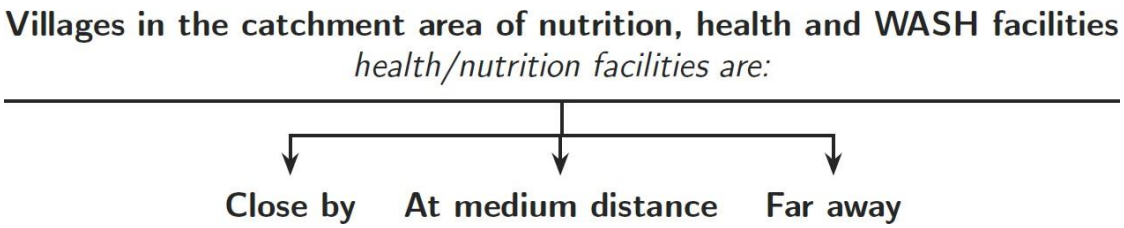
59. Among the resilience programmes covered under the Climate and Resilience Impact Evaluation Window, the education assessment and collaboration with UNICEF is unique to South Sudan. Given the central role of access to education in the South Sudan resilience programme, it is important to understand the contribution of the UNICEF education package to household resilience.

Heterogeneity analysis

Distance to services

60. Some interventions under the JRP – health, nutrition, sanitation and education – are implemented at the community level. Therefore, access to these facilities could influence how much households can benefit from these services. As it was not feasible to individually randomize all resilience activities in South Sudan, the impact evaluation used heterogeneity analysis to understand how the comprehensive programme correlated with the targeted outcomes. While heterogeneity analysis does not provide the same kind of causal evidence as experimental designs, it can be useful for understanding trends and correlations in outcomes of interest. The heterogeneity analysis conducted for this evaluation uses data collected for the experimental components of the RCT to compare the health and nutrition outcomes of households with varying levels of access to services (Figure 7).[30]

Figure 7: Non-experimental design



61. Access to services is measured as distance to the primary health-care units/centres and nutrition facilities that have benefited from the JRP. WASH interventions have been targeted at health and

30 For instance, in terms of nutrition outcomes, the report looks at Continued Breastfeeding (CBF), Minimum Acceptable Diet (MAD), Minimum Dietary Diversity (MDD) and Minimum Meal Frequency (MMF). Then, regarding health outcomes, the report presents summaries for vitamin A supplementation, measles vaccination and the probability of seeking treatment if the child shows symptoms of an illness.

education facilities and have partially overlapped with the related interventions. The geographic distance is computed based on the GPS coordinates of households, nutrition centres and health facilities. Regarding distance to health facilities, households are grouped as follows: close (<10 km), medium distance (10 to 20 km) and far (>20 km). Similarly, for nutrition facilities, the groups are: <5 km, 5 to 15 km, >15 km.[31]

Non-experimental evidence of integration – overlap of programme activities

62. The impact evaluation also employs heterogeneity analyses to examine the effects of having access to multiple interventions being implemented simultaneously in the same communities. To do this, we combine the experimental design testing the livelihoods component of the JRP (UCT or FFA) and the heterogeneity analysis analysing effects by distance to non-randomized interventions. For instance, the heterogeneity analysis explores whether or not the impacts of livelihood interventions are larger the closer households are to education, health or nutrition facilities that are also benefiting from the JRP. In this case, the outcomes of interest are linked to education, health and nutrition. As nutrition and education support targeted children of specific age groups, the analysis is implemented for households with children in the age brackets of interest.

Ethical considerations

63. A key goal of WFP's Impact Evaluation Strategy is to increase the use of rigorous evidence to inform programmes in countries where WFP works and globally. Guided by this overarching principle, the evaluation takes into account several ethical considerations and employs best practices.

64. **Institutional review board (IRB) approval:** The evaluation team has obtained international approval from an IRB provided by Solutions IRB for the Climate and Resilience Impact Evaluation Window design, as well as for the specific design and measurement elements in South Sudan. The Window approval was received on 12 November 2020 and the South Sudan amendment approval was received on 12 September 2021. In addition, the evaluation team has obtained approvals from local institutions in South Sudan. This ensures that the evaluation complies with local regulations and does not violate any laws.

65. **Communication to the participants:** Given that the evaluation is taking place in a context of heightened intercommunal tensions and extreme vulnerability, an evaluation risk is the perception that some groups receive benefits at the expense of others solely for the purposes of research. To mitigate this risk, UNICEF, WFP and DIME worked together to ensure transparent and clear communication to communities.

66. **Informed consent:** The team ensured that enumerators were fully trained to obtain informed oral consent from all evaluation participants. Every participant had to consent to take part in surveys. It was made clear that refusal to respond to surveys did not come with any consequences for their participation in the joint resilience programming. The head of the household is the primary respondent for the survey. While most survey questions were addressed to the head of the household, there were a few questions directed to other members of the household, including women (such as questions on women's empowerment, food consumption for children aged 6 to 23 months and so on). To avoid respondent discomfort during surveys, several precautions were taken to ensure that interviews took into account the respondents' privacy and comfort:

    - Participants were allowed to skip any questions they did not wish to answer or withdraw from the survey at any time.
    - Interviews were conducted at participants' homes to increase the likelihood that they were comfortable answering questions.
    - Finally, all enumerators went through one to two weeks of training, which was followed by extensive piloting in the field. The goal of the training was to ensure that enumerators followed

31 Groups were declared such that each group had a representative number of households.

survey best practices in terms of protocols and ethics, but also that questions were asked in a uniform and contextually appropriate manner.

67. **Confidentiality:** The evaluation team ensured complete anonymity and confidentiality of all data collected from study participants. This means that the identity of study participants will remain hidden in all forms of data construction and analysis, and sensitive information about individuals will not be shared with anyone outside the evaluation team.

68. **Transparency in evaluation designs:** To increase the transparency of the work, the evaluation was registered through the American Economics Association's (AEA's) trial registry.

69. **Testing of questionnaires:** All survey instruments were thoroughly tested and piloted in the field prior to use, in order to ensure that all questions were contextually relevant and culturally sensitive. One cultural consideration particular to South Sudan is that the number of livestock owned by a household is considered sensitive. As a result, this question was removed from the questionnaire after piloting.

Limitations and notes

70. Impact evaluations start before the initiation of programme activities and often last for several years, either for the whole programme duration or at least the initial phase. In experimental evaluations, it is important to oversee implementation fidelity (i.e. ensure the intended beneficiaries receive the intervention), but also compliance with the RCT design – that is, ensure that comparison communities do not receive the programme while programme communities consistently benefit from the intervention. Moreover, during programme implementation, external factors can lead to changes in programme design and implementation, which in turn can affect the impact evaluation.

71. South Sudan's volatile situation, coupled with extreme weather events and the COVID-19 pandemic at the start of programme activities, posed several challenges to the impact evaluation. The exceptional 2022 flooding destroyed homes, livelihood assets, food crops and livestock, water infrastructure, and other essential services such as education, health and nutrition facilities. In turn, these events diminished people's ability to recover from natural or other socioeconomic shocks. UNICEF noted that flood-induced temporary school closures disrupted learning for about 430,000 children and exposed them to other risks such as early marriage, child labour and other forms of abuse.

72. Throughout data collection, the project was occasionally affected by localized episodes of tension and conflict. For instance, baseline data collection could not be completed in Torit County. Conflict also affected Juba County in August 2022 (Round 6 of Phase 1). Consequently, programme as well as comparison communities were temporarily displaced, and this led to some households from comparison communities benefiting from the programme. Moreover, the exact timing of transfers varied due to challenges on the ground including insecurity, flooding and budget constraints. This resulted in some villages not receiving regular monthly transfers during the lean season as intended. All these factors could have resulted in either less precise estimates of the programme or an underestimation of programme impacts.

73. However, despite the extremely challenging context, the livelihoods programme was implemented largely as designed in all programme areas.

74. The success of an impact evaluation hinges on the availability of a sufficient sample size. Both livelihoods and education experiments were underpowered to detect programme impacts at the outset. Consequently, the livelihoods experiment increased its sample size from 25 to 76 villages in Phase 2 of the project. The education experiment, however, was not able to increase the size of the sample due to budget limitations governing the scale-up of new education sites during the impact evaluations. Therefore, the education experiment could still benefit from a scale-up if such opportunities were to arise in the future. A larger sample size would allow for a more precise estimation of impacts. Such a scale-up could also create opportunities for explicitly randomizing the joint location of education and other sector interventions.

75. Moreover, several programme research questions proved to be difficult to answer due to practical limitations. For instance, the de-linking sub-experiment was meant to compare the default programme approach – that is, working and receiving transfers during the lean season – with an alternative

approach in which households would receive their transfers during the lean season against the promise of working at a later point in the year when the demand for their time is less of a constraint, as the agricultural season has ended. The de-linking design was piloted in the counties of Juba and Yambio and required the upfront planning of the asset schedule. However, the only de-linking that happened was due to exogenous factors – for example, excessive rain or drought. Thus, it was not planned but ad hoc. Based on experience, WFP South Sudan was not comfortable making transfers against the promise of future work without any additional amendments that could have addressed potential incentive problems. Consequently, the pilot was not scaled up, and most of the sample for this sub-experiment was dropped at endline to prioritize other components of the impact evaluation.

76. Similarly, the evaluation team discussed at length with the UNICEF and WFP nutrition teams designing an experimental evaluation to assess the impact of nutrition volunteers on children's outcomes. The design would have required the JRP to vary the intensity of the volunteers' activities. However, it was decided that the programme could not vary the number of nutrition volunteers or their activities in a way that would result in programme learning without increasing resources. This EQ was therefore dropped from the study. Other more general limitations of impact evaluations, and how they have been addressed, are described in Annex C.

4. Data collection

77. Quantitative data were collected in several rounds. The baseline data collection was completed between July and August 2021 in Juba and Yambio, and between April and May 2022 in Aweil West and Centre. Baseline data were not collected from Torit due to a tense security situation in the field at the time of data collection. Subsequently, high-frequency data collection was conducted between October 2021 and August 2022 in Juba, Yambio and Torit, and between July 2022 and January 2023 in Aweil West and Centre. Finally, the endline data were collected between March and May 2023 from all locations. The household surveys that were used covered outcomes of interest for the Climate and Resilience Impact Evaluation Window and other project-specific indicators. School surveys were collected in November 2021 to assess school infrastructure and at the start of the 2022 academic year to collect the exam grades for the 2021 academic year. Finally, the school surveys were rerun at endline to reassess the infrastructure of schools and collect the exam grades for the 2022 academic year.

78. The data collection schedule was implemented as planned, and the livelihoods endline took place before activities started the 2023 cycle. This timing gave Field Offices the chance to phase in former comparison villages if their budgets and plans allowed.

Figure 8: Timeline of data collection

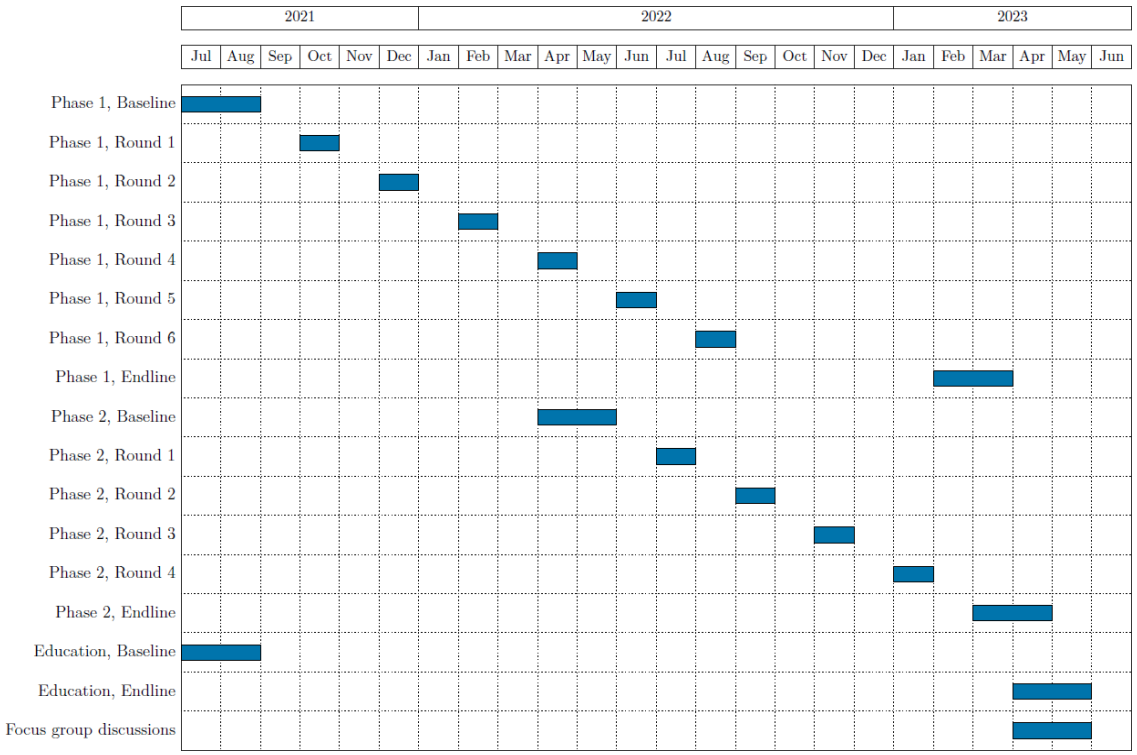


Table 6: Completed surveys by round

Number of households in newly eligible villages

County	Baseline	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Total endline
Juba	**91**	91%	91%	91%	88%	86%	85%	**77**
Torit	**187**	98%	98%	97%	96%	95%	91%	**171**
Yambio	**320**	100%	98%	97%	96%	93%	92%	**294**
Aweil Centre	**140**	99%	98%	95%	94%	94%	94%	**132**
Aweil West	**440**	99%	99%	98%	97%	97%	97%	**428**
Total	**1,171**	99%	98%	97%	96%	95%	94%	**1,102**

Number of households in existing/old villages

County	Baseline	Round 1	Round 2	Round 3	Round 4	Round 5	Round 5 dropped*	Total endline target
Juba	**303**	100%	99%	99%	98%	92%	228	**64**
Yambio	**305**	99%	98%	97%	95%	86%	217	**64**
Total	**608**	100%	99%	98%	97%	89%	445	**128**

Note: Exits are due to households moving away permanently, deceased beneficiaries, refusals to continue being part of the study or, occasionally, duplicated households that we identified and dropped.

Note: The target for interviews among the existing/old villages was cut at endline to approximately eight interviews per village due to limited funds and the prioritization of the sample of new villages. This should not be considered attrition.

79. Qualitative data were collected from 13 FGDs. Each group included six to eight individuals (beneficiaries in FFA and UCT, and programme-eligible individuals in comparison) for a duration of two to three hours. The main objective of the FGDs was to gain more knowledge about the livelihood opportunities of households and their experiences implementing livelihoods programme activities in a sample of impact evaluation villages. For instance, we explored how livelihood opportunities may change throughout the year, from county to county and from village to village, depending on their treatment status; we learned about the implementation of asset activities, the benefits they may bring, and the village-level experience of going through the main stages of a livelihoods programme (e.g. choice of assets, timing of transfers, cash versus in-kind transfers). The FGDs collected information on how the transfers were used and how the allocations were shaped by local social norms and rules. The objective of the FGDs was to give context to, but also to confirm, strengthen or challenge, the impact estimations of the quantitative data analysis. The FGDs included both programme and comparison villages. Some groups were male and female, and others were female-only. Quotes from FGDs are presented alongside quantitative results. Qualitative data collection was carried out in March and April 2023.

Table 7: Inventory of focus group discussions

County	Number of focus group discussions	Types
Juba	2	1 in a UCT village (mixed group) 1 in an FFA village (mixed group)
Yambio	4	2 in a comparison village (mixed and female-only groups) 2 in an FFA village (mixed and female-only groups)
Torit	1	1 in an FFA village (mixed group)
Aweil West	4	2 in a comparison village (mixed and female-only groups) 2 in a UCT village (mixed and female-only groups)
Aweil Centre	2	1 in a comparison village (mixed group) 1 in an FFA village (mixed group)

Table 8: Sample evolution education component

County	Schools	Baseline target	Baseline response rate	Endline target	Endline successful rate
Aweil West, Centre, North, South, East	30	450	450 100%	450	90%

80. Table 7 and Table 9: Main outcomes of interest summarize the evolution of the samples for the livelihoods and education experiments. The team did not find significant differential attrition between programme groups – that is, FFA and UCT – or between comparison and programme.

5. Outcomes of interest and resilience measurement

81. A growing body of literature on resilience has relied on measuring programme impacts at a single point in time, and documenting positive gains in well-being, sometimes by comparing households in communities exposed to shocks with those that are not (Gunnsteinsson et al., 2019; Macours et al., 2020; Barrett and Constas, 2014; Premand and Stoeffler, 2022). The impact evaluation considers the fact that the capacities needed to improve and sustain well-being are likely to evolve over time, depending on the type and severity of shocks encountered. Evaluating the effect of programmes on resilience requires measuring well-being over time, including across seasons and before and after shocks, as well as absorptive, adaptive and transformative capacities. Building on proposals from Barrett and Constas (2014) and Cissé and Barrett (2018) to conceptualize resilience as the avoidance of poverty in the face of shocks and stressors, each evaluation in the Climate and Resilience Impact Evaluation Window directly measures welfare dynamics to understand resilience outcomes. These measures are calculated from a minimum set of indicators collected at higher frequencies in each country supported.

82. While specific outcomes are discussed in detail in the results sections, the main outcome categories for the impact evaluation are as follows:

Table 9: Main outcomes of interest

Outcome	Definition	Measurement
Consumption and food security	Food Consumption Score – Nutrition (FCS-N) Food Insecurity Experience Scale (FIES) Food and non-food expenditure	Household/individual (head of household)
Livelihoods	Agricultural production and sales Livestock rearing and sales Household business ownership and profits Wage income and revenues	Household/individual (head of household)
Educational access, attendance, progress and attainment	Grade and grade progression School attendance and dropout rates	Household/individual (head of household/children)
Health and nutrition knowledge, behaviours and outcomes	Immunization and vitamin A coverage Dietary diversity for women and children (WDDS/MDD-W) Child feeding practices WASH and health-seeking behaviours Diarrhoea prevalence and treatment sought	Household/individual (female head of household, children)
Coping mechanisms	Reduced Coping Strategy Index (rCSI) Livelihood Coping Strategy Index (LCSI)	Household/individual (head of household)
Psychosocial and other	Women's empowerment Social capital Mental health and depression Assets Subjective Resilience Score	Household/individual (head of household)

83. The indicators were selected in collaboration with the WFP and UNICEF country offices and the WFP Livelihoods, Asset Creation and Resilience Unit in Rome, and the following three factors were considered: (i) operational relevance and importance to the programme components; (ii) a review of relevant literature; and (iii) evidence generation across the portfolio of Climate and Resilience Window evaluations. The primary set of outcomes are measured using food security indicators. These include, for example, Food Consumption Score (FCS), Food Insecurity Experience Scale (FIES) and household food consumption. Moreover, intermediary outcomes related to livelihoods (such as agricultural production, asset ownership, off-farm income-generating activities) help us understand the mechanisms of impacts in terms of resilience capacities.

84. Outcomes are measured at baseline and endline through a multi-module household survey covering the domains shown in Table 9, which are aligned with the evaluation objectives, impact evaluation inception report and Window pre-analysis plan; meanwhile, the high-frequency survey (bimonthly surveys following the baseline) collected data on a subset of indicators, including food security outcomes, coping strategies and shocks, as well as self-reported programme participation captured over time. A key feature of the resilience measurement approach adopted for this evaluation is reliance on high-frequency data to explore the dynamics of well-being throughout the evaluation period. This approach to resilience measurement differs from previous resilience indices, which are static and measure resilience at one point in time, or before and after an intervention.

6. Project implementation

85. **Livelihoods:** During implementation, the project was occasionally affected by localized episodes of tension and conflict. For instance, the project was temporarily stopped in Torit County around baseline. Consequently, programme activities (including data collection) were suspended until the situation improved. Torit was returned to the impact evaluation sample starting in Round 1 of the high-frequency data collection. Conflict also affected Juba County in August 2022 (Round 6 of Phase 1). Consequently, programme as well as comparison communities were temporarily displaced, and this led to some comparison households receiving access to the programme.

86. In the counties of Northern Bahr el Ghazal, project activities faced a different type of threat: extensive flooding. The situation was relatively worse in Aweil West, where households were temporarily displaced until the flood waters receded. According to reports from the Field Office, up to 45 percent of the expected 2022 harvest was lost due to the dry spell which preceded the flood waters and the flood itself.

87. Despite this extremely challenging context, the livelihoods programme was implemented largely as designed in all programme areas. Around 72 percent of households reported receiving at least one transfer in the 12 months preceding the endline (this may be an underestimate, as beneficiaries may have been reluctant to declare transfers). Table 10 summarizes the rate at which households received their transfers as intended in programme villages. The same summary is also compiled for comparison villages to check not only the implementation of the livelihoods intervention but also compliance with the RCT design. Ten percent of comparison households reported having received at least one transfer.

88. In practice, the exact timing of transfers varied due to challenges on the ground, including insecurity, flooding and budget constraints. This resulted in some villages not receiving regular monthly transfers during the lean season as intended. At times, several monthly benefits would come all at once after a two-, three- or even four-month break between transfers. Similarly, due to budget constraints, Aweil Centre had to cut the planned transfers in half, but it, too, saw a double transfer in January 2023, which was four months after the previous one had happened in August 2022. These may in turn have affected the capacity of the impact evaluation to answer questions related to the impact of transfers disbursed during the lean season – as not all transfers were paid during that time. Conversely, the asset work largely happened on time, with only exogenous factors, such as delayed rains, postponing the agricultural assets slightly – for example, the case of Aweil West and Centre.

Table 10: Percent of households who reported receiving transfers (cash and/or in-kind)

	Phase 1							Phase 2					Grand total
Rounds	***1***	***2***	***3***	***4***	***5***	***6***	***Total***	***1***	***2***	***3***	***4***	***Total***	
Comparison	9%	11%	8%	10%	7%	8%	***9%***	11%	16%	11%	16%	***14%***	**10%**
Programme	65%	68%	73%	80%	73%	78%	***73%***	63%	67%	66%	78%	***69%***	**72%**

Note: Table compiled using the self-reported receipt of transfers throughout the high-frequency survey (six rounds for Phase 1 and four rounds for Phase 2) and endline.

89. **Education:** The implementation of the UNICEF education package was partially delayed regarding its classroom construction component and related WASH infrastructure. The other interventions linked to school supplies, training sessions, peace clubs, school management committees, and so on, were implemented according to the plan set out at the RCT design stage. Consequently, the impact evaluation was able to capture the impacts of the latter type of interventions but not of the former infrastructure components.

90. **Nutrition, health and WASH:** This being a non-experimental component of the impact evaluation, there were no constraints on keeping any pre-agreed project implementation schedule or guidelines. However, the fact that WASH interventions have exclusively been implemented using health or school facilities as entry points has rendered infeasible the distance to services analysis for this subcomponent. There is no reason to believe that access to WASH-treated schools or health clinics is correlated with household-level WASH behaviours in any significant way. Households will not rely on the WASH infrastructure built for school and health clinics for their daily needs. However, the WASH infrastructure will likely support the services of health and education facilities. Those benefits, however, cannot be measured using the available household data and are beyond the scope of this impact evaluation.

7. Experimental results

91. Results from the RCTs are presented in this section. Subsection 7.1 combines results from the FFA and UCT groups and compares them with communities that were not supported by the Joint Resilience Programme (JRP). Subsequently, FFA and UCT groups are compared with each other, followed by how results varied over time. Some outcomes were measured every two months (i.e. bimonthly) as part of the high-frequency survey and at endline, while others were only measured at endline. Where possible, data from high-frequency and endline surveys are combined, in order to draw from a larger sample size and gain more statistical power to detect impacts. Two measures of food security (FCS and FIES), coping strategies and assets fall into this category. The combined data can be interpreted as measuring combined impacts over the course of the programme and up to two years later. Women's dietary diversity, livelihoods, finances, and psychosocial outcomes were limited to endline and came from one point in time, one to two years after the programme started. The results are standardized and presented in standard deviations in order to compare across outcomes. Where relevant, results are also presented in units such as kilograms, South Sudan Pounds (SSP) and points on an index, for added interpretability.

Impact on programme communities (FFA and UCT combined) versus comparison communities (Evaluation Question 1)

Food security

92. We first investigate the impact of the programme on food security. We measure food security in three ways: FCS, FIES and Women's Dietary Diversity Score (WDDS). The FCS captures how often households consume food items from different food groups during the seven days before the survey. The WDDS captures dietary diversity of the female head of household through the number of different food groups consumed over the previous 24 hours. The FIES scale captures the number of types of experiences of food insecurity a household has had over the last 12 months, with food insecurity experiences including being worried about not having enough food, being unable to eat nutritious foods, eating a smaller variety of foods, having to skip a meal, adults eating less so that children can eat more, running out of food, being hungry and not eating, and going a day without eating. The scale is reversed so that a maximum score of eight indicates that a household has not had any of these experiences, and a score of zero indicates that it has experienced them all. The results are presented in Figure 9 for both average effects on these measures and impacts on categories of food security classifications by standard measures.

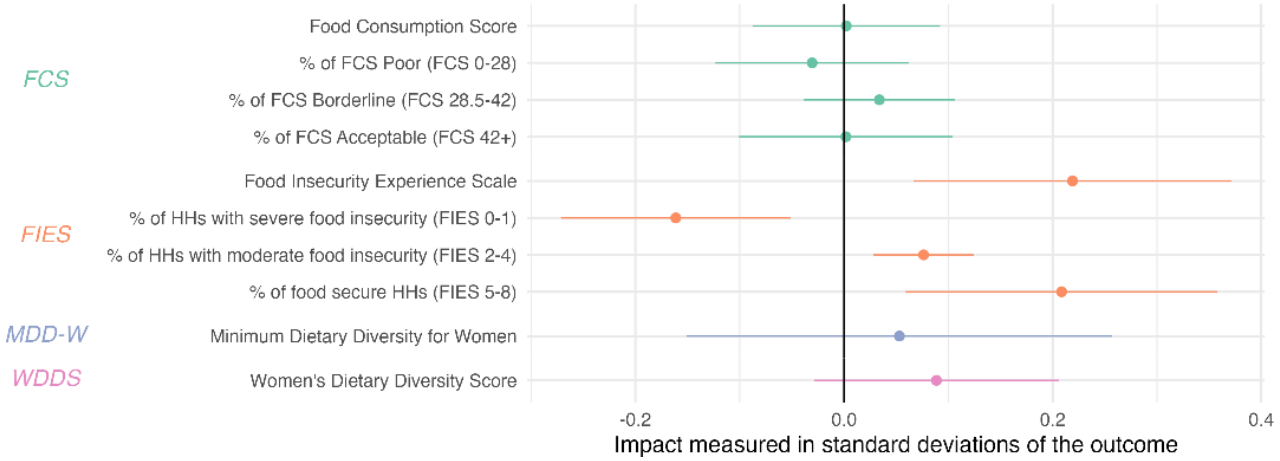
93. We find that the interventions lead to positive impacts across all three measures, although they were only statistically significant for FIES. Specifically, the interventions improve FIES by 0.26 points. A programme effect of 0.26 on the FIES could be explained, for example, by an increase of more than a quarter of households answering "no" to one of these questions about negative coping experiences. Consistent with these results, we find suggestive increases in the other measures as well: FCS increases by 0.66 and WDDS increases by 0.15, though neither of these effects is statistically significant.11

94. We can also measure impacts on food security in terms of whether the programme helped households avoid adverse food security outcomes, using standard coding of the food security outcomes to the categories of "Poor", "Borderline" or "Acceptable" (FCS), or "Severe", "Moderate" or "Acceptable" (FIES), and whether women reach the minimum dietary diversity threshold (MDD-W). Figure 9 shows how food security indices and categories change in programme villages compared with the comparison group during the impact evaluation.

Note on interpreting coefficient plots (Figures 9–15): These graphs show the impact of the programme by visualizing the difference in the outcome of interest between the programme and comparison communities. These effects come from regression analysis where other characteristics are held constant. Results are expressed in standard deviations to allow for multiple outcomes to be displayed together.

The dot shows the average impact in terms of standard deviations, while the horizontal bars show a 95 percent confidence interval. The further away the dot is from the vertical line at zero, the larger the impacts of the programme. When the bars do not touch the vertical line, we can say that the result is statistically significant at the 5 percent level.

Figure 9: Food security impacts at endline



Note: Confidence intervals (lines) that touch the "0.0" line indicate effects are not statistically significant.

95. When breaking down the results by category, we see that the programme has the biggest impacts on food security status as measured by FIES, which is not surprising, as this is the measure where we find impacts on the overall score. Access to FFA or transfers resulted in fewer households being severely food insecure (a reduction of 5.2 percentage points), while there was an increase in the share of households experiencing moderate or no food insecurity. The share of households achieving "food secure" status by the FIES measure increased by 3.2 percentage points from only 0.02 percent at baseline. In addition, there was an increase in the share of women with a diverse diet, although this was not statistically significant.

Qualitative insights

These findings of improved food security following the programme are in line with perceptions gathered during qualitative interviews:

"Since I started this work, I have seen great changes in my family. We can now eat two times a day with my family. We also cater for some basic needs." (FFA village)

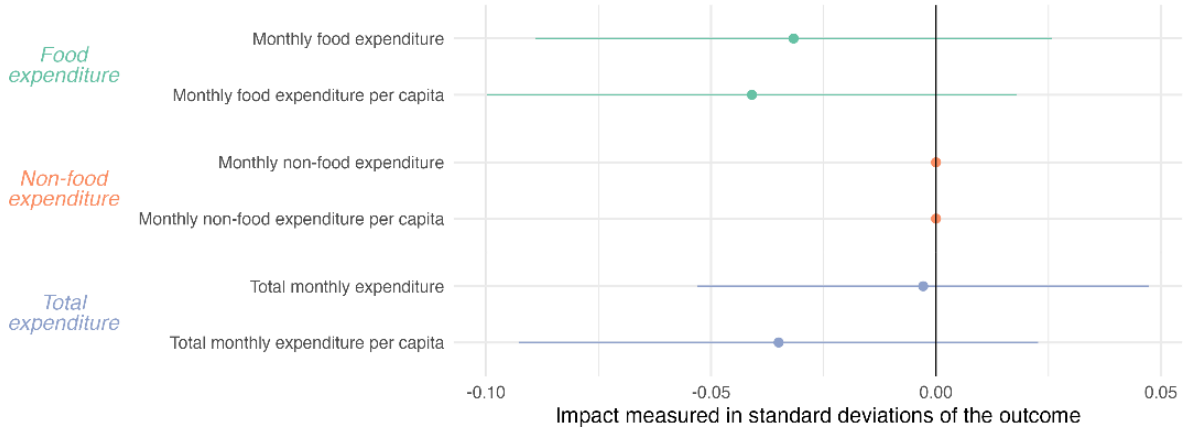
Consumption expenditure

96. We measure consumption in three dimensions: food expenditure, non-food expenditure and total expenditure both by household and per capita. The results in standard deviations are presented in Figure 10.

97. The impact evaluation finds negative but statistically insignificant impacts on food expenditure (SSP 238/household/month) and total expenditure (SSP 63/household/month), while there were smaller positive effects on non-food expenditure (SSP 161/household/month), but these were also not statistically significant. Taken together with the results on agricultural production (see Figure 10 below), we can conclude that households did not have to spend as much money on food, as they had more available from their own harvests.

98. Impacts on Food Expenditure Share (FES), as measured by total expenditure on food as a share of total household expenditure, are negative but not statistically significant.

Figure 10: Consumption expenditure impacts



Note: Confidence intervals (lines) that touch the "0.0" line indicate effects are not statistically significant.

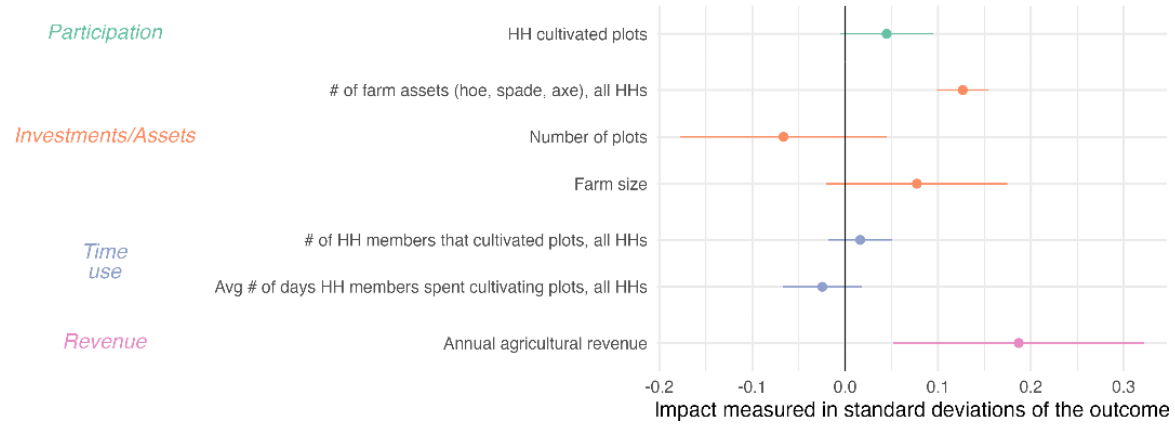
Livelihood outcomes

99. Food security may be changing over the course of the programme and throughout the year because households use transfers of food or cash to meet their food needs, or because they invest in assets that earn returns allowing them to improve their food security, or for both reasons. In this section, we investigate the impacts of the programme on livelihood outcomes across four categories: agriculture, rearing of livestock, operating a small business and wage labour. Within each category, we consider whether anyone in the household was involved in that livelihood activity, purchase of assets related to that activity, time spent on that activity and earnings from that activity.

100. **Agriculture:** There were positive and statistically significant increases in the number of farm assets owned, agricultural production and total agricultural revenue. Importantly, households in programme villages harvested 60 kg more than households in the comparison group, including a 24 kg increase in sorghum and a 18 kg increase in groundnut, two important crops in this context. For reference, the average yield for those both crops in the comparison group was around 44 kg. There was an associated increase in agricultural revenue by SSP 11,300/household/year. This translates to an additional 0.7 kg of food per household member per month, which may have been enough to boost food security in the period immediately after the harvest, but possibly not enough to boost food security for the whole year. These outcomes were driven by plots owned and cultivated by individual households, rather than communal plots.

101. The impact evaluation finds that these improvements in agriculture are not driven by any single mechanism. There was no observable change in the proportion of households cultivating any crops (more than 90 percent of all households in the sample were engaged in agriculture prior to the project starting). There was no change in the amount of time spent on agriculture or in the amount of land dedicated to crops as a result of the programme. The programme had a small but statistically significant increase in the amount spent on chemical fertilizer across all crops and plots by SSP 54, compared with the average of SSP 12 in the comparison group. Surveys did not capture farming practices, which could have affected productivity. It is possible that the programme affected these intermediary mechanisms differently for different farmers, but we cannot conclude that any single input drives these gains in productivity.

Figure 11: Agriculture impacts



Note: Confidence intervals (lines) that touch the "0.0" line indicate effects are not statistically significant.

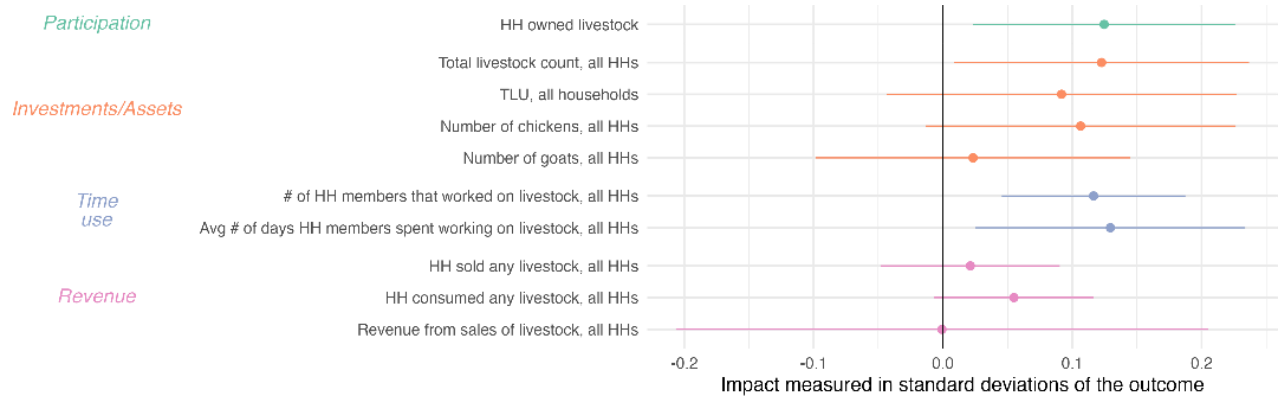
Qualitative insights

Participants from the focus group discussion highlighted how the programme contributed to improved agricultural production, which in turn led to better food security and health outcomes.

"The money has changed our lives a lot; I used it to cultivate crops, I sell the crops to get income which is then used to buy clothes for my children. The children will eat well, I also sell crops to pay medical bills. We planted a lot of crops like groundnuts, sesame, and sorghum, it has helped to eradicate poverty." (Juba, FFA)

102. **Livestock:** Households in programme villages were 5.4 percent more likely to own livestock compared with a mean of 37 percent in the comparison group. They own an average of 5.1 animals, 0.9 more than the comparison average of 4.2 animals. Programme households also spent more days working on tasks related to livestock rearing and had more household members doing so, and also had higher rates of consuming livestock. Other livestock measures indicate greater prevalence of livestock in the programme group than the comparison but are not statistically significant. These include revenue earned from sales of livestock, and rates of ownership for specific animals. Together this pattern of results suggests small but measurable increases in the intensity of livestock investment. It should be noted that cow ownership is a culturally sensitive topic in South Sudan and few households reported owning cows; these results focus more on small and medium-sized livestock such as chickens and goats.

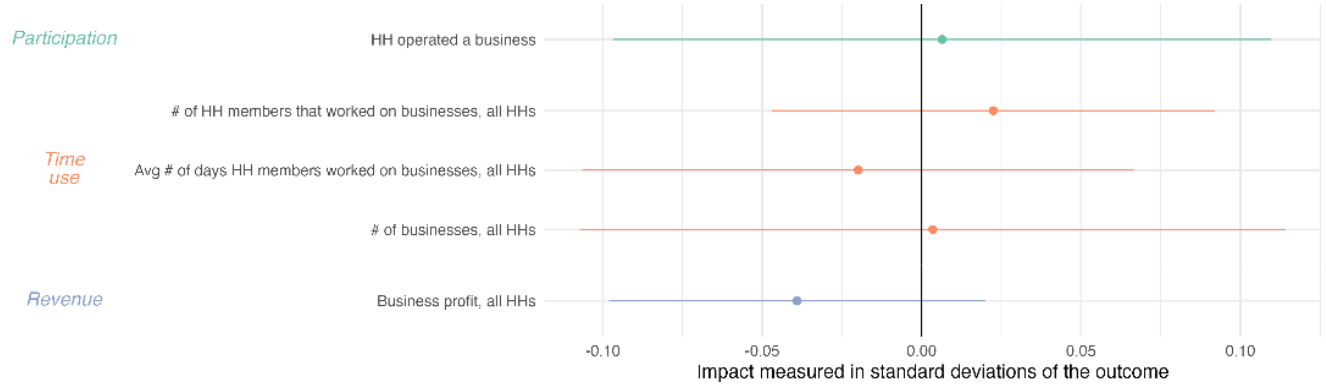
Figure 12: Livestock impacts



Note: Confidence intervals (lines) that touch the "0.0" line indicate effects are not statistically significant.

103. **Business:** The impact evaluation did not find any measurable impact on business outcomes, including the likelihood of operating a business, time spent on businesses or revenue earned in household businesses.

Figure 13: Business impacts



Note: Confidence intervals (lines) that touch the "0.0" line indicate effects are not statistically significant.

104. **Wage employment:** Households in programme villages engaged in wage labour and earned more from wage labour than those in the comparison group. They were 3 percent more likely than the comparison group to engage in wage labour at all, with household members working 0.3 more days per month in wage labour. This is associated with a small increase in earnings from wage labour of SSP 661 compared with a comparison mean of SSP 1,742.

Figure 14: Wage labour impacts

Note: Confidence intervals (lines) that touch the "0.0" line indicate effects are not statistically significant.

Financial outcomes

105. The programme saw a small but significant increase of 3 percent in households using a savings mechanism. Furthermore, interventions reduced the likelihood of households sending money to family members by 5 percent as compared to the comparison group's mean of 11 percent. The impact evaluation did not find any statistically significant effects on other financial indicators such as taking out loans and receiving money from, or giving a loan to, family or friends.

106. **Assets:** The programme led to an average increase of 0.5 (3.8 total) farm assets (e.g. hoes, axes, spades) owned by households in programme villages as compared to the comparison group's mean of 3.3. The intervention increases the number of household assets (e.g. radios, bicycles, cell phones, beds) by 1.1 (7.5 total) on top of an average number of 6.4 household assets in the comparison group.

Qualitative insights

Qualitative analysis gives more insights into how the programme-supported households invest in different livelihoods, as well as the kinds of assets they were able to buy.

"What I bought was a bicycle, my paste grinding machine and I also bought my farming plot which I was lacking." (Juba, FFA village)

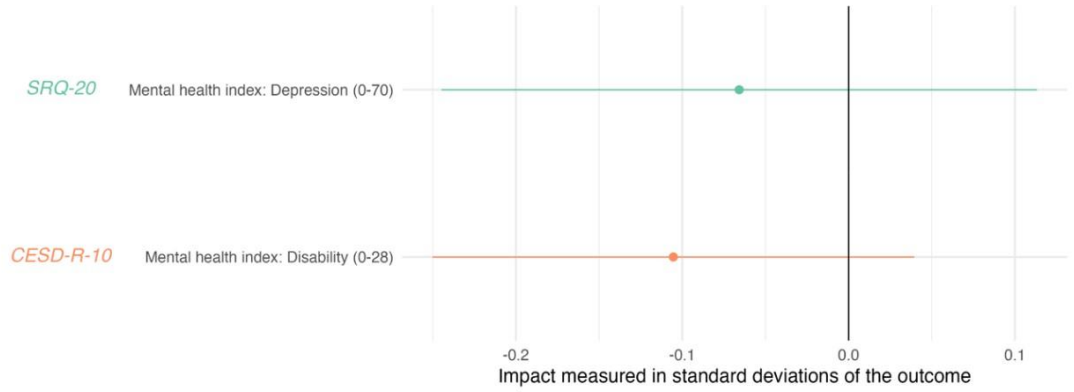
"It has helped at the household level, I am eating well, I used some of it in order to start up a business, I used the money to hire casual laborers to help me dig, I used some of it to support children in school, I used some of it to buy chicken. I am happy because your money has helped me a lot." (Juba, FFA village)

Psychosocial impacts

107. Psychological well-being is measured through standard indices of depression and disability. Households were asked ten questions based on the Center for Epidemiologic Studies Depression Scale-Revised to measure depression and four questions from the self-reporting questionnaire to measure mental health disability.

108. There is suggestive evidence that WFP livelihood programmes improved psychological well-being, as we observe lower rates of depression and disability. However, these effects are not statistically significant.

Figure 15: Psychosocial impacts



Note: This graph reports the results of a regression of treatment on the Depression and Disability standardized indices with controls for outcomes at baseline and controls selected using double-selection lasso using a 90% confidence interval. The regression includes county-fixed effects, and standard errors are clustered at the village level.
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 the Self-Reporting Questionnaire 20-Item (SRQ-20) to measure mental health disability. The questions were framed as follows: In the last seven days, how many days have you felt a certain way? Higher scores for the Depression and Disability indices suggest a higher risk of depression. The number of observations varies due to "refuse to respond answers".

Coping strategies

109. The programme had a statistically significant decrease in the total number of coping strategies used by households in response to shocks, with nearly one less coping strategy in both the last month and the last 12 months.

110. To gauge the type and severity of coping strategies used, two standard indices were constructed: the Reduced Coping Strategies Index (rCSI) and the Livelihood Coping Strategy Index (LCSI). The rCSI considers both the frequency and severity of pre-selected coping strategies that the household used in the 12 months prior to the survey. We find that the programme reduced the rCSI index by 0.3 (to 13.7), compared with a comparison group mean of 14, although this result is not statistically significant.

111. We do not find any statistically significant impact of the programme on the LCSI, on the percentage of households reporting the use of no coping strategies, stress coping strategies or crisis coping strategies. There was also no impact observed on the Subjective Resilience Score, a related measure of self-reported resilience and ability to recover from shocks.

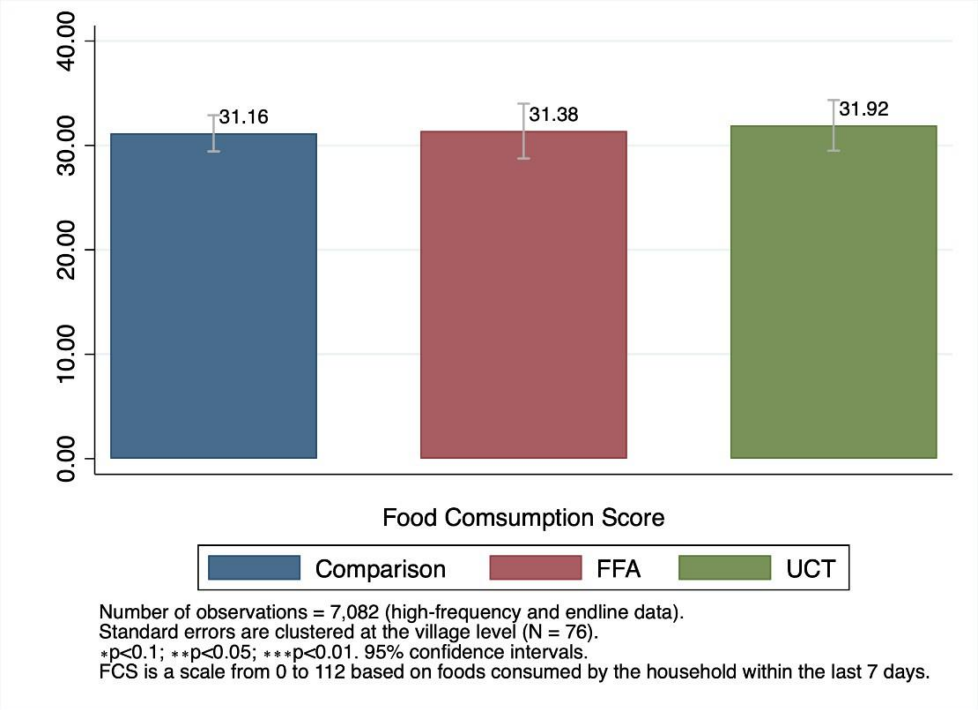
Impact of receiving support for asset creation through FFA versus only receiving cash transfers (Evaluation Question 2)

112. A unique contribution of the impact evaluation in South Sudan, above and beyond the other studies in the Climate and Resilience Window, is the ability to separate impacts arising from the community asset work component of FFA programming from impacts arising from transfers. This learning is made possible by an experiment – done only in South Sudan – in which some communities were randomly assigned to receive unconditional cash transfers during the impact evaluation (UCT communities) and others were randomly assigned to both receive transfers and participate in asset creation activities (FFA communities). This allows us to directly observe the impacts of the transfers against the impacts that occur when asset creation activities take place. Here we highlight outcomes where we find that only one of the two programme arms has a statistically significant effect compared with communities not receiving livelihood activities.

113. Both FFA and UCT groups had positive impacts on food security compared with the comparison group. Average impacts on FCS were virtually identical between the two. However, FFA groups had slightly stronger impacts on FIES, with means of 1.01 and 0.90 respectively, and UCT groups had slightly

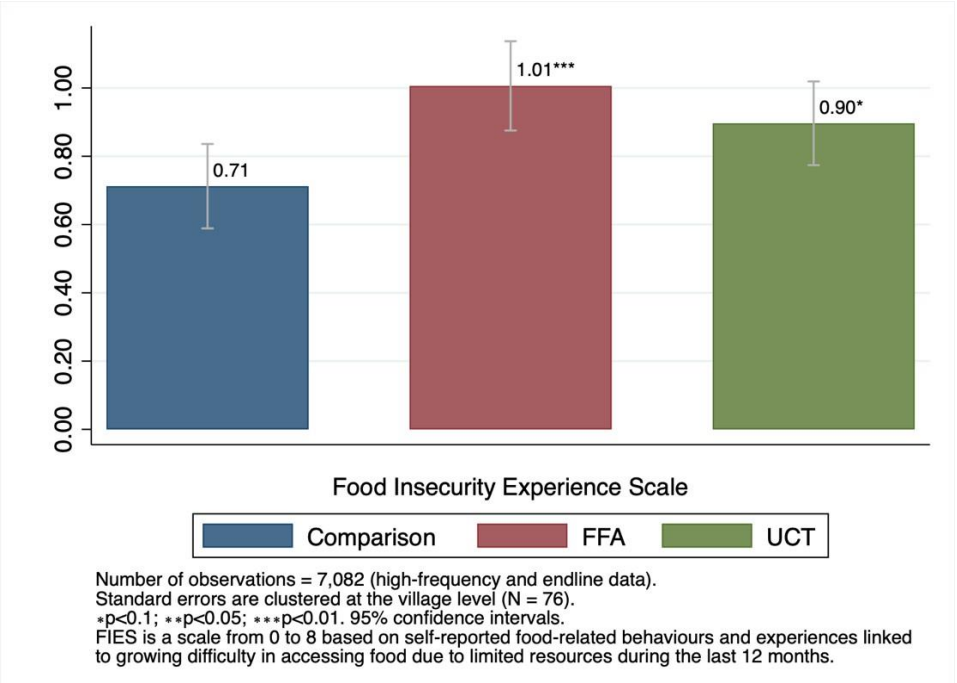
stronger impacts on WDDS, with means of 3.1 and 3.5 respectively. These differences are statistically significant.

Figure 16: FCS by FFA/UCT/comparison



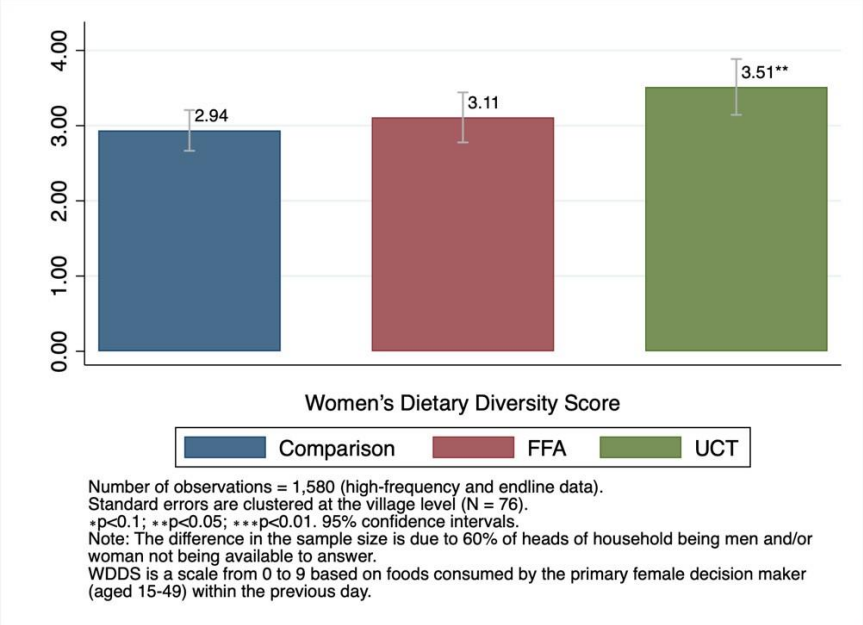
Number of observations = 7,082 (high-frequency and endline data).
Standard errors are clustered at the village level (N = 76).
*p<0.1; **p<0.05; ***p<0.01. 95% confidence intervals.
FCS is a scale from 0 to 112 based on foods consumed by the household within the last 7 days.

Figure 17: FIES by FFA/UCT/comparison



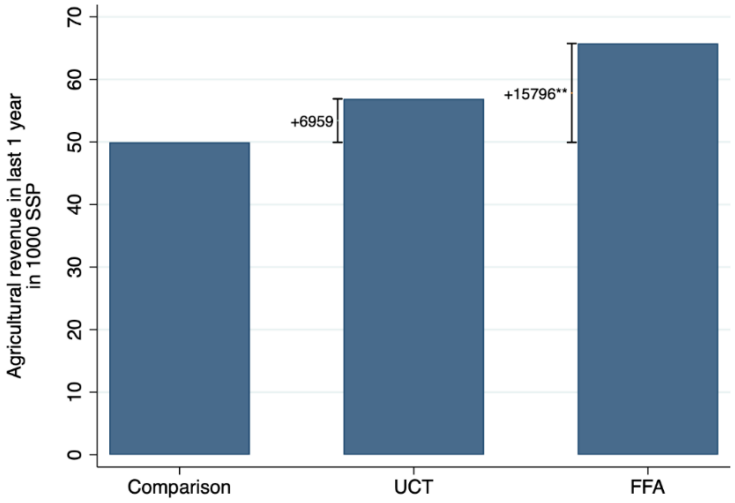
Number of observations = 7,082 (high-frequency and endline data).
Standard errors are clustered at the village level (N = 76).
*p<0.1; **p<0.05; ***p<0.01. 95% confidence intervals.
FIES is a scale from 0 to 8 based on self-reported food-related behaviours and experiences linked to growing difficulty in accessing food due to limited resources during the last 12 months.

Figure 18: WDDS by FFA/UCT/comparison



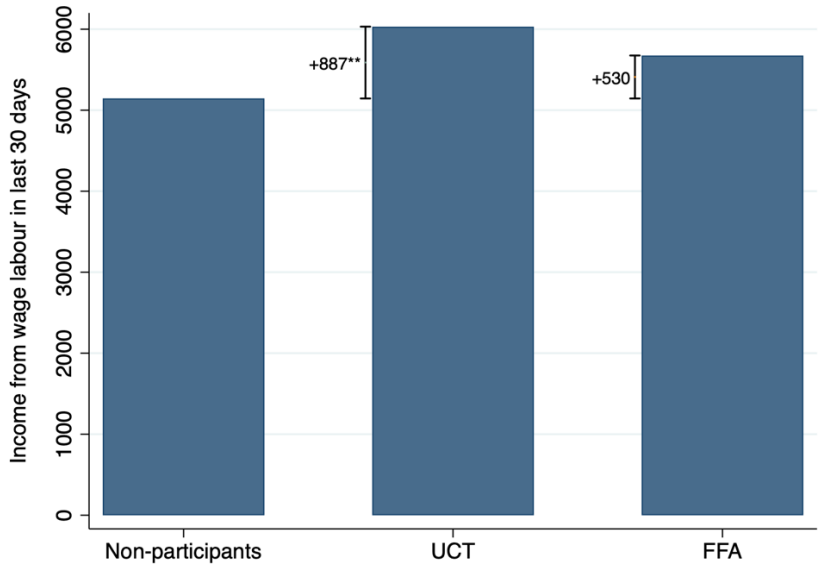
114. Effects on livelihoods also appear to differ between the two groups Figure 19 shows differences in total revenue earned from agriculture in the year prior to the endline survey, comparing FFA, UCT and comparison groups. Compared with households in the comparison group, households in FFA communities earn a total of SSP 65,740 – SSP 15,796 more per year than the SSP 49,944 earned by non-participating households, an effect that is statistically significant. By contrast, the UCT communities earn only SSP 6,959 more (SSP 56,903 total) than the households in communities where no livelihood interventions take place, an effect that is not statistically significant. Similarly, FFA groups spent 0.7 more days per month in agriculture and cultivated 0.15 more plots, on average, than UCT groups. Given that FFA asset creation activities in the South Sudanese context are most often intended to support and complement agriculture, it is not surprising that the communities engaging in these activities saw the biggest returns.

Figure 19: Agricultural revenue by programme type



115. The second outcome highlighting differences in how UCT and FFA impact beneficiaries is earnings from wage labour. UCT increased earnings from wage labour by nearly SSP 900 per household per month (SSP 6,045 total), compared with the average of SSP 5,145 per household per month in the non-participating communities, an effect that is statistically significant. In FFA communities, this impact was smaller, only about 500 additional SSP (5,645 total) per household per month compared with the comparison group, and not statistically significant. This suggests that UCT has a different impact on livelihoods from FFA. When there are no asset activities focused on agriculture, households are more likely to earn additional income from wage labour rather than through agricultural revenue.

Figure 20: Wage labour by programme type



116. Other livelihood outcomes where FFA and UCT had statistically significant differences included livestock and household business, though these impacts were smaller than those on agriculture and wage labour. FFA households had higher rates of owning livestock, time spent rearing livestock, total livestock count and reported consumption of livestock. Interestingly, non-agricultural household business profit was higher in the FFA group by SSP 4,000 compared with the UCT group.

Qualitative insights

In the FGDs, beneficiaries expressed preference for FFA over UCT, as they feel higher satisfaction when receiving money in exchange for their work.

"If you are engaged in farming for instance and you become lucky for the crops to yield well then you will not be hungry again next year. But getting food idly is not good." (UCT village)

"It is the work that you do that brings you something and when you just sit in the shade claiming to be waiting for free food which may come to an end tomorrow when there's no money to continue the program." (UCT village)

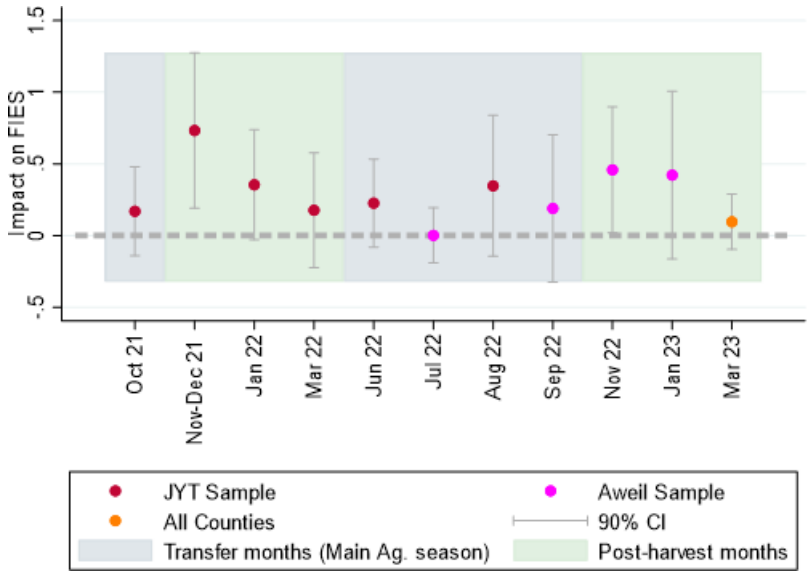
Dynamic livelihood results over time

117. By transforming capacities that allow households to maintain food security over time, the livelihood interventions aim to help households better adapt to their environments, maintain their standard of living, and better absorb shocks and stressors. The unique design of the impact evaluation, incorporating short high-frequency surveys approximately every second month, allows us to directly observe when food security impacts emerge in order to directly associate the timing of impacts with households' ability to absorb shocks over time.

118. Figure 21 shows the impact of the programme on FIES, the measure for which we observed the most significant impacts with the combined data from high-frequency and endline surveys. For this measure of food security, the timing of impacts shows a surprising finding. We did not find statistically significant impacts of the FFA/UCT interventions between April and October, when transfers were planned to be delivered (the grey-shaded region in Figure 21). Instead, the largest and most statistically significant impacts emerge between November and January. This pattern is repeated over each of the two years of the study.

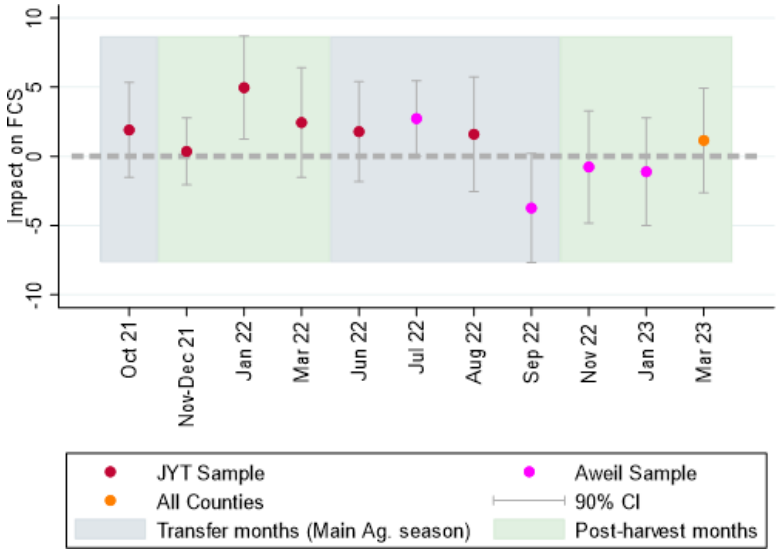
119. However, this pattern of impacts aligns with the findings on impacts on livelihoods. Households benefiting from FFA and UCT seem to invest most in the production of basic staple crops (sorghum and groundnut). Impacts on livestock rearing, business ownership or wage income are smaller. As a result, households benefiting from FFA and UCT may find that the post-harvest periods when they have just finished receiving their transfers and harvesting the major crops are the periods when their livelihoods allow them to gain better food security.

Figure 21: FIES impacts over time



120. Figures 21 and 22 repeat the measurement of dynamic effects for the other measure of food security captured in high-frequency surveys, FCS. Impacts in the first year look very similar to the impact on FIES. In the second year, we do not find statistically significant effects on FCS, which may be a sign that impacts were more sensitive to the kind of relatively severe food insecurity that is best measured by FIES.

Figure 22: FCS impacts over time



Heterogeneity analysis

121. One final comparison that can be made on the topic of livelihood impacts is whether different types of households benefited more or less from the programme. Finding that different types of households benefit differently from the programme can have implications for whether there are trade-offs involved in targeting the households who have the biggest benefits versus those who are the most vulnerable, whether changing targeting would change the impacts of the programme and whether changes in programming would affect the most vulnerable households for a given approach to targeting.

122. Here, we consider how results varied by two important household characteristics: whether a household cultivated land for agriculture, and the gender of the household head. These characteristics were not randomly assigned, and any observed differences in impacts may be due to other factors with which they are correlated – for example, households with female heads are likely to be single-headed, with fewer adults residing in the household, and may be more vulnerable than male-headed households in a variety of ways. However, observing trends in how the programme benefited groups differently can shed light on ways to improve it going forward and align programming to target households who may be especially vulnerable.

123. Whether households cultivate land appears to be a major household characteristic which leads to differences in programme impacts. At baseline, more than 90 percent of all households in the sample cultivated land, so those without access to land are a minority. However, given that this group likely includes the most vulnerable households, it is worthwhile examining how they were affected.

124. Food security appears to be highest among households who cultivate land. While slight differences appear round by round, in general we see that households who have access to the programme and who cultivate land are best off, followed by comparison households who cultivate land, then programme households who do not cultivate land and, finally, comparison households who do not cultivate land.

125. Unsurprisingly, households who cultivated land at baseline saw significantly higher impacts on agricultural revenue compared with households who did not cultivate land. Given that the primary effect of the programme on food security came through increased revenues from agricultural production, it may be the case that households without land did not benefit as much.

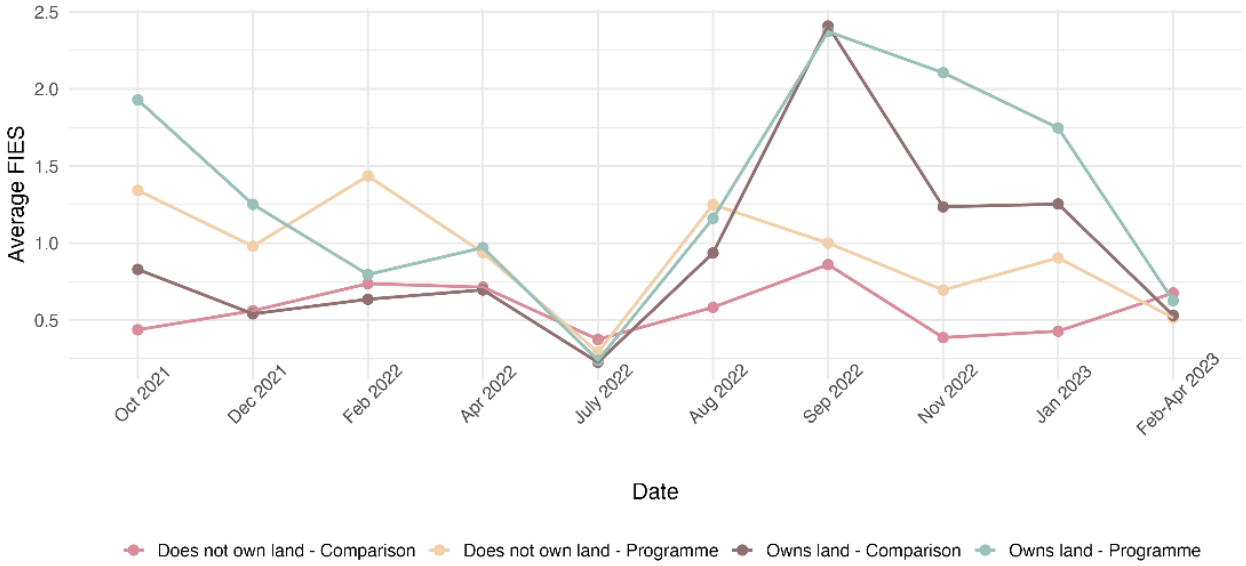
126. The second important household characteristic is the gender of the household head. We find that female-headed households earned SSP 13,400 less in agricultural revenue than male-headed households. This result was even stronger in FFA communities compared with UCT communities. This can be explained by the fact that female-headed households are less likely to cultivate land, and, when they do, their farm size is smaller than that of male-headed households. The programme also had stronger impacts on livestock ownership in male-headed households. No differential impacts of the programme are observed by gender on non-agricultural business or wage labour.

127. These effects suggest there is a trade-off. FFA supports agricultural income, which boosts food security impacts, but this may result in fewer benefits to female-headed households, who do not have land and so do not benefit as much from FFA. This suggests the need to also prioritize assets according to the specific needs and characteristics of the most vulnerable populations.

Heterogeneity of food security dynamics

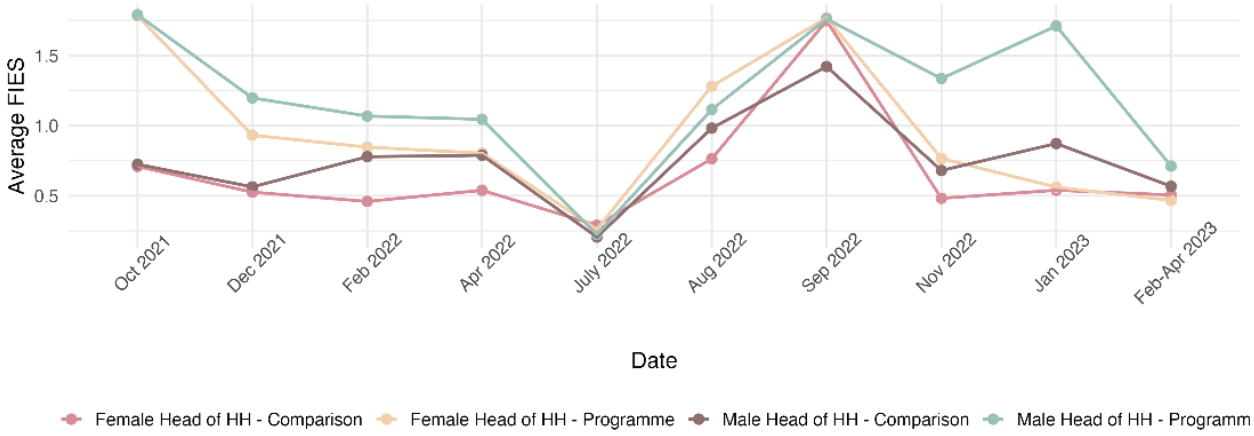
128. Putting together the heterogeneity with the timing effects, we can learn how access to FFA/UCT determines both when and for whom these programmes improve food security. If impacts on agricultural revenue are driving the dynamics of food security impacts, then we should expect to see differences in how the programme affects food security before and after harvest months based on whether households own the land they cultivate. In Figure 23, we find that households who have access to the programme have better food security than households who do not, whether or not those households own land. But there is also seasonality to the impacts consistent with agriculture. Food security as measured by FIES improved in the months during and immediately following normal harvest periods – September to January – for people who owned land. In 2022, this impact of harvests on food security was great enough that households who owned land but did not have access to FFA/UCT actually had better food security for several months than households who had access to FFA/UCT but did not own land. Across the two years, the households who had the best food security in the greatest share of rounds were those who both had access to FFA/UCT and owned land, with the biggest impacts for such households during or just after the harvest (September to January). Overall, these findings suggest that this programme is most successful at improving food security during and after the harvest for households who have land they cultivate.

Figure 23: FIES – Land ownership



129. The results in Figure 23 have implications for when the impacts of FFA/UCT will be the biggest for male- versus female-headed households. Figure 24 shows trends in food security for male- versus female-headed households with and without access to FFA/UCT. The group for which impacts are most apparent is male-headed households with access to FFA/UCT in the months during and immediately following harvests. While it is encouraging to see that the programme seems to be boosting food production and food security, these findings suggest that adjustments to programming that consider assets women could benefit from, especially during the difficult months between planting and harvest, could help ensure that these benefits accrue for the vulnerable group of female-headed households.

Figure 24: FIES – Gender



Education results

130. Results of the education RCT are presented in Figures 23 to 26. The sample of schools was smaller than the sample of villages used for the livelihoods RCT, so statistical precision is lower for education outcomes. However, it is encouraging to see that the direction of these impact estimates is largely favourable, and this suggests student outcomes in UNICEF-supported schools are relatively better than in schools not benefiting from the UNICEF package.

131. The schools included in the education RCT have also largely benefited from the WFP-implemented school feeding support. Only 5 of the 30 schools included in the study did not receive any school feeding support during the study period. Four were comparison schools, and one was a UNICEF-supported school, which may have created an advantage for the UNICEF-supported arm of the experiment. Moreover, some UNICEF-led interventions had a blanket approach, including back-to-school campaigns and the provision of school supplies. Consequently, the impact of these interventions has not been captured for lack of a comparison group.

Impacts on enrolment

132. Data on 1,554 children aged 5 to 18 were collected at endline. This included "entry-point" children (selected for the impact evaluation from school lists) and their siblings or other young live-in relatives. Their education-related outcomes are summarized in Table 11: Education summary statistics, household surveys, and differences between students in UNICEF-supported schools and comparison schools are shown in Figure 25.

Table 11: Education summary statistics, household surveys

Outcome	Baseline		Endline	
	Number children	Mean	Number children	Mean
Ever in school (yes is 1, no is 0)	1,713	0.78	1,554	0.81
Main reason never in school was financial (yes/no)	382	0.38	298	0.41
In school at the time of the survey (yes/no)	1,331	0.95	1,256	0.89
Missed school last 30 days (yes/no)	1,209	0.18	1,116	0.20
Age when child started school	1,159	8.10	1,055	7.29
Current grade is repeat (yes/no)	not collected at baseline		1,055	0.19
Went up in grade (yes/no)	not collected at baseline		780	0.70

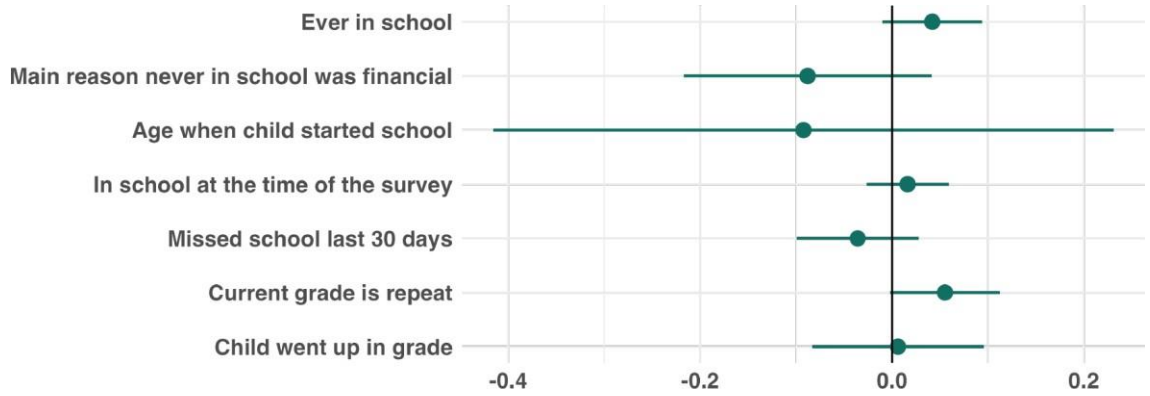
Note: The sample includes children aged 5–18 years during the entire study period.

133. While not statistically significant, outcomes mostly show a favourable impact of the UNICEF package on school attendance. For instance, children from households where at least one child was on the enrolment list of a UNICEF-supported school in 2021 were 4.2 percentage points more likely to have ever registered in Primary 1 compared with children from comparison schools.[32] Similarly, children who were offered the chance to study at a UNICEF-supported school were also 9 percentage points less likely to say that they had never enrolled in school due to financial constraints and were 3.5 percentage points less likely to skip school. The only estimate that is counterintuitive is that for grade repetition, as children with access to UNICEF-supported schools seem to be more likely to repeat a grade. There is suggestive evidence, however, that this may be due to slightly higher retention rates at UNICEF-supported schools – instead of dropping out, children may opt to repeat the grade.[33]

32 These are children from households where at least one child was on the enrolment list of a control school in 2021.

33 Estimations for the age of enrolment in Primary 1 are imprecise and statistically not significant. The interpretation would be that children in UNICEF-supported schools start school roughly one month younger on average – i.e. 0.1 × 12 months is 1.2 months. However, a larger sample is required to confidently make a statement in this regard.

Figure 25: Education impact estimates, household surveys



Note: Estimates using endline data and controlling for the age and gender of the child, and the education of the household head. Errors are clustered at the level of schools – i.e. the randomization unit. The 90% confidence intervals are plotted. In order of the plotted variables: N=1,554, N=298, N=1,055, N=1.256, N=1,116, N=1,055, N=780, where N is the sample size.

Impacts on attendance and grades

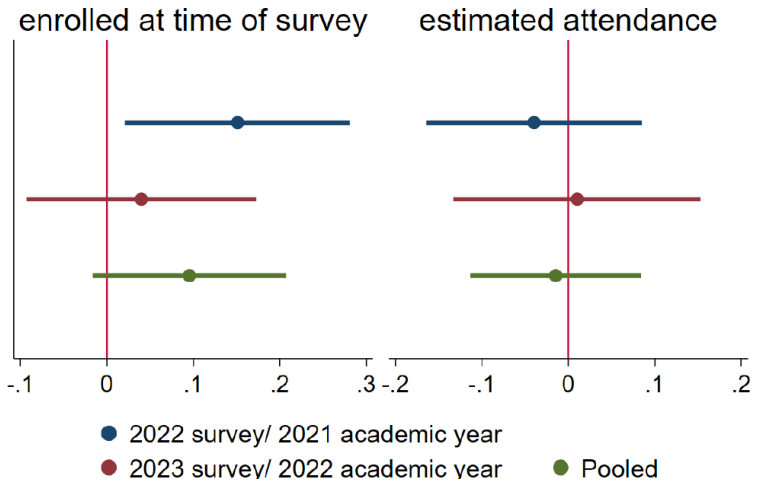
134. Seventy-six percent of the entry-point children were still in school at the start of the 2022 academic year, and 67 percent at the start of the 2023 academic year. Children going to UNICEF-supported schools were 15 percentage points more likely to be in school at the start of the 2022 academic year (one year after baseline). The estimate is statistically significant. However, the impact fades, and there is no statistically significant difference between the UNICEF-treated and comparison schools at the start of the 2023 academic year (two years after baseline). Children in the UNICEF programme schools are only 4 percentage points more likely to still be in school, but this effect is not statistically significant.

Table 12: Education summary statistics, attendance and grades surveys

Outcome	End of 2021 academic year			End of 2022 academic year		
	Number children	**Mean**	**Standard deviation**	**Number children**	**Mean**	**Standard deviation**
Enrolled time of survey (yes/no)	450	0.76	–	450	0.67	–
Est. attendance last year*	450	0.57	0.31	450	0.61	0.37
Average grade across exams**	326	46.93	19.67	297	55.68	19.74
Sat at least 1 of 4 exams (yes/no)	450	0.72	–	450	0.66	–

*Range is 0% (no attendance) to 100% (full attendance). **Computed only for the children who took exams, 1 to 100.

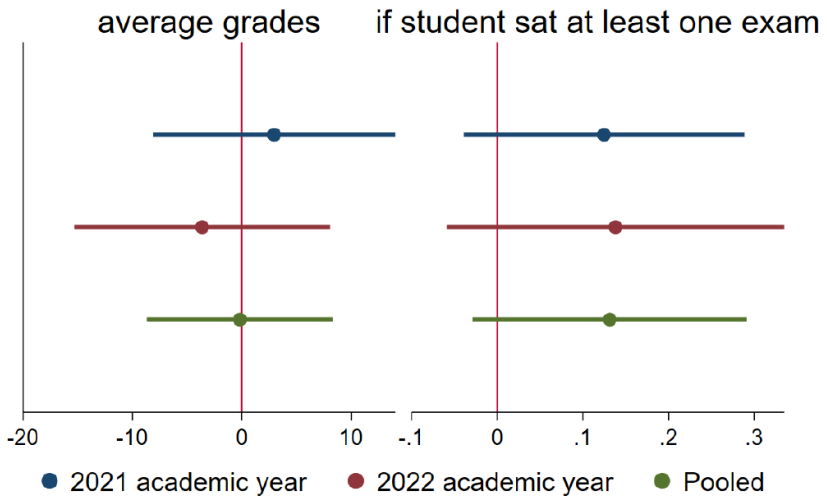
Figure 26: Enrolment and attendance impact estimates, school surveys



Note: This figure shows impacts from being in a UNICEF school among entry-point children based on enrolment data from the 2021and 2023 academic years, and attendance data from the 2021 and 2022 academic years, with 90% confidence intervals. The pooled data combining all academic years are also shown for higher statistical confidence.

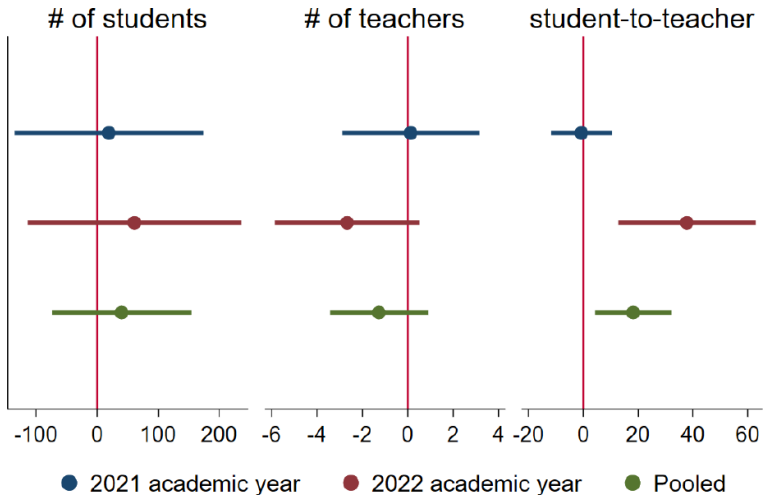
135. As per Figure 26, there is suggestive evidence that children that were registered at a UNICEF-supported school at the start of the 2021 academic year were more likely to take end-of-year exams: a 13-percentage-point higher chance across the 2021 and 2022 academic years. Despite this, there was no impact on grade averages. The impact may be diluted by the low- performing students that are retained (as opposed to dropping out) in the UNICEF-supported schools.

Figure 27: Exam impact estimates, school surveys



Note: This figure plots the impacts of being in a UNICEF school among entry-point children based on the 2021, 2022 and combined academic years, with 90% confidence intervals. Exams covered maths, English, social and natural sciences.

Figure 28: Student and teacher numbers, school surveys



Note: These observations were made in school settings. The figure plots the UNICEF treatment coefficients based on (a, blue) data collected in November 2021 (N=30), (b, red) data collected in April–May 2023 (N=30) and (c, green) data from (a) and (b) pooled in one dataset to improve the precision of estimates (N=60). For (a) and (b), outcome variables are regressed on the treatment variable, and Huber–White standard errors are used. For (c), the regression also controls for the wave of data collection. The 90% confidence intervals are plotted. Volunteer teachers are excluded. Only the formally employed teachers are considered.

Impacts on student and teacher numbers

136. Figure 28 shows that the UNICEF-supported and comparison schools were not different in terms of the number of students and teachers and the ensuing student- to-teacher ratio at baseline (blue point estimates and their confidence intervals). However, as of endline data collection, it appears that the UNICEF programme schools may have attracted more students than the comparison schools (60 more students on average), although the estimate is not statistically significant. At the same time, UNICEF-supported schools seem to have lost teachers (two to three fewer teachers on average) compared with the comparison schools. This estimate, too, is not statistically significant. However, when the two trends are combined to compute the student-to-teacher ratio, they become strong enough to lead to a statistically significant difference between UNICEF programme schools and comparison schools. Specifically, UNICEF-supported schools have a student- to-teacher ratio that is 90 students per teacher, higher by 38 students per teacher compared with comparison schools. This can be due to the dynamics between volunteer teachers and formally hired teachers, or the attrition of the better-trained teachers from the UNICEF-supported schools, who seek opportunities elsewhere. These are, however, hypotheses that the data do not allow us to confirm. On the other hand, the increase in the number of students may also reflect a higher retention rate of students in UNICEF-supported schools and be a weak hint that children may go to UNICEF-supported schools at a younger age, which translates into a possibly higher annual intake of Primary 1 students in UNICEF-treated schools.

137. In terms of methodological limitations, it is important to keep in mind that the impact evaluation focused on 30 schools for the RCT of education components, because this was the total of all schools eligible to start receiving interventions during the study period. This is a fairly small sample for an RCT, and it is limited to schools in only one county. However, future impact evaluations could build on this foundation for enhanced learning (for instance, by adding schools to this sample and exploring new questions).

138. In addition, the package of interventions is diverse, and it may not be the case that every school received exactly the same component interventions in exactly the same way. If different components have different impacts (for example, some components affect attendance and others affect grades), the estimated impacts will be less clear.

Impact on school infrastructure

139. Data on school infrastructure were collected from school administrators, but as of the endline survey no construction of classrooms had yet taken place. Notes on the findings of this survey are in Annex B.

8. Non-experimental results on WASH, health and nutrition

Analysis of distance to facilities

140. Some JRP initiatives in South Sudan (health, nutrition, sanitation and education) operated at the community level, and could not be studied in the same way as livelihoods and education interventions. However, with the available data in these communities, we can still investigate how distance to these services affected outcomes. Other factors can be correlated with both distance to project sites and the outcomes of interest. Still, this can give suggestive evidence that access to project services helped beneficiaries. Distance is measured by proximity to a nutrition or health facility, which we categorize as close, medium or far, depending on the distance brackets that are specific to each type of facility.

Nutrition

141. In this section, we focus on four indicators measuring child feeding and nutrition outcomes. This includes Continued Breastfeeding (CBF), Minimum Dietary Diversity (MDD), Minimum Meal Frequency (MMF) and Minimum Acceptable Diet (MAD).[34] CBF is the ratio of children 12–23 months old who were fed breast milk during the day before the survey took place. MDD is the ratio of children aged 6–23 months who consumed at least five out of eight defined food groups during the day before the survey.[35] MMF is the ratio 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 day before the survey.[36] Finally, MAD is the ratio of breastfed children who met both the MDD and MMF criteria and of non-breastfed children who received at least two milk feedings and met the MDD and MMF criteria.

Table 13: Average nutrition indicators

Outcome	Endline	
	Number of children in age category	Ratio of children who meet the indicator
CBF, 12 to 23 months	152	0.57
MDD, 6 to 23 months	219	0.15
MMF, 6 to 23 months	219	0.24
MAD, 6 to 23 months	219	0.05

Note: Endline data from the livelihoods experiment. Data collected from Juba, Yambio, Torit and Aweil Centre. The JRP did not reach nutrition facilities in Aweil West during the time of data collection.

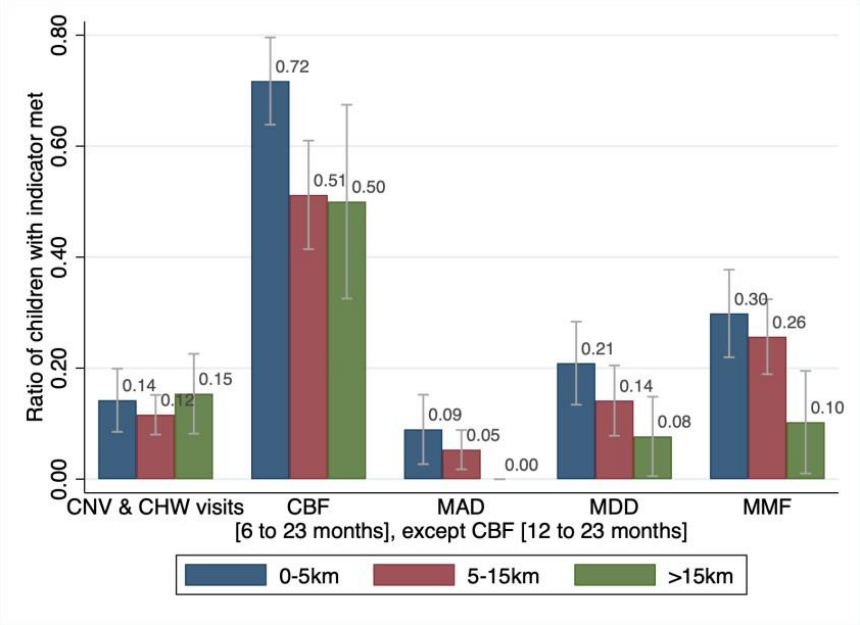
142. Endline data are used to conduct the analysis. Among the households interviewed, 219 reported having children aged between 6 and 23 months and 152 had children aged 12 to 23 months. Only 5 percent of the sampled children aged 6 to 23 months met the MAD criteria,

34 Other indicators, such as Exclusive Breastfeeding (EBF), had too few observations to allow for an analysis. This was mainly linked to the narrow age interval for which the indicator had to be computed.
35 The eight food groups consist of: (i) breast milk, (ii) grains, roots and tubers, (iii) legumes and nuts, (iv) dairy products (milk, yogurt, cheese), (v) meat, fish or poultry, (vi) eggs, (vii) vitamin-A-rich fruits and vegetables, (viii) other fruits and vegetables.
36 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 (including milk feeds).

while 57 percent of the observed children between 12 and 23 months of age were still being fed breast milk.

143. Figure 29 investigates how these measures differ by access to a nutrition facility. We compute the average CBF, MDD, MMF and MAD for households living across the three distance categories: less than 5 km, 5 km to 15 km and beyond 15 km. The figure suggests that the farther away households are from the closest nutrition facility that received support from the JRP, the fewer children meet the food consumption criteria for an adequate diet. Average CBF drops from 72 percent to around 50 percent for households living within 5 km of a facility relative to those living farther away. Similarly, while 9 percent of children meet the MAD criteria if they live within 5 km of a nutrition facility, none residing more than 15 km from the closest nutrition facility meet these criteria. A similar decrease is observed for the MDD and MMF indicators, albeit slightly more gradual.

Figure 29: Correlation between access to nutrition facilities and children's food consumption



Notes: Figure 27 shows average rates of community nutrition volunteer (CNV) and community health worker (CHW) visits, as well as CBF, MAD, MDD and MMF, based on geographic distance between households and nutrition facilities, with 95% confidence intervals. The rates for the CNV and CHW visits are computed based on reports from households with children under 5 years of age. The geographic distance is computed based on the GPS coordinates of households and nutrition facilities. Endline data from the livelihoods experiment. Data collected from Juba, Yambio, Torit and Aweil Centre. The JRP did not reach nutrition facilities in Aweil West during the time of data collection.

144. Overall, these results suggest that children's food consumption is correlated with how close they live to a nutrition facility. It is important to emphasize that this relationship is correlational and not causal. Access to a nutrition facility is correlated with other outcomes that may affect consumption (e.g. nutritional facilities are often located close to urban centres with better access to food). These results support the use of CNVs, who are mobile and can reach areas that do not have access to facilities. They can reduce the need to be physically close to a nutrition centre and potentially dampen the relationship we observe in Figure 27 However, we find that relatively few households were visited by CNVs at endline. Approximately 13 percent of households with children under 5 years of age reported visits by CNVs in the last year, and 7 percent of households were provided a mid-upper arm circumference

(MUAC) tape and were trained in how to use it.[37,38] The difference in the percentage of households visited by CNVs in the last year is not statistically significant across the various distance categories: 14 percent for households residing within 5 km of a nutrition facility, 12 percent if the distance is between 5 and 15 km and 15 percent for households more than 15 km away.

145. The observation that (i) children's food consumption declines with distance and (ii) CNV visits are infrequent and not specifically aimed at households farther from nutritional facilities implies a potential benefit in increasing the coverage of CNVs to target the hardest-to-reach locations. This assumes that one of the main reasons for low Food Consumption Scores for hard-to-reach locations is limited access to information, as opposed to other factors such as limited access to a diverse range of food groups due to the remoteness of households.

Health

146. The health outcomes of interest include vitamin A supplementation, measles vaccination and health-seeking behaviours. From among the 885 households with children aged between 6 months and 5 years, 75 percent reported that their children had received a dose of vitamin A in the last six months and 84 percent reported having received the measles vaccination. Then, from among approximately 990 households with children aged 0 to 5 years, 29 percent reported that their children had had loose or watery stools in the last two weeks, of whom 71 percent sought treatment. Similarly, 53 percent reported that their children had a fever, cough or other respiratory symptoms in the last two weeks. In 65 percent of these cases, caretakers sought treatment advice. Households resort to multiple sources of advice, although the majority rely on government/public health facilities. Some also consult with friends, relatives or traditional practitioners, and more so in the case of diarrhoea-related symptoms – in these cases, 14 percent asked friends or relatives for advice, and 11 percent went to a traditional practitioner.

Table 14: Distance to JRP-supported facilities and average health outcomes

County	Average dist. JRP facility, km	# JRP facilities	Sought treatment	Vitamin A dose last six months	Measles vaccination
Juba	21.6	15	0.89	0.91	0.91
Torit	8.7	15	0.87	0.94	0.93
Yambio	4.3	15	0.84	0.74	0.86
Aweil Centre	60	1	0.65	0.67	0.82
Aweil West	62	1	0.58	0.73	0.82

Note: The age interval relevant for exploring health-seeking behaviours is 0 to 60 months. For the other indicators, the interval is 6 to 60 months. Geographic distance is computed based on the GPS coordinates of households and health facilities. Endline data from the livelihoods experiment.

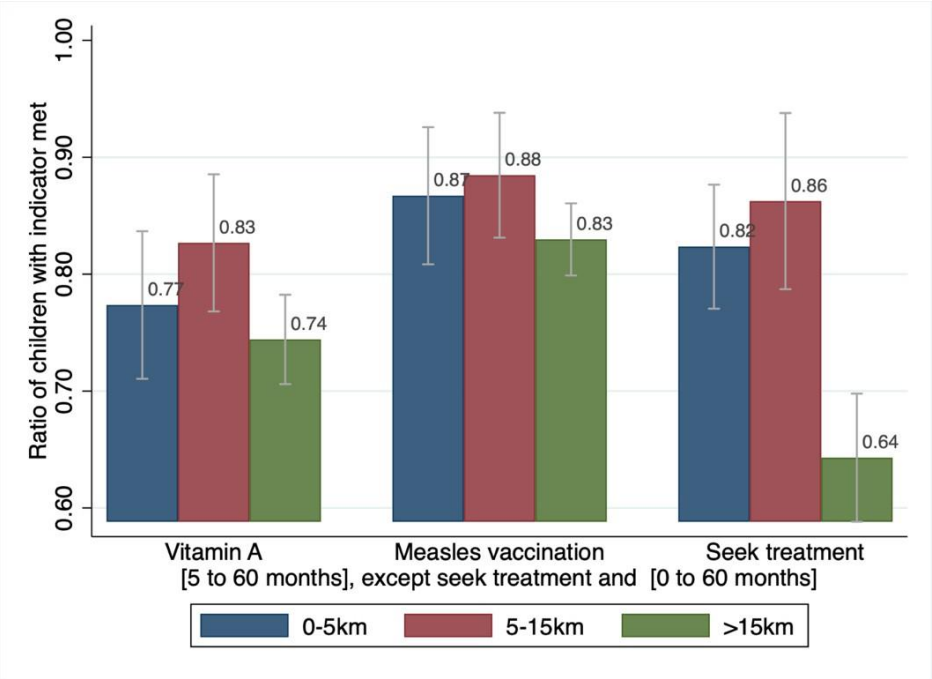
147. We investigate how these measures differ by access to health facilities. First, we note that distance to JRP health facilities is negatively correlated with children's health-related outcomes, although this observation mostly applies to households living more than 15 km from a health facility. The differences in average outcomes for households residing 0–5 km versus 5– 15 km from a facility are not statistically significant. Second, Table 13 shows that average distances to

37 This came against the background of COVID-19 restrictions, which meant it was no longer possible to implement malnutrition screenings by gathering large crowds of children and their caregivers.

38 The sample used to compute these summary statistics was meant for the livelihoods and education experiments. Thus, the sample may be more inclusive and reach beyond the households directly targeted by the WFP/UNICEF-supported nutrition facilities. Nevertheless, the sample is restricted to households that had children in the relevant age groups.

JRP-supported health facilities vary considerably across counties. Consequently, we are largely comparing households from the county of Yambio, for most of whom JRP health facilities are within 5 km of their location, with households from Torit (usually located at medium distance), and households from the county of Juba and Northern Bahr el Ghazal, who may be close to health facilities in general but are far away from JRP-supported health facilities. Consequently, county characteristics (as opposed to distance from facilities) may explain the difference in health outcomes.

Figure 30: Correlation between access to health facilities and health-related indicators

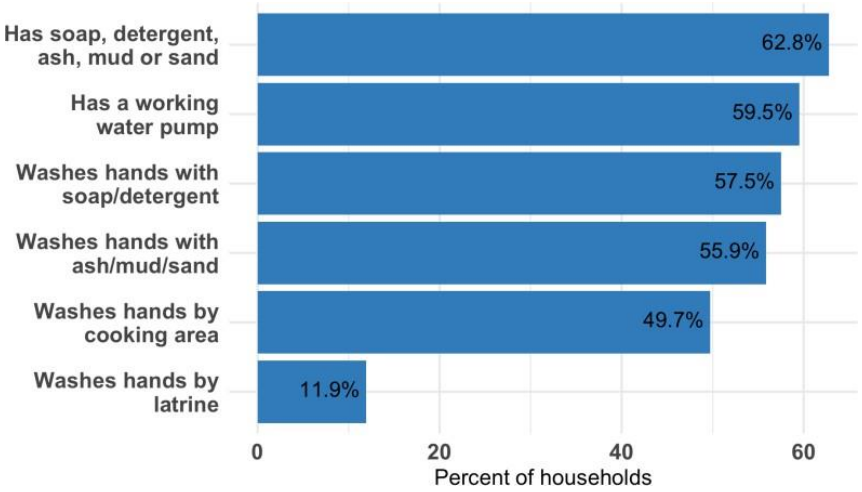


Note: The figure shows the average rates of vitamin A supplementation, vaccination and health-seeking behaviours, with 95% confidence intervals. The age interval relevant for exploring health-seeking behaviours is 0 to 60 months. For the other indicators, the interval is 6 to 60 months. Geographic distance is computed based on the GPS coordinates of households and health facilities. Endline data from the livelihoods experiment. Data collected from Juba, Yambio, Torit, Aweil Centre and Aweil West.

WASH

148. In this subsection, we present summary statistics related to water and sanitation at endline. The JRP targeted schools and health facilities as entry points for WASH interventions. Households were not individually targeted. Therefore, we do not apply the same distance analysis as for the nutrition and health facilities because households are not expected to use health or school facilities for their daily WASH requirements, and the data we collected do not allow us to study the usage of WASH infrastructure at a school or health clinic level. Instead, we present data on WASH-related behaviours in Figure 31. Through this figure, we learn that approximately 63 percent of households have soap, detergent, ash, mud or sand available for hand washing, and 60 percent have a working hand-washing facility. Moreover, 58 percent wash their hands with soap/detergent. Lastly, most households wash their hands close to the cooking area, although they should do so close to where their latrines are. Nevertheless, given that the percentage of households with access to a latrine is very limited (70 percent of households report no access), the fact that only 12 percent report washing their hands by the latrine is not surprising.

Figure 31: Summary stats for related behaviours (endline)



149. Lastly, endline data were used to elicit households' willingness to pay for kiosk water, as UNICEF was specifically interested in learning about the potential to support a market for clean water in project areas. Households were presented with several hypothetical scenarios in terms of water price options. For the least expensive water – that is, SSP 0.50/litre – 86 percent of households preferred to receive 120 litres of water as opposed to the equivalent in cash, in which case the households would source the water on their own. Then, for UNICEF's price of interest, SSP 1.25/litre, 81 percent of households still preferred receiving 120 litres of water as opposed to the equivalent in cash. Lastly, for the most expensive water, priced at SSP 3.75/litre, 68 percent of households continued to prefer water over cash. Households in Juba were the most willing to pay for kiosk water, followed by Aweil West, Aweil Centre, Yambio and Torit. Importantly, a water kiosk would only be viable if it did not take households more than 45 minutes to reach the kiosk, wait in line, collect the water and come back. Very few households would be willing to access water kiosks if it took them longer than 45 minutes to complete the trip, and 10 percent of households even reported not being willing to use the services of a water kiosk regardless of its location. Regarding actual access to a water kiosk, 19 percent of the interviewed sample already has access to a water kiosk, and 88 percent of those with access also reported buying water from the kiosk.

Analysis of the co-location of programme activities

Livelihoods co-location with nutrition, health and WASH interventions

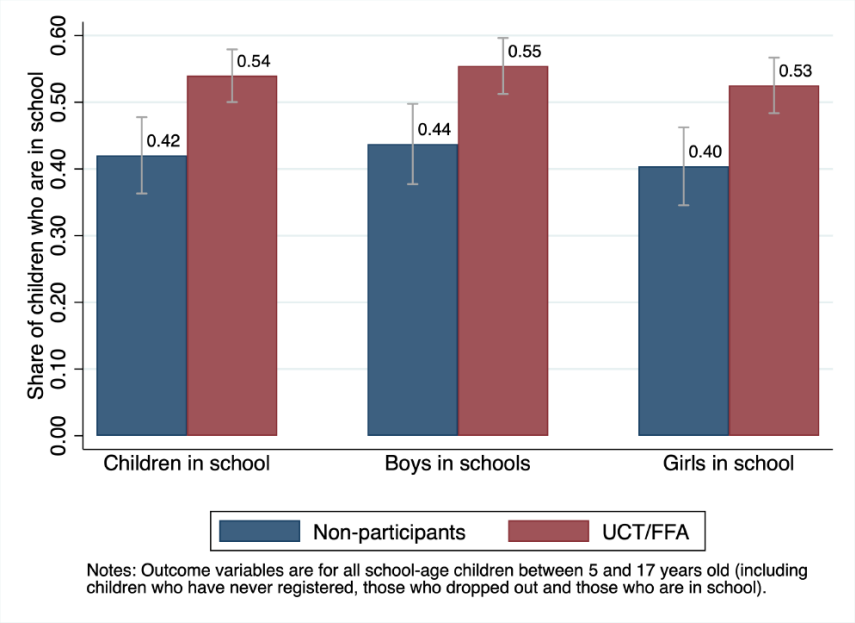
150. A key area of interest among the programme teams was in the impact of integrated programming. While we were unable to create experimental comparisons between individual project components, the impact evaluation was able to examine whether there are any additional effects on account of the co-location of interventions – that is, having access to livelihoods as well as nutrition or health interventions.

151. Specifically, the analysis explores whether livelihood interventions can compensate for the negative effects of distance to JRP-supported services on children's food consumption or health outcomes. In this regard, the analysis does not find evidence that FFA or UCT programming reduces the disadvantage of living far away from nutrition or health facilities or that livelihood interventions affect children's food consumption and health-related outcomes. This means that while livelihoods programming has an impact on its intended outcomes, and access to nutrition and health facilities leads to better child-level outcomes, the co-location of these interventions does not lead to additional improvements that are statistically significant in the short run. Nevertheless, there could be longer-term complementarities that the impact evaluation is unable to capture due to its limited coverage of only two programme cycles.

Livelihoods co-location with education interventions

152. The co-location of livelihoods interventions with education interventions follows a similar pattern, as livelihoods programming cannot fully make up for the negative correlation between education outcomes and distance to JRP-supported schools. However, unlike the case of children's food consumption and health outcomes, children's education outcomes improve as a result of livelihoods programming. A child whose household receives livelihoods support is about 12 percent more likely to be in school as compared to their counterpart in a household that does not benefit from livelihoods support, and these results are statistically significant for boys and girls. For girls, the impact is bigger for households who live closest to schools where the JRP school-based programming is being implemented. For boys, the effect is bigger for households that live farther away.

Figure 32: Access to livelihoods programming and enrolment in school



Notes: Outcome variables are for all school-age children between 5 and 17 years old (including children who have never registered, those who dropped out and those who are in school).

9. Main findings and considerations for future programming

153. This last section answers the EQs posed by the impact evaluation and discusses considerations for future WFP programmes.

EQ1. What is the impact of livelihoods programmes on household resilience?

154. Based on the programme theory of change, we hypothesized that, in the short term, the WFP resilience programme would support people to maintain their food security by meeting households' immediate food needs, including those that may arise as a result of a shock or the lean agricultural season. In the medium term, the WFP resilience programme is expected to support households by strengthening capacities to improve food security more permanently, including when exposed to multiple or recurring shocks. For instance, these capacities include livelihoods, assets, savings and social support.

155. The programme had positive impacts on food security, particularly in supporting households to shift away from the worst forms of food insecurity and towards intermediary categories (as measured by the FIES). Improvements in food security were not consistent throughout the year, though. When analysing the high-frequency data, we observe bigger impacts during the post-harvest season, and no significant impacts during the lean season.

156. Almost two years after the start of the intervention, programme-supported households adopted varied livelihood strategies: WFP beneficiaries earned more agricultural revenue (+11,300 SSP/year, representing almost 30 percent of average annual revenue), harvested more crops (+60 kg food/year), owned more farm assets (+0.3 tools), were more likely to own livestock (+~1 animal) and earned more from wage labour (+600 SSP/month/HH).

157. Food security appears to be highest among households who cultivate land, in both the FFA and UCT groups. Unsurprisingly, households who cultivated land at baseline saw significantly higher impacts on agricultural revenue compared with households who did not cultivate land. Given that the primary effect of the programme on food security came through increased revenues from agricultural production, it is likely that households without land did not benefit as much.

158. Although the programme had a positive impact on agricultural production for all households, we also find that female-headed households earned SSP 13,400 less in agricultural revenue than male-headed households. This result was even stronger in FFA communities than in UCT communities. This is explained by the fact that female-headed households are less likely to cultivate land, and when they do, their farm size is smaller than that of male-headed households. The programme also had a stronger impact on livestock ownership in male-headed households.

Consideration #1. Additional lean season support (including revising transfer adequacy).

159. Additional efforts to help households extend their food security into the lean season may help improve overall resilience even further. For example, adjustments to the timing of transfers to make them more regular or to make a greater share of funds available at the beginning of the transfer period during the lean season could help households smooth over the difficult lean season months. Complementary interventions on savings and credit groups or ways to help households plan their expenditure over difficult seasons could also help households smooth their income over the year.

160. Limited impacts on food security during the lean season could also be explained by high inflation levels, which reduced beneficiaries' purchasing power, as well as a culture of sharing, which is also supported by qualitative evidence. Delays in transfer distribution in some villages due to conflict and other operational challenges could have also led to people being less protected during this difficult season of the year. Adjusting the value of transfers to the cost of essential needs or food basket could

also enhance the impacts during the lean season, although this impact evaluation did not test whether larger transfers lead to better outcomes.

Consideration #2. Balancing and prioritizing other assets that benefit the most vulnerable (female-headed households, landless households) and that also support non-agricultural livelihood strategies.

161. Another important finding is that not everyone benefits equally from the agricultural focus of asset activities, such as landless and female-headed households. These effects suggest that there is a trade-off: FFA supports agricultural income, which boosts food security impacts, but this may come at the expense of female-headed households, who do not have land and so do not benefit as much from FFA. An implication for future programming is to consider balancing and prioritizing other assets in ways that are locally viable and gender-sensitive, and support non-agricultural livelihood strategies.

EQ2. What is the added value of asset activities beyond the impact of transfers alone?

162. Both communities working on asset creation activities in exchange for food or cash transfers and communities receiving unconditional transfers experienced increases in food security following the programme, and the effects were similar in both groups. However, the mechanisms were different: FFA had a stronger impact on agricultural production, while UCT was more effective at increasing asset ownership and wage labour outside of the household.

163. Households in FFA communities earned SSP 15,796 more (SSP 65,740 total) than the SSP 49,944 earned by non-participating households. By contrast, the UCT communities earned only SSP 6,959 more (SSP 56,903 total) than the households in communities where no livelihoods interventions take place, an effect that is not statistically significant. Similarly, FFA groups spent 0.7 more days per month in agriculture and cultivated 0.15 more plots, on average, compared with UCT groups. Given that FFA asset creation activities in the South Sudanese context are most often intended to support and complement agriculture, it is not surprising that the communities doing these activities saw the biggest returns.

164. Meanwhile, UCT increased earnings from wage labour by nearly SSP 900 per household per month (SSP 6,045 total), compared with the average of SSP 5,145 in the non-participating communities, an effect that is statistically significant. In FFA communities, this impact was smaller: only about 500 additional SSP per household per month (SSP 5,645 total) and not statistically significant compared with the comparison group.

Consideration #3. Relative cost-effectiveness of FFA compared with UCT over time.

165. UCT and FFA have their respective merits based on the objectives they each set out to accomplish. However, given that FFA interventions are more costly to implement, tracking livelihood strategies over the longer term would be important to understand the future returns from the increases in agricultural productivity. If UCTs are as successful at improving food security but less costly to implement, programmes may want to reconsider investing in livelihoods programming. If, on the other hand, the impacts on agricultural productivity were sustained over the longer term, those investments would pay off. Based on data from two years of programming, we cannot yet say which of these is more cost-effective in the long run. At the same time, and as mentioned above, not everyone benefits equally from asset creation; in those cases, targeting the most vulnerable with unconditional cash transfers could be more efficient.

EQ3. What is the impact of the UNICEF education package on top of WFP school programming?

166. The UNICEF education package had a positive impact on retention rates among eligible children. Children going to a UNICEF-supported school during the 2021 academic year were 15 percentage points more likely to still be in school at the start of the 2022 academic year than children going to comparison schools. Nevertheless, this impact becomes smaller and consequently statistically

insignificant when measured again at the start of the 2023 academic year. There was no observed impact on test scores.

Consideration #4. Addressing the consequences of higher student-to-teacher ratios – for example, by increasing the focus on children at risk of dropping out.

167. A potential unintended consequence of the programme is the higher student-to-teacher ratios resulting from greater enrolment. Given this, one suggestion would be to focus on the quantity and quality of teachers in schools where enrolment is expected to increase. This can also support improvements in learning outcomes as well as retention rates. Enhanced targeted back-to-school campaigns to increase the timely return of out-of-school children could also be helpful to reduce the time children take to return to school between school grades.

168. Given that financial constraints were the reason cited most commonly by parents of sampled children for not having ever enrolled in school, consider ways to sustain the reduction of education-related costs to increase the enrolment and attendance of children. Moreover, when presented with the findings on higher student-to-teacher ratios, the UNICEF country office emphasized the importance of providing special focus to children at risk of dropping out. This is especially the case for girls, due to child marriage, school-related gender-based violence and other concerns. This could take the form of extracurricular activities, such as the provision of guidance, counselling and life skills education.

EQ4. How does distance from health and nutrition facilities influence take-up and use of the assistance provided?

169. Living far away from health and nutrition facilities is associated with lower health and nutritional outcomes, respectively. We also observe that visits from CNVs are infrequent and not specifically aimed at households farther from nutritional facilities, which implies a potential benefit in encouraging CNVs to target hard-to-reach locations or hiring additional CNVs to increase access.

Consideration #5. Addressing the negative correlation between nutrition and health outcomes and distance to facilities.

170. The negative correlation between nutrition and health outcomes and distance to facilities suggests that there may be room to increase the mobility of such services to reach more households if the catchment area of a clinic is too large. The programme team considers that this can be best achieved through recruiting more CNVs to enable them to reach the farthest-away households. UNICEF is on track in terms of mitigation measures through the hiring of vaccinators and provisioning of bikes to reach remote households. However, the data suggest that there is still room for improvement.

171. Findings point to the need to assess the number and coverage of the CNVs and improve the participation of other community-based workers in the delivery of nutrition and health interventions. Moreover, additional interventions that improve dietary diversity among children aged 6–23 months using locally produced foods (e.g. local recipe development) might be needed.

EQ5. Does integrated programming lead to better resilience outcomes?

172. To the knowledge of the authors, this is the first impact evaluation of a United Nations joint programme. While the design did not allow the evaluation team to assess experimentally the added value of different intervention components, or to measure the comparative effectiveness of two agencies working together towards a common goal, non-experimental and correlation analysis was performed to gain insights into whether benefiting from one component (i.e. livelihoods activities provided by WFP) enhanced the impacts of other components (i.e. educational or health components provided by UNICEF).

173. Overall, we do not find significant correlations between livelihoods interventions and take-up of nutritional or health services; however, this does not imply that the interventions should not be

implemented jointly, as the desired effects may materialize in the longer run, which is beyond the scope of the impact evaluation.

174. At the same time, and unlike the case of children's food consumption and health outcomes, children's education outcomes improved as a result of livelihoods programming. A child living in a household receiving livelihoods support is about 12 percent more likely to be in school as compared to their counterpart in a household that does not benefit from livelihoods support. These effects of livelihoods support on enrolment are statistically significant for both boys and girls. Given that UNICEF-supported schools offer a range of benefits to children, the fact that the transfers from the WFP interventions relax household financial constraints and enable parents to send children to school is indicative of the positive gains seen from joint programming.

Consideration #6. Maximizing the benefits of joint programming by ensuring school capacity in livelihood intervention areas.

175. The joint programme has demonstrated its ability to support household food security and agricultural production, as well as increasing access to education for boys and girls in South Sudan. However, to benefit from the increased enrolment that results from livelihood interventions, future programmes should consider whether there is a need to increase the number and capacity of teachers in schools near JRPs.

Annex A. Estimation

The impact evaluation analysis is aligned with the pre-analysis plan (PAP) registered with the American Economic Association Randomized Controlled Trials (AEA RCT) Registry. The PAP includes detailed information on primary outcomes, research design, randomization method, randomization unit, clustering, sample size (total number, number of clusters and units per intervention arm) and regression specifications. The purpose of the PAP is to outline the set of hypotheses and analyses that will be performed on the data before they are collected, ensuring transparency of the process.

To estimate the impacts of the resilience programme on the different outcomes of interest (primary and secondary outcomes), we run the following specification:

$$Y_{ht} = \beta_0 + \beta_1 \text{TREATMENT} + X_{h0} + \varepsilon_{ht} \ (1)$$

where Y_{ht} is the outcome variable, treatment is an indicator for whether a village is mapped to a site that was assigned to receive the integrated resilience programme; X_{h0} is a vector of controls which includes baseline variables (including the baseline outcome when available and other baseline controls selected through a double-selection LASSO procedure) and randomization strata (county). The primary coefficient of interest is β_1, which captures the estimated impact on households in villages assigned to the resilience programme. We cluster standard errors at the community level, given that sampling was stratified per village.

To determine the additional contribution of assets to resilience, as measured by improvements in food security, we run the following specification:

$$Y_{ht} = \beta_0 + \beta_1 \text{UCT} + \beta_2 \text{FFA} + \ \varepsilon_{ht} \ (2)$$

where Y_{ht} is the mean or intra-annual standard deviation, UCT is an indicator for receiving cash in the pre-harvest season and FFA is an indicator for whether a village was assigned to FFA. We test whether B1 ≠ B2, which is a comparison of the average outcome Y in the UCT and FFA groups. A priori, we might expect 2 > 1 if the productive asset confers additional benefits to the household. There may be time horizons, under which 1 > 2 if the productive asset requires labour that diverts from other productive activities in the short term, but additional income from the asset takes time to materialize.

A feature of FFA, especially relative to a UCT, is that it may take time for impacts to develop if assets divert labour from other productive activities in the short term but produce income gains in the longer term.

$$Y_{htr} = \beta_0 + \beta_1 round + \beta_2 UCT + \beta_3 3CCT + \beta_4 UCT{*}round + \beta_5 CCT{*}round + \varepsilon_{ht} \ (3)$$

where Y_{htr} is the mean of FCS, intra-annual standard deviation of FCS and assets and income measured at baseline and endline; and round is a high-frequency data round of collection. In countries that include both a midline and endline, we also estimate this specification where y is annual income and round is baseline, midline or endline. This specification allows us to test whether the difference in average outcomes change by round. For example, if the difference between 4 and 5 is greater for the midline interactions than for the endline interactions, we infer that UCT groups are more advantaged relative to FFA groups at midline than they are at endline when the FFA group has had more time to realize the returns to assets or better readjust their labour decisions to FFA conditions.

We then consider the heterogeneity of programme impacts on two dimensions. First, we estimate whether programme impacts are different among households who cultivate land and households who do have have access to land for cultivation. We do so by estimating the following specification:

$$Y_{ht} = \beta_0 + \beta_1 \text{TREATMENT} + \beta_2 \text{Land} + \ \beta_3 \text{TREATMENT} * \text{Land} + X_{h0} + \varepsilon_{ht} \ (4)$$

Land captures whether the household cultivated land for agriculture at baseline.

Second, we consider the heterogeneity of programme impacts by gender of household head. We do so by estimating the following specification:

$$Y_{ht} = \beta_0 + \beta_1 \text{TREATMENT} + \beta_2 \text{Female} + \ \beta_3 \text{TREATMENT} * \text{Female} + X_{h0} + \varepsilon_{ht} \ (5)$$

Female captures whether a household head is female.

Lastly, we operationalize resilience measurement by collecting high-frequency data to analyse the evolution of food security indicators over time. We do so by estimating equation (1) separately for each high-frequency data collection round. We also provide estimates pooling all high-frequency rounds together, also using equation (1), but adding round fixed effects.

Annex B. Notes on school infrastructure

A school infrastructure survey was conducted with school administrators in November 2021 and April–May 2023. As of May 2023, half of the schools in the study were exclusively using open-air learning spaces and had no access to permanent or semi-permanent learning spaces. Five schools had only improvised roofing for some learning spaces and no walls. The remaining schools had some semi-permanent or permanent structures serving as learning spaces. It is after the May 2023 survey that the classroom construction component of the Joint Resilience Programme was deployed. Thus, those efforts are not reflected in this report.

The average class size across the 30 schools in the sample was of 70 students per teacher. None of the schools reported having desks and chairs in good working condition, and less than half of the schools reported having sufficient textbooks or black/white boards in good working order.

Sixty percent of schools had no functioning improved latrines, and 40 percent had no on-site permanent source of water. Among these schools, it is important to note that the majority were comparison – that is, 60 percent and 75 percent of the poor infrastructure schools, respectively. Moreover, UNICEF-treated schools were 40 percent more likely to have an on-site source of clean water. The estimate is statistically significant. Similarly, UNICEF-treated schools were also 20 percent more likely to have writing boards. However, differences between UNICEF-treated and comparison schools were negligible in terms of latrines and hand-washing stations. Latrine construction relied on the existence of permanent classroom blocks at the beneficiary schools. Thus, as the classroom construction is not captured, neither is the construction of latrines. Finally, UNICEF provides textbooks based on a blanket policy. All schools are eligible, and this goes beyond the schools in this experiment. This is visible in the data, as both UNICEF programme and comparison schools have access to textbooks equally.

Annex C. Limitations

External validity: The results of a single experimental study (i.e. the livelihoods or education experiments) might not generalize to other settings. In regard to the livelihoods analysis, however, the robustness of findings across contexts can be assessed through a synthesis of results from all the countries that participate in the Climate and Resilience Impact Evaluation Window (see the Window pre-analysis plan for details). The use of coordinated survey instruments and data collection protocols helps to ensure that the data collected in South Sudan are comparable to other countries in the Window and in other WFP-supported evaluation windows. The objective is to maximize the potential to draw general conclusions.

Internal validity: The livelihoods and education components of the impact evaluation have mitigated the risks to their internal validity by employing the most rigorous impact evaluation method – randomized controlled trials (RCTs). RCTs allow the attribution of impacts to the intervention being evaluated. For that, they must be implemented according to a rigorous set of rules. Differential attrition, evaluation-driven effects, spillovers and partial compliance are potential risks to the internal validity of an RCT. The team worked closely with the survey firm, the WFP and UNICEF Field Offices to monitor the implementation of the education and livelihoods interventions as well as the collection of survey data.

First, survey response rates were high for both the livelihoods and education components (Table 6 and Table 8), and we did not observe any statistically significant differences in attrition rates between the programme and comparison groups. Thus, differential attrition is unlikely to have affected the internal validity of the results overall. However, there are some indicators, especially in the case of the education experiment, whereby even though the household has not attrited and was surveyed, the child has nevertheless dropped out of school and has not sat the end-of-year exams. Thus, data on exam grades are missing for children leaving school, and the pattern appears to be more pronounced in comparison schools. Consequently, the impact estimates for this measure of school performance may be biased downwards.

Second, evaluation-driven effects mean that people behave differently and may work, make decisions or answer the survey differently depending on their treatment arm as well as their belief with respect to the evaluator/enumerator's expectations and objectives, the future of the intervention or the mere fact that the households are surveyed repeatedly.[39] Regarding the measures to mitigate these risks, a cluster randomized evaluation was used. The purpose was to limit the interactions between programme and comparison households by assigning all eligible households within a village to one of the treatment arms. Nevertheless, one can argue that households interact across villages too and that the impact evaluation villages should be far apart. In general, villages in the impact evaluation are not neighbours. However, we cannot entirely exclude the fact that villages are not aware of what is happening elsewhere in their respective bomas or payams. A sign of problems would have arisen in the form of differential attrition, which appears not to be the case. The cluster randomized design of the RCT has limited this problem. Moreover, the data collection team had no specific knowledge of the programme or the plans for it in the future. Thus, it is unlikely that the enumerators have created or fed any expectations that the households may have had regarding future benefits. Finally, the impact evaluation team used the same survey, the same procedures and the same enumerators regardless of the programme groups from which data were collected.

Third, spillovers happen when an intervention has unintended impacts on the comparison group (or other comparison groups). For both experiments, it is unlikely that spillovers have affected the comparability of the comparison group. The main mitigation strategy was once again that of using a cluster randomization design, which effectively limited the contamination of the comparison households in the case of both

39 See Glennerster, R. and Takavarasha, K. 2014. '7 Threats' in *Running Randomized Evaluations: A Practical Guide*. Princeton, Princeton University Press, 298–323.

experiments. Nevertheless, one can think of an area where there might have been positive spillovers. That is the case of the FFA villages working on road construction or rehabilitation. Inherently, the asset is meant to connect villages, and these villages may be other FFA villages but also UCT, comparison or altogether random villages that are not part of the experiment. This remains a theoretical exercise, as it is difficult to measure these spillovers (if any) with the data that we have. The risk may have been mitigated by the fact that the asset work related to roads is relatively smaller in importance as compared to agricultural assets. For instance, all FFA villages are engaged in agricultural assets, but only a small subset of villages engaged in road-related assets.

Lastly, partial compliance happens when some households do not comply with their treatment or comparison group assignment due to reasons such as: programmatic constraints (e.g. level/intensity of support is changed; conflict impedes timely distribution/implementation, etc.), personal choice (e.g. refusing programme although assigned to programme, etc.), one's ability to circumvent processes (e.g. getting programme although assigned to comparison, etc.). Partial compliance can make the impact estimates smaller and harder to detect. In the case of the livelihoods experiment, we took several measures to mitigate the risk of partial compliance. For instance, the list of eligible villages that was to be randomized did not include any villages that had received programme support in the recent past so that households are comparable. We also asked Field Offices to provide eligible villages that are equally vulnerable. Before we randomized villages, the "must-reach" villages were excluded, as they would have been at risk of being treated if assigned to comparison, and villages that were not reachable or beyond the current Field Level Agreements with Cooperating Partners were also excluded, as they would have faced the opposite risk of not being treated if assigned to programme. While these selection criteria were carefully applied in general, the scale-up of the experiment benefited from Phase 1 learning, where, despite efforts, the latter issue was present and is documented in the numbered list below.

Overall, the livelihoods experiment may have been subject to partial compliance due to the following situations. All situations that are outlined in this list may have contributed to making the impact estimates smaller and harder to detect.

1. Some households from one comparison village in Phase 1 managed to partially enrol in the programme towards the end of the experiment, thus impacting – although partially – Rounds 5 and 6 of the high-frequency data collection and the endline wave. This happened against the background of localized conflict around the area of this village, which led to the temporary displacement of households to a village that was not part of the impact evaluation but was being reached by programme activities at that time. These households withheld their true village of origin and were consequently enrolled as part of the village where they were temporarily relocated, although they ultimately moved back to their village of origin.
2. One village that was assigned to the UCT arm in Phase 1 voluntarily opted to implement asset activities and essentially became FFA. Not all households were involved in the asset activities, but it is likely that this decision affected the data coming from this village.
3. Two additional UCT villages from Phase 1 were non-compliant during the first programme cycle – that is, Rounds 1 to 6. They were not part of the Field Level Agreement with the Cooperating Partner and could not be reached despite their assignment to UCT. They were finally reached before endline data collection took place; however, they had only received three out of six of the required transfers for the second programme cycle.
4. All UCT and FFA villages (a total of seven villages) in one of the Phase 2 counties received a lower monetary support due to the budget constraints faced by the Joint Resilience Programme. Their overall support was roughly half of what the other villages received.
5. One comparison village from a Phase 2 county received the intervention. This is linked to the complex organizational system of villages in that county. The problematic village was a subpart of another village that was labelled "must-reach". The latter was excluded from the randomization; however, the Cooperating Partner did not identify the comparison village as

being linked to the “must-reach” village, and thus the former village was erroneously included in the sample and randomly assigned to Comparison.

6. Following focus group discussions and survey answers, it has become apparent that households are likely to share their benefits, as this is socially expected. In some areas of the experiment, households may even face negative social consequences if they refuse to share while others in their village are in need. Based on endline data, 70 percent of Phase 1 households said that they would share their transfers in a hypothetical scenario. This includes both comparison and programme households. The percentage was 77 for Phase 2 households at endline.

The impact evaluation team worked closely with the country office to consolidate programme monitoring data to track the implementation of the various programme activities. The programme monitoring system did not allow them to track households precisely, but it did allow them to track villages. This, in conjunction with the self-reported survey monitoring data, has enabled the identification of the issues detailed in this section.

Regarding the education experiment, field checks have not revealed any potential source of non-compliance, although, as mentioned in subsection 0, the education package was not implemented in full. For instance, the evaluation was unable to capture the impacts of building classrooms and WASH infrastructure. Thus, the estimated impacts are smaller than initially thought when sample size decisions were made.

Disability inclusion: As part of the 2020 disability inclusion road map, WFP is building on continued efforts to mainstream and standardize disability data collection methodologies, aligning with international standards and best practices. In 2022, the Niger Annual Country Report estimated that 129,472 beneficiaries had disabilities out of a total of 5,640,341 beneficiaries (2.3 percent). Based on this estimation, approximately 25 beneficiaries in the project evaluated could have had disabilities. Although this represents an important population, the size is too small for this evaluation to estimate any differential impacts for disabled beneficiaries.

Gender considerations: The lack of household-level participation data prevents the impact evaluation team from reporting programme participation by gender. However, the team has estimated impacts disaggregated by the gender of the household head, in an attempt to better understand whether the programme effects vary according to the household type, and considerations have been drawn with the gender aspect in mind.

Annex D. Full regression results

See the appendix for the full list of results tables.

Acronyms

AEA	American Economic Association
BMZ	Federal Ministry for Economic Cooperation and Development (Germany)
CBF	Continued Breastfeeding
CBPP	community-based participatory planning
CHW	community health worker
CNV	community nutrition volunteer
CSP	Country Strategic Plan
DIME	Development Impact Evaluation
EQ	evaluation question
FCS	Food Consumption Score
FCS-N	Food Consumption Score – Nutrition
FES	Food Expenditure Share
FFA	Food Assistance for Assets
FGD	focus group discussion
FIES	Food Insecurity Experience Scale
GPS	Global Positioning System
IMF	International Monetary Fund
IPC	Integrated Food Security Phase Classification
IRB	institutional review board
JRP	Joint Resilience Programme
KfW	German Development Bank
LCSI	Livelihood Coping Strategy Index
MAD	Minimum Acceptable Diet
MDD	Minimum Dietary Diversity
MDD-W	Minimum Dietary Diversity for Women
MMF	Minimum Meal Frequency
MUAC	mid-upper arm circumference
OEV	Office of Evaluation (World Food Programme)
PAP	pre-analysis plan
RCT	randomized controlled trial
rCSI	Reduced Coping Strategies Index
SSP	South Sudan Pounds
UCT	unconditional cash transfer
UN	United Nations
UNICEF	United Nations Children's Fund
USD	United States Dollar
WASH	water, sanitation and hygiene
WFP	World Food Programme

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