

NURU NIGERIA: Final Impact Evaluation

2019-2023 Resilience Capacities Study



RAY MARSHALL CENTER FOR THE STUDY OF HUMAN RESOURCES

December 2023

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NURU NIGERIA

2023 ENDLINE IMPACT REPORT

December 2023

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This report is commissioned by Nuru International



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ACKNOWLEDGEMENTS

The Nuru Nigeria resilience study includes four previous reports, five years of survey-based data collection, incorporates work from seven years of Nuru interventions in Nigeria, with substantial contributions from a number of individuals both national and international. The paper would like to specifically acknowledge first and foremost the communities in which this program intervened, encompassing both the intervention and control participants, who gave their time and effort to contribute constructively and frequently to questions about their personal lives and matters. Community members also include those implementing the programs, including Nuru Nigeria staff, and contracted enumerators, transcribers, and a number of other local leaders and facilitators who made this study possible. Aside from the community, the paper would like to acknowledge the following individuals for their substantial contributions to the study.

Nuru Nigeria

- Amy Gaman (Managing Director)
- Olayinka Orefunwa (MEL Manager)
- Bless Jima (MEL Coordinator)
- Amos Emmanuel (MEL Officer)

The Ray Marshall Center for the Study of Human Resources

- Dr. Heath Prince (Research Scientist)
- Ashweeta Patnaik (Research Associate)
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Nuru International

- Matt Lineal (Chief Program Officer)
- Casey Harrison (Impact and Learning Director)
- Dena Bunnell (Impact and Markets Specialist)
- Ian Schwenke (Monitoring Evaluation and Learning Senior Associate)
- Julie Carandang (Monitoring and Evaluation Advisor)
- Charlie Lindsay Brink (Monitoring and Evaluation Specialist)

EXECUTIVE SUMMARY

INTRODUCTION

This endline report shares the outcomes from the 4-year randomized control trial impact evaluation of Nuru Nigeria's interventions, from 2019 to 2023 in northeastern Nigeria. Nuru Nigeria's vision is to cultivate lasting, meaningful choices in the most vulnerable and marginalized communities in the world. By 2030, Nuru Nigeria intends to build resilient corridors of functioning locally-owned farmer cooperatives and profitable rural livelihoods in 12 Local Government Areas (LGAs) of northern Nigeria proximate to conflict-vulnerable areas. In implementing interventions, Nuru Nigeria aims to equip rural, vulnerable households to improve livelihoods and build resilience capacities to cope with conflict, environmental, economic, and social shocks and stressors for stability and prosperity within the program implementation period. This study focuses exclusively on Nuru Nigeria's work in Adamawa State, the first LGA in which Nuru Nigeria began implementation.

This study tracks a number of indicators for the groups of farmers involved, including various short-term and long-term outcomes. The primary objective for this study however is to measure resilience capacities and how Nuru Nigeria may affect them using the Nuru model of agricultural intervention. This study aims to answer the question: *“do Nuru Nigeria programs have a positive and statistically significant impact on adaptive, absorptive, and/or transformative resilience?”*.

METHODOLOGY

The goal of the endline evaluation is to analyze how Nuru interventions in Nigeria lead to increases in household resilience, resilience capacities, and other well-being outcomes as compared to the baseline and midline time points. This report is the culmination of the 5-year mixed-methods randomized control trial and includes both qualitative and quantitative components. Baseline data for comparison and intervention groups was collected in 2019. Follow-up data was collected each year thereafter. The full resilience survey tool was measured at baseline (2019), midline (2021) and endline (2023), while a shortened short-term impact evaluation approach was deployed at intervening time points in 2020 and 2022. Qualitative data includes focus group discussions (FGDs) and key informant interviews (KIIs). All quantitative and qualitative data were subject to comprehensive quality assurance quality control processes by Nuru Nigeria, Nuru International, and the Ray Marshall Center (RMC) in an effort to understand and critique the data from multiple perspectives and levels of involvement in the analysis process.

The study involves an intervention group participating in Nuru interventions and a nonintervention comparison group assigned through clustered random control trial design. Researchers applied statistical techniques, such as propensity score matching, to allow better group comparability across time points. Resilience indicators and capacity indexes followed the REAL Consortium methodology.¹ RMC employed a difference-in-differences (DID) approach to gauge program impact. Qualitative data underwent constant comparison analysis and was integrated with quantitative results. The cleaned baseline, midline and endline data, excluding personally identifiable information, are accessible on the University of Texas at Austin's Ray Marshall Center website. Instructions on accessing this dataset are available in the appendix section of this report under “reproducibility”.

FINDINGS

Key findings can be disaggregated into several categories as mentioned above, including primarily shocks and stressors, resilience impacts, and other program outcomes.

Shocks and Stressors

In terms of shocks and stressors, the frequency of shock exposure among individuals has generally decreased since previous assessments. Climatic shocks are the notable exception, as they have increased overall for both intervention and control groups at endline. The threat posed by insurgency has significantly decreased in both groups. While there were instances of the intervention group experiencing shocks at a higher rate than the comparison group, these were generally the same as the midline results. Intervention groups experienced a higher occurrence of theft and asset destruction. Regarding coping methods, both groups have shown a shift towards relying more on cash savings and less on in-kind savings since the midline survey, with no significant differences between the control and intervention groups.

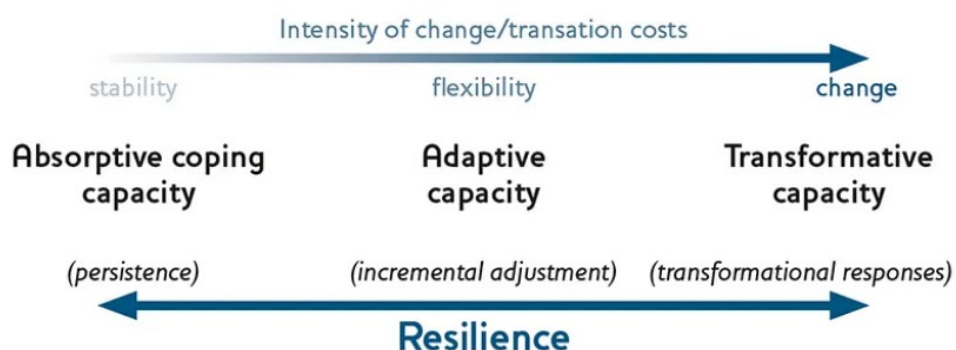
Resilience Capacities

Resilience capacities are broken into three larger components including absorptive, adaptive, and transformative capacities. The endline analysis indicates several noteworthy findings in the context of absorptive, adaptive, and transformative capacities. Overall, this study observed the following changes in resilience capacities:

- The Nuru Nigeria intervention led to significantly higher levels of both adaptive and absorptive resilience as compared to the control group.

¹ Sagara, B. and Smith, L. (2018). Resilience Measurement Practical Guidance Note Series 4: Resilience Analysis. ([link](#)).

- The intervention did not find any significant changes between control and intervention group in terms of transformative resilience.



Source: Béné et al. 2012

There were additional observations in terms of resilience within each index. On absorptive capacity, the Nuru Nigeria intervention positively influenced access to cash saving. Adaptive capacity was enhanced in the intervention group as they had greater access to borrowing options within the village and reported significantly higher levels of education and training opportunities, contributing to their resilience. Notably, transformative resilience capacities analysis also did not yield significant differences between the two groups in terms of sub-indicators.

Immediate Program Outcomes

Lastly, there were a few outcomes of note in terms of other immediate program outcomes. In terms of livelihoods, more farmers are reporting crop production and sales in the intervention group than in the comparison group, showing a shift from subsistence to farming as a business. Moreover, crop yield findings in Chapter 8 indicate that intervention farmers increased their yields by 121% over the baseline and were able to increase incomes by an average 65% over baseline. Significantly more farmers are also reporting increases in income due to animal fattening and other livestock practices in the intervention group in comparison to the control group. Echoing the increase in cash savings under absorptive capacities, significantly more farmers reported saving money whatsoever in the intervention group, an indicator that had actually decreased since baseline for the comparison group. Women's decision-making, livelihood improvements, and savings behaviors are all instrumental outcomes under Nuru Nigeria's model of intervention.

CONCLUSION

The endline report clearly shows the positive impact of the Nuru Nigeria intervention on the resilience of smallholder farmers in Northeast Nigeria. The program not only improved adaptive and absorptive

resilience but also led to significant benefits such as increased cash savings and better access to education. These outcomes highlight areas ideal for further research by both the Nuru Collective and other interested researchers, implementers, or policy-makers.

Moreover, this report provides solid evidence that community-led agricultural programs can make a real difference in the lives of smallholder farmers, improving their resilience in meaningful ways. The study also has broader implications for the field of resilience. It marks one of few long-term studies by a local organization that has effectively applied advanced resilience measurement techniques in smallholder communities, leading to positive, measurable results.

This success is a strong indicator of the effectiveness of Nuru's work in Nigeria, demonstrating the significant role of agricultural interventions in enhancing community resilience. Although this study concluded in 2023, Nuru Nigeria will continue to operate, using the insights from this report to refine and improve future programs.

CHAPTER 1. INTRODUCTION

OVERVIEW

Nuru Nigeria and Nuru International share a global vision dedicated to supporting the most vulnerable and marginalized communities worldwide. Recognizing that fragile states remain a source of instability and relative deprivation globally, Nuru strives to address vulnerabilities in these marginalized communities that are susceptible to exploitation by violent extremist groups and ideologies. Nuru envisions a world where all individuals can thrive and exercise their agency within an enabling environment, free from the burdens and vulnerabilities that jeopardize the stability and resilience of households and communities.

Nuru International strives to realize its global vision by collaborating with local changemakers, implementers, and visionary leaders. The organization believes that fostering resilient communities is most effectively achieved through the leadership of local figures, with external support providing temporary scaffolding and expertise. Nuru Nigeria, a locally-led non-governmental organization established in 2017, owns and implements Nuru's global vision in Nigeria. Nuru Nigeria's mission is to build resilience corridors of functioning locally owned farmer cooperatives and profitable rural livelihoods in 12 Local Government Areas (LGAs) of northern Nigeria proximate to conflict-vulnerable areas by 2030. The goal is to support rural, vulnerable households in these LGAs in northeastern Nigeria, enhancing livelihoods and building resilience to address conflicts, environmental challenges, economic fluctuations, and social stressors, ultimately contributing to stability and prosperity. Nuru is dedicated to eradicating extreme poverty through investments in self-sustainable and scalable initiatives. Accordingly, Nuru Nigeria implements livelihood and income-generating interventions in collaboration with farmer-owned organizations.

The Ray Marshall Center (RMC), a social science research unit within the LBJ School of Public Affairs at The University of Texas at Austin, has been a valuable partner in providing technical assistance to bolster Nuru's monitoring, evaluation, and learning (MEL) endeavors. RMC's extensive experience and expertise enhance Nuru's efforts by validating the effectiveness and robustness of its integrated approach to resilience-building interventions. The collaboration with RMC was initiated prior to the launch of this resilience study in Nigeria, facilitating the development of a structured and rigorous research agenda that aligns with Nuru's evolving vision in Nigeria.

Since its establishment in 1970, RMC has been a leader in pro-poor education, workforce, and social policy research. The RMC specializes in identifying and nurturing innovative solutions to complex issues through various applied research activities. These activities encompass policy analysis, state-level consulting for capacity development, program monitoring and evaluation, and impact assessments, all conducted using a combination of quantitative and qualitative research methods. The RMC's research team consists of Ph.D. and master's level researchers with expertise in quantitative and qualitative research and evaluation, drawn from diverse disciplines including international development, economics, education, social policy, public affairs, public health, sociology, and geography. Several members of RMC have been involved throughout the many years of this study from the conceptual and research stage through the various periods of evaluation, through the endline.²

CONTEXT

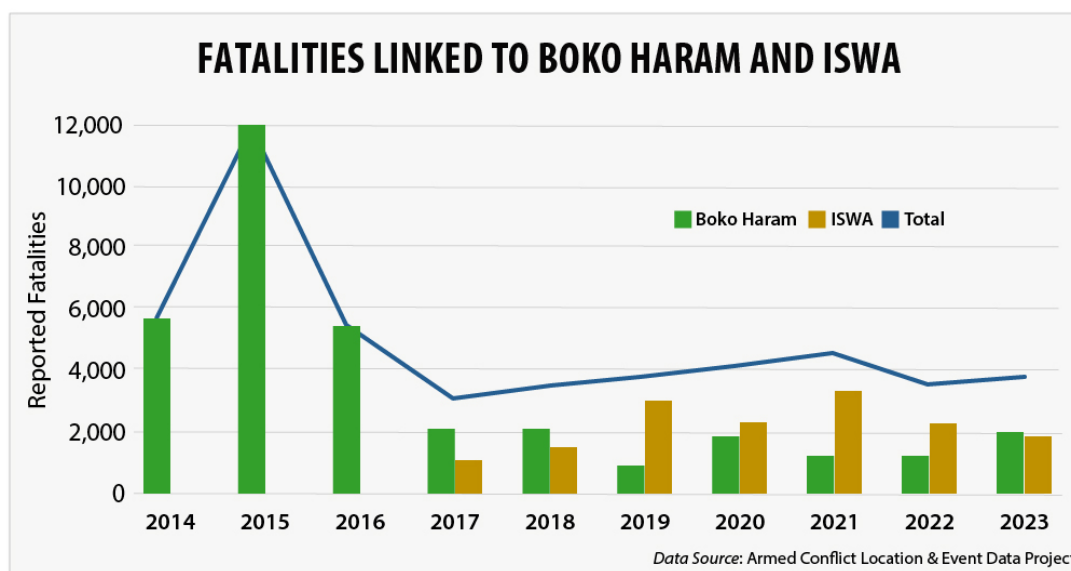
Nuru Nigeria (NN) currently operates in three Local Government Areas (LGAs) in northern Adamawa State, Nigeria, located in the northeastern part of the country and sharing its eastern border with the Republic of Cameroon. In September 2014, the initial LGA of operation fell under the control of the Boko Haram terrorist group, as part of their efforts to establish an Islamic state (caliphate). The Nigerian military successfully reclaimed the LGA in January 2015. However, upon their return, local residents encountered a devastating scene - burnt houses, destroyed bridges, looted banks, damaged schools and hospitals, and desecrated Christian churches and cemeteries. The community continues to grapple with the challenge of identifying and addressing Boko Haram and Islamic State of West Africa Province fighters or sympathizers within the local population up until this point, almost a decade after the height of Boko Haram violent conflict.

While historically marginalized both economically and politically, the area had been experiencing positive trends in economic development. However, the recent violent conflict has left lasting consequences and a stigma that continues to hinder the area's progress. Although major hostilities in the immediate vicinity have ceased, low-intensity conflict has persisted throughout the implementation period and continues to persist in the regional environment through the endline in 2023. The 2014-2015 hostilities resulted in the destruction of critical infrastructure, including bridges, roads, electric lines, telecommunications systems, and water facilities. While many repairs have been completed in this region, several are ongoing, and many remain the target of terrorist groups. Similarly, commercial interests such as banks have not fully

² Heath Prince, Ashweeta Patnaik, and Thomas Boswell from the Ray Marshall Center provided design and analysis support throughout the 4-year study.

resumed operations in the LGA leading individuals to require alternative forms of money transfer and a high reliance on cash. Nevertheless, agriculture and trading activities, particularly those that are seasonal and transitory, have made a strong comeback.

Figure 1. Fatalities linked to Boko Haram and ISWA



Adding to the complexities, the region has faced other tumultuous events in recent years, such as the contentious 2023 presidential and gubernatorial elections,³ which although relatively peaceful, caused major delays in program implementation, as well as, other economic concerns and general instability.⁴ External influences, including the war in Ukraine, the ongoing COVID-19 pandemic, and local impacts of climate change,^{5,6} have also cast additional economic uncertainty over the area. Furthermore, the long-delayed Nigeria currency swap crisis added to the economic challenges faced by the community in 2023, which relies mostly on cash due to national constraints in mobile money markets.^{7,8}

³ Brookings. 2023. Nigeria's Elections and their Security, Economic, and Crime Implications. ([link](#)).

⁴ Foreign Policy. 2021. Nigeria is a Failed State. ([link](#)).

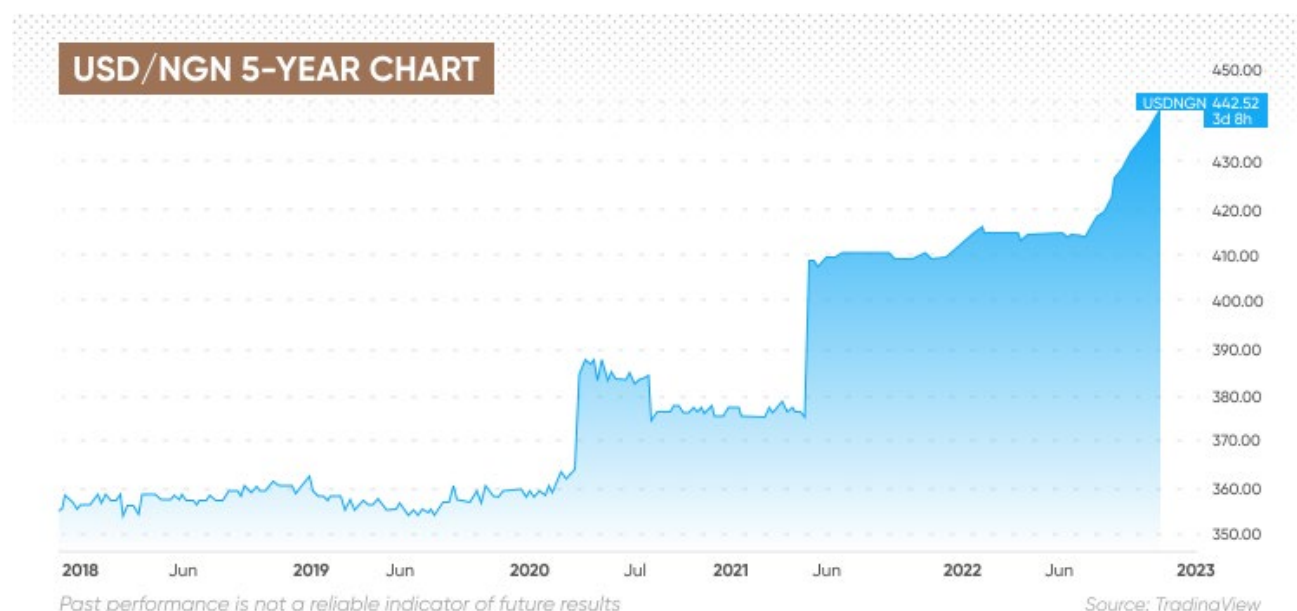
⁵ FEWS Net. 2023. Food Security Outlook. ([link](#)).

⁶ FEWS Net. 2023. Global Weather Hazards Summary August 2023. ([link](#)).

⁷ The Guardian. 2023. Naira swap: Court restrains Buhari, CBN on Feb 10 deadline. ([link](#)).

⁸ Aljazeera. 2023. Nigeria allows currency to drop third of value on official market. ([link](#)).

Figure 2. Currency exchange rates over time



PROGRAM IMPLEMENTATION

Nuru Nigeria's primary objective is to support rural, vulnerable households to enhance their livelihoods and develop resilience to cope with conflicts, environmental challenges, economic fluctuations, and social stressors, ultimately promoting stability and prosperity. The organization collaborates with local leaders and farmer groups to strengthen the resilience of vulnerable communities in Northeastern Nigeria. Nuru Nigeria also works to facilitate the establishment of farmer cooperatives, which serve as a means for accessing markets, creating revolving funds, and achieving financial sustainability. The overarching aim is for local leaders and cooperatives to acquire the skills and assets necessary to devise community-based solutions, thereby fostering self-reliance within Nigerian civil society, enhancing stability, and reducing vulnerabilities in these communities.



Nuru Nigeria began a local design and program planning process in 2019 for the first farming season, after founding the organization in 2017. The intervention began with 500 households in 2019. In 2022, an intervention adaptation workshop was conducted to adapt program activities based on the lessons learned throughout this study and during implementation. Over the course of the study, Nuru activities encompass the following interventions:

- Community mobilization
- Establishing farmer associations and organizations
- Training for local farmers on good agricultural practices
- Savings groups through financial inclusion programming on a mobile money platform
- Loans to increase crop yield and income through agricultural programming such as vegetable permagardens, cash crop production of soybeans and groundnuts, and harvest and post-harvest activities (including the sale and training on the use of Purdue Improved Crop Storage (PICS) bags)
- Income diversification activities such as small ruminants fattening
- Market support services to provide access to good markets through aggregation, storage, and commercialization of farm produce so that farmers get fair prices and establish relationships with off-takers and processors through the collective bargaining power of groups
- Access to digital financial tools that make transactions easier and safer.

In 2023, Nuru Nigeria has currently registered 4,827 individuals in programs, showing almost a 10-fold increase in program reach within these four years of program implementation. As the resilience study began in 2019, the initial cohort of 500 individuals are those who are tracked through the endline minus

those lost to attrition, discussed further under “methodology”. Many other indicators and metrics of success have been tracked over this amount of time for each of the activities above. The data generated from the study has informed Nuru Nigeria’s adaptive management approach as local, national, and international circumstances have disrupted original programming plans.

ORGANIZATION OF THE REPORT

The objective of the endline study is to provide a comprehensive overview of the methodology and approach behind the 5-year RCT that took place with the Nuru Nigeria intervention farmers. This includes a deep dive into the research methods, background on programs and impact activities, and details on the results achieved not only at endline, but throughout the study, paying specific attention to results that were significantly attributable to the programming of Nuru Nigeria. Although the final section of the report aims to summarize the results and discuss future options for data analysis, it is the hope that further research will follow using this data and these results, to inform other policies or interventions in the region, and to iterate on already successful programming both for Nuru Nigeria and other implementers across Nigeria.

CHAPTER 2. METHODOLOGY

The endline study builds upon the mixed-methods strategies applied during the baseline and midline phases of this research. These strategies encompassed both quantitative and qualitative elements, using the qualitative inputs from focus group discussions to contextualize and provide insight into quantitative results. The quantitative data collected at the endline pertains to both the intervention and control groups. This data is utilized to assess the ongoing effects of the program at the endline stage, comparing it with the midline and baseline periods. Propensity Score Matching (PSM) was employed to address attrition in both the treatment and comparison groups at the endline data collection stage. PSM allows for endline treatment households to be matched with endline comparison households based on their baseline characteristics. Through this method, we can reasonably assess the impact of the intervention on those that were treated despite study attrition.

In tandem, the qualitative aspect involved conducting focus group discussions to gather insights from participants, local community leaders, and other stakeholders. Their firsthand experiences in relation to the community at the endline were explored. By augmenting the quantitative data with qualitative observation, a distinct comprehension of the endline conditions for both intervention and control participants is achieved. The following sections delineate the methodologies employed by Nuru Nigeria at endline.

QUANTITATIVE DATA COLLECTION AND ANALYSIS

Sample design

To ensure a comprehensive and effective sample for this study, a cluster randomization technique was employed during the baseline phase. This process involved the random allocation of two wards to the intervention group, two wards to the comparison group, and two wards earmarked for future scaling initiatives by Nuru Nigeria. Wards are the lowest-level administrative units in Nigeria, with published, recognized and legally-established boundaries available in GIS data format. Consequently, there were three distinct groups assigned to both the treatment and non-treatment categories. It's worth noting that although the program's scope extended beyond the initially chosen wards, the participants monitored within the program and the originally selected wards remained consistent throughout the study's duration.

During the baseline phase, a total of 496 households undergoing treatment were surveyed across two wards. After intervention and control wards were assigned, participants from the intervention wards self-

selected into the intervention. 1,136 households were randomly chosen from another two wards to form the comparison group. These two groups remained engaged in the study for a period of 5 years, although attrition of both control and intervention participants occurred (refer to table 1). The selection of non-intervention households during the baseline phase was executed using a geospatial technique, wherein housing units were identified through remote sensing and included or excluded based on random number generation.

The sampling design, encompassing both intervention and comparison groups, was devised using inverse probability weighting methods. These methods aimed to balance covariates and ensure a representative composition of the groups.

Table 1. Sample size at baseline and endline

Assignment type	Ward 1	Ward 2	Ward 3	Ward 4
Treatment-2019	248 households	248 households	-	-
Control-2019	-	-	568 households	568 households
Treatment-2023	99 households	59 households		
Control-2023			260 households	206 households

Household survey design

At the baseline time point, a survey was co-created by Nuru Nigeria, Nuru International, and the Ray Marshall center that was adapted from multiple sources, including:

- Existing Nuru household surveys;
- The resilience-focused household questionnaire developed by the Resilience Evaluation, Analysis and Learning (REAL) Consortium (funded by the USAID Center for Resilience and led by Save the Children with Food for the Hungry, Mercy Corps, and TANGO International as partners);⁹
- The women’s empowerment focused BRIDGE household questionnaire, developed by Mercy Corps;¹⁰

⁹ TANGO International. 2018. Resilience and Resilience Capacities Measurement Options: Full Approach—Household Questionnaire. Produced by TANGO International as part of the Resilience Evaluation, Analysis and Learning (REAL) Associate Award. ([link](#)).

¹⁰ Anderson, A., Theis, S., and Bryan, E. 2018. Measuring Gender Dynamics in Resilience: Tools for integrating gender into resilience-focused programs. Portland, OR: Mercy Corps. ([link](#)).

- the CVE focused Vulnerability and Resilience Assessment Initiative (VRAI) household questionnaire, developed by Mercy Corps.¹¹

The components and reactions related to resilience capacity were adjusted to align with the local circumstances. This led to the development of a final resilience assessment tool that mirrors the goals specific to the context and employs language and terms tailored to that context. Moreover, insights gleaned from the preliminary qualitative data collected during the baseline phase were utilized to enhance the survey instruments.

The devised instrument allows the evaluation team to gauge exposure to shocks, capacities for resilience, responses, and recovery. More precisely, the instrument is designed to assess resilience capacities through a series of indexes. These indexes are segmented into three dimensions of resilience capacity—namely, absorptive capacity, adaptive capacity, and transformative capacity. Additionally, an overarching index is generated by combining these three individual indexes.

Training, piloting, and pre-testing

For the baseline survey, a team of 32 research assistants (RAs) was responsible for its administration, while the midline survey was conducted by 26 RAs. At the endline, 12 RAs completed the data collection process. These individuals underwent a comprehensive three-day training before embarking on the survey at each time point. The training encompassed various aspects, including research ethics, the principle of "Do No Harm," familiarity with the survey tool, refining their interviewing skills, and understanding the logistical aspects of the process.

To ensure preparedness and accuracy prior to baseline, Nuru Nigeria staff selected a nearby community to conduct a pilot survey. This pilot involved administering the survey to a group of 20 individuals. The purpose of this pilot was to fine-tune the survey process and identify any potential issues before full-scale implementation.

Incentives for survey participants

Comparison group participants were given NGN 1000 (at baseline \$2.94) for their participation in the survey at each time point at which they were surveyed. NGN 1000 was determined to be the amount that could be earned in an equivalent period of time working. The intervention group was not compensated for their participation at any time point.

¹¹ Mercy Corps. 2018. Vulnerability and Resilience Assessment Initiative to counter violent extremism (VRAI) Final Synthesis Report. ([link](#)).

Household survey administration

Baseline surveys were administered from June to July 2019, followed by the midline survey in May 2021. The endline survey was conducted in June 2023. Between each time point in September 2020 and May 2022, short term impact surveys were conducted using *only* the intervention group to assist in tracking participants and to inform outcomes in the interim.

Intervention group

The intervention group consists of 500 Nuru-registered farmers in two wards. At baseline, 496 of these 500 individuals were reached. RAs were assigned a private space in a predetermined area to conduct the survey, where the majority of the participants were told to assemble beforehand. At the midline, a similar approach was used, collecting responses from 284 participants. At the endline, due to natural attrition, including program dropout, inability to locate participants, or relocation, 158 individuals were surveyed from the intervention group, representing roughly 31% of the original intervention group.

Comparison group

The comparison group at baseline represented 1,136 individuals sampled randomly from two wards, distinct from the intervention group. Random sampling was conducted based on spatial random sampling using GIS to identify household structures and list randomizing them so that RAs would arrive at specific predetermined locations. Each comparison participant was assigned an ID that would be used to track their unique participation over the course of the 5-year study.

At both midline and endline, RAs used the ID codes, matched with other personally identifiable information (PII) such as names, numbers, marital status, education and religion to ensure the same participants were matched for response. At midline, a total of 799 individuals were reached for the survey, and at the endline the total reached was 466. A large portion of individuals were no longer able to be reached due to a variety of reasons, including but not limited to relocation, change in contact details, declining to be interviewed, passed away since the baseline, or for other reasons were not locatable.

Data entry and processing

During the baseline, the QuickTapSurvey tool (QTS)¹² was used to deploy the survey, followed by a switch to KoboToolBox¹³ at both midline and endline. QTS and KoboToolBox are standard survey tools that are used by a plethora of organizations in the development sector internationally. Both tools are a regular

¹² Quick Tap Survey. 2023. ([link](#)).

¹³ KoboToolBox. 2023. ([link](#)).

part of the operation processes of Nuru Nigeria during other ongoing programmatic activities throughout the year, and as such, are well known and understood by enumerators prior to the resilience study. The survey was translated into local language and administered to survey participants using the aforementioned tools. These tools are available offline, and allow Nuru enumerators to effectively gather data at a reasonable pace, and upload securely once they are able to access service. Data is uploaded from the platforms and stored for analysis on Google Drive, where translations are verified, data points are crosschecked, and IDs are assigned for accuracy. Any spot errors are dealt with before analysis begins and by group consensus in the event of any data incongruencies.

Data privacy is addressed at multiple instances. Firstly, respondents are informed on the survey and how their data will be used to obtain consent. The respondents have the right to contact Nuru and withdraw their data at any time, for any reason. Data is then downloaded and stored on a secure server, encrypted for privacy. The full dataset will only be available by request via the Ray Marshall Center webpage to those pursuing further research and analysis using this information. All data publicly available is completely cleared of personally identifiable information (PII).

Quantitative data analysis

Once the data is uploaded and securely stored in encrypted Google Drive folders, a thorough analysis involves collaboration between the Nuru International MEL team and the Nuru Nigeria MEL team. This joint effort aims to ensure accuracy across various data points and years. It involves cross-verifying ID numbers to guarantee proper participant matching, as well as scrutinizing any data points that appear to be outliers or inaccuracies. These discrepancies are evaluated to determine whether they require verification or removal. This data cleansing process is essential to ensure the dataset's quality before being transferred to the Ray Marshall Center.

The Ray Marshall Center (RMC), situated at the University of Texas at Austin, houses the dataset on a secure server for further analysis. By utilizing the methodologies outlined in the research proposal and literature review from the REAL consortium, RMC evaluators can calculate the distinct components of the resilience capacity indexes—namely, absorptive, adaptive, and transformative capacities. These individual calculations ultimately contribute to the calculation of the overall resilience index. This index is then compared across multiple time points to discern alterations in index scores, attributing these changes to the Nuru intervention.

Every indicator within the dataset is meticulously examined on an individual basis, and these changing trends are visually depicted in graphs within the report. To identify indicators and trends that can be more

directly linked to the intervention, additional tests for statistical significance and difference-in-difference analysis are employed. Differences between the intervention and comparison groups are deemed statistically significant if they meet the criteria of being significant at a confidence level of 5% or greater. In the charts, bold text indicates statistical significance at this level, denoting meaningful differences between the treatment and control groups.

QUALITATIVE DATA COLLECTION AND ANALYSIS

Qualitative data collection tools

The qualitative data collection procedures have remained consistent since the initial baseline data collection in 2019 to uphold the integrity of the original survey format. Despite numerous global events occurring during this period that might warrant adjustments to the survey, such events were only monitored during the evaluation phase by identifying specific keywords, topics, or discussion points within participant responses. These events were not directly queried with participants as part of the principal survey.

Both the focus group discussions (FGDs) and the key informant interviews (KIIs) produced diverse outcomes from the participants. These interactions were conducted in both English and Hausa languages as required. Nuru Nigeria's research assistants (RAs) facilitated these discussions, effectively leading them and managing the translation and transcription as needed. The collected data was then uploaded into the same encrypted drive where the quantitative data was stored. Comprehensive transcriptions of the survey content from both the English and Hausa discussions are available and were utilized during the evaluation phase.

Focus Group Discussions

The utilization of focus groups aimed to gather qualitative insights from the target population, allowing for an assessment of their perspectives on the program, the prevailing situation in Nigeria, and insights into their personal lives and experiences. To encourage more profound responses beyond a conventional question-and-answer format, projective discussion techniques were employed. These techniques prompted participants to offer reactions and thoughts that go beyond standard responses. This approach was chosen to attain more profound insights from the participants engaged in these discussions.

The specific structure and methodology of the focus group discussions (FGDs) are examined in greater detail in the subsequent sections.

In-Depth Interview via Key Informant Interviews (KII)

Key Informant Interviews (KIIs) were employed to gather data from individuals who hold significant roles within the communities, extending beyond the target participant population. The objective was to gain additional insights from key stakeholders residing in the communities of interest. This encompassed a range of individuals, such as community leaders, religious figures, government officials, and vigilante leaders, among others. These interviews provided a means to capture a broader perspective on the program's impact and community dynamics.

While these interviews were carried out during both the baseline and midline phases, they were not repeated at the endline. This decision was based on a strategic focus on obtaining robust quantitative data during the endline phase. Furthermore, the decision was also influenced by the substantial insights garnered through the Focus Group Discussions (FGDs) at both previous time points. The FGDs proved to yield more meaningful data for analysis, thus guiding the allocation of resources and attention at the endline evaluation stage.

Training, piloting, and pretesting

Each iteration of the survey from 2019-2023 used enumerators who had previously worked for Nuru Nigeria as moderators over the course of multiple years. As such, these individuals were trained in the respective survey tools, FGD protocols, data security measures, and general moderation and interview skills. Prior to each survey, the tool is piloted by the enumerators and they receive refresher training on how to conduct the survey in both an efficient and ethical manner.

Incentives for focus group discussions

In line with the approach taken for the quantitative data collection, participants from the intervention group engaged in FGDs without receiving compensation for their involvement. Given the extended time commitment required for FGDs, control group participants who partook in these discussions received a stipend of NGN 1,000 (approximately \$2.94 at baseline). This stipend was provided to acknowledge their time and to cover travel expenses associated with their attendance at the communal location where the discussions were held. Further information on the currency exchange rates and inflation over the period of the study in relation to this stipend can be found in the annex.

It's important to emphasize that these incentives were designed to compensate participants for their contribution rather than to induce participation. The compensation amount was aligned with the value of participants' time, reflecting what they could potentially earn through a comparable amount of work. This

approach aims to strike a balance between acknowledging participants' efforts and ensuring that their involvement remains voluntary.

KII implementation

The KII methodology was repeated at both baseline and midline, but not at endline. During the first two iterations of the study in 2019 and 2021, KIIs were conducted with a selected group of stakeholders from the community that would provide a unique and beneficial perspective to the study. A total of 14 KIIs were conducted at both time points with a diverse set of individuals including village heads, religious leaders, government officials, women's group leaders, healthcare workers, teachers, and local hunters. However, since KIIs were not included in the final iteration of the study, their analysis and insights will not be extensively presented in the concluding report.

FGD implementation

Nuru Nigeria conducted FGDs for both comparison and intervention participants. FGDs were conducted in all 4 intervention wards, as well as 4 communities in the comparison wards. FGD discussions were separated by gender per table 2 below. For each iteration of FGDs over the course of the study, participants were chosen by random selection to participate in the focus groups. In the comparison wards, Nuru Nigeria coordinated with the respective local authorities and village heads in order to get individuals who had lived in the LGA over the period of at least 5 years, which was important due to the amount of internally displaced individuals at the time of the baseline survey. All FGD participants are between the ages of 18-70.

Table 2. Focus group implementation

Female FGDs	Male FGDs	Total
8	4	12
64 participants	32 participants	96 participants

Qualitative data analysis

Focus group discussions were captured on digital audio recorders after having obtained consent from research participants. Audio recordings were then typed into transcripts by members of the MEL team. These transcripts were then fed into an analysis framework sheet capturing all themes and organizing data to be analyzed in line with the research questions.

A content analysis approach was used for a detailed analysis of data collected from the study. The approach involved:

- Developing framework/coding
- Create themes based on the qualitative survey questions
- Coding with relevant examples/data entry
- Linking of findings to (general) themes

Quality control

Achieving quality control in data collection is crucial to ensure the accuracy, reliability, and integrity of the data gathered. Some key strategies implemented to achieve quality control during data collection were:

- A detailed data collection protocol that outlines the entire process, including the research design, sampling methodology, data collection methods, and timeline was developed and reviewed with the team.
- Research assistants (RAs) were thoroughly trained on the data collection methods, procedures, use of data collection instruments and review of questionnaires to ensure consistency in data collection and good understanding of the questionnaire. They were also trained on how to adhere to general data protection regulation (GDPR), ethical guidelines and data collection schedule.
- Before full-scale data collection, pretest or pilot study was conducted to identify and address any issues with survey instruments, questionnaires, or data collection procedures.
- A daily debrief of the day's activities which included broad discussions across teams, focusing on issues that emerged while collecting data in the field were discussed and solutions proffered to emerging issues.
- A communication platform was created for all research assistants to provide smooth coordination and also ensure that errors identified, shared, and discussed daily will not be repeated by other RAs.
- The MEL team ensured that interviews submitted daily are cross-checked for invalid, biased, inaccurate, manipulated, or incomplete entries with feedback provided in real time to enumerators.
- Discussion venues with a relaxed and informal atmosphere to encourage spontaneity in responses were used e.g. town halls, community centers, etc. The discussion venue was checked before the scheduled time to ensure it was appropriate for its purpose. Specifically, less noisy areas and coziness was checked.

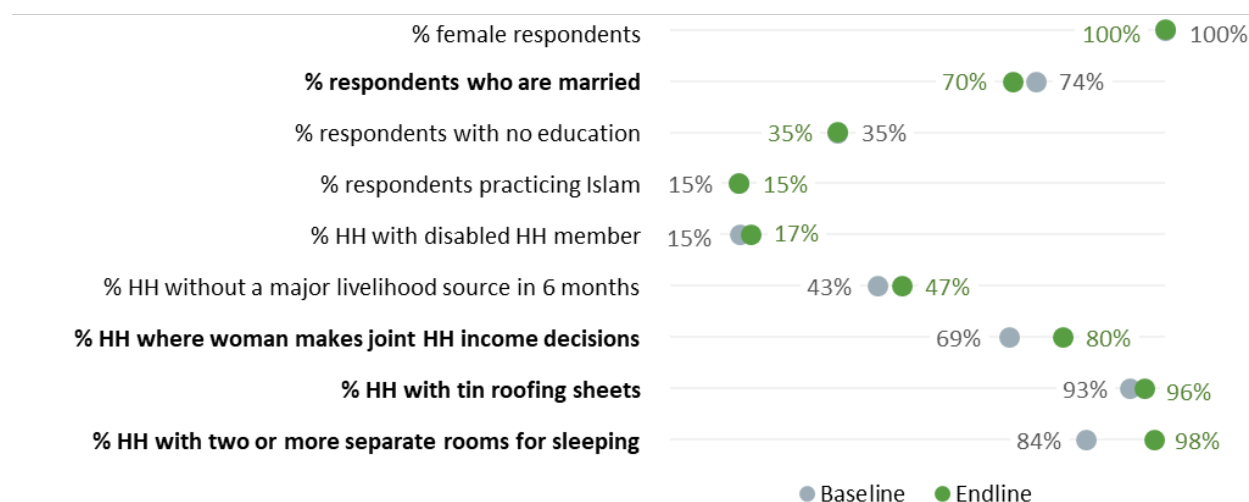
- All groups were moderated with a note-taker in attendance to ensure that other non-verbal expressions were noted. All discussions were audiotaped for transcription and documentation.
- Onsite field visit was conducted by the MEL team to ensure firsthand data quality assurance.

CHAPTER 3. HOUSEHOLD DEMOGRAPHICS AND LIVELIHOODS

DEMOGRAPHICS

At baseline, a total of 1,632 individuals were surveyed, comprising 1,136 from the comparison group and 496 from the intervention group. Due to attrition from varying causes such as relocation, program dropout, change of contact information, or other reasons, participant counts declined over the survey period. Attrition was addressed using Propensity Score Matching (PSM) as indicated in the methodology section of this report. At the endline, there were 137 intervention and 466 comparison group participants, or a total of 603 individuals who were able to be matched by their IDs from the baseline. Figure 3 below represents the baseline and endline time points by demographic indicators comparing the remaining households that were present at both baseline and endline. Statistically significant differences are denoted by bold text. Notably, although the intervention experienced some level of attrition, many of the attributes at the household level remained similar across time points. Indicators experiencing larger positive increases over the course of the study are those generally attributed to positive intervention outcomes. This data can be used to further indicate a high level of similarity between the intervention and control groups, and indicates that attribution of other significant outcomes can be explained by the intervention and not differences in study groups.

Figure 3: Demographic characteristics by time point



Quantitative Demographic Observations

The demographic indicators allow us to consider changes to the household dynamic for respondents that were captured at both baseline and endline. All respondents were female at each time point. There were less respondents that indicated they were married (70%) at the endline compared to the baseline rate (74%). This difference was statistically significant. About one-third of the respondents indicated that they had no education at both time periods. Fifteen percent of households reported practicing Islam at both time periods. There was a two percent increase in respondents reporting a disabled household member at the endline compared to the baseline rate, but these changes were insignificant and remained below 20%. There was a slight jump (4%) in households reporting no major livelihood source at endline compared to baseline, but this difference was insignificant. Major changes were reported for female decision-making and the number of rooms available for sleeping. These changes were statistically significant. The percent of households with tin roofing increased slightly (3%) and the change was significant, though the rate of tin roofing was over 90% at both time periods.

Qualitative Demographic Observations

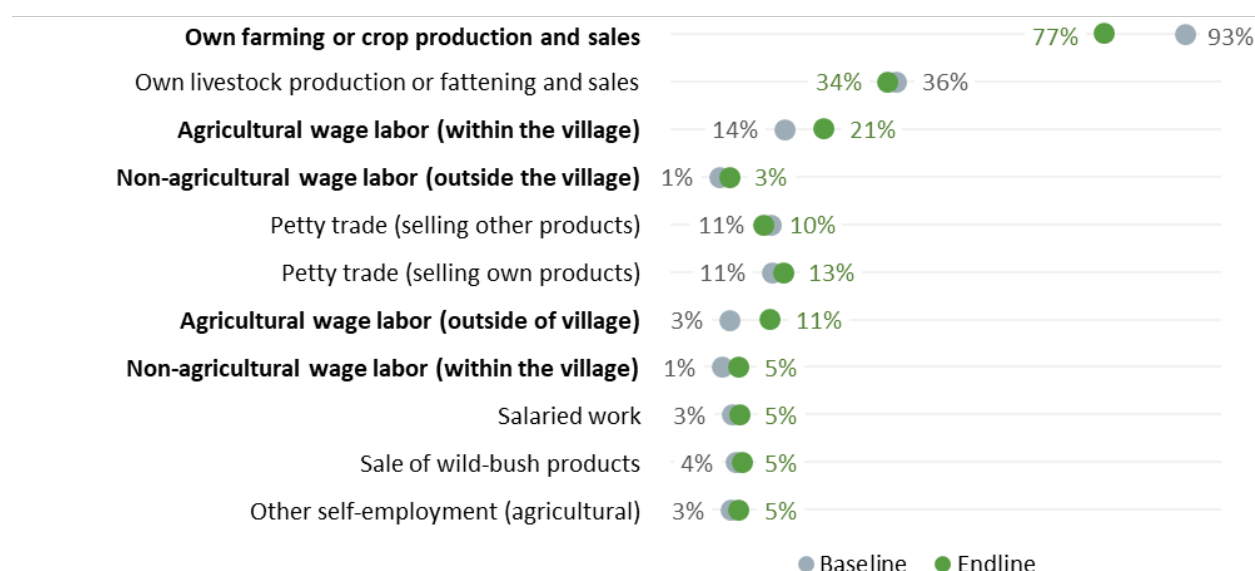
While looking to explain the significant increase in instances of multiple rooms and tin roofing, qualitative focus groups indicated a high level of flooding and excess rainfall. This rainfall, often leading to water damage, led farmers to rebuild housing structures at a faster rate than prior to the intervention. Although further data and research would be needed to justify the claim, it is possible that due to having increased incomes and diversified livelihoods, farmers choose more often to construct additional rooms and opt for tin roofing when reconstructing their homes. Further research would also be needed to connect security in the face of shocks with investing more into one's household structure, without the fear of losing one's home due to conflict, movement, or other natural or manmade causes.

Another significant outcome was women's decision-making at the household level. Nuru Nigeria (NN) incorporates gender as a cross-cutting theme across training conducted and also as a standalone training for household equitable decision-making and women economic empowerment. The qualitative survey has indicated a similarly high level of decision-making at the household level on behalf of women in particular, higher than the regional average. As NN continues to collect more data about household decision-making over the course of years, this outcome is expected to be substantiated as NN continues to bolster women's decision-making through the women-first approach of NN interventions.

LIVELIHOODS

Illustrated in Figure 4 below are the diverse livelihoods in which all participants engaged across the three time points, irrespective of their intervention status. Farming and crop production is the primary livelihood for participants in the region at large, and for those benefiting from Nuru Nigeria interventions in particular. This endeavor was identified as the predominant livelihood for 76.6% of the populace, although its prevalence exhibited a noticeable decline over time. Subsequently, a substantial portion of individuals continue to participate in livestock production, representing the second most frequently observed livelihood.

Figure 4. Livelihoods by time point



Over 4 years from baseline to endline, discernible trends in livelihood patterns become apparent. The proportion of individuals involved in crop production steadily decreased, whereas more individuals are actively engaged in wage labor and petty trade. Figure 5 below represents livelihoods by intervention status at the endline time point, the most striking difference seen in this figure is that a significantly greater proportion of intervention respondents continue to be involved in their own agricultural crop production and sales, which indicates that they are able to plan for productive activities on their farmland.

Figure 5. Livelihoods by intervention status at endline

MATCHING

The intervention and comparison groups exhibited varying degrees of disparity in terms of demographic and livelihood attributes, necessitating consideration of these differences when assessing the impact on other indicators of change. The evaluators at the Ray Marshall Center employed techniques from the midline and baseline evaluations to equate treatment groups with their nearest counterparts from the comparison group, utilizing PSM tools. This matching process was predicated on an array of demographic characteristics, designed to account for a substantial portion of the dissimilarities between the groups, thereby enhancing the robustness of the evaluation. Instances of weak matches were subsequently excluded. Given the rate of attrition at the endline constituting 58% for the comparison and 66% for the intervention, employing a PSM design allowed the Ray Marshall Center team to reduce bias in the results.

The following analyses presented in this report, subsequent to the examination of livelihoods and demographics, have been conducted employing PSM methods.

CHAPTER 4. WELL-BEING OUTCOMES

COPING STRATEGIES INDEX

Food security, in accordance with the definition provided by the United Nations' Committee on World Food Security,¹⁴ entails the assurance that "all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life." The evaluation of food security is facilitated through the application of the Coping Strategies Index (CSI), an experiential metric. The CSI employs a calibrated scale that takes into account both the frequency and severity of adaptive measures undertaken to manage the challenges posed by food insecurity. The calculation of the CSI adheres to methodologies established by Maxwell, Caldwell, and Langworthy.¹⁵ In the context of Nuru Nigeria, the CSI exhibits a potential range from zero to 175. Elevated scores are indicative of more adverse circumstances, signifying a heightened reliance on unfavorable strategies to address scarcities.

Table 3 below shows that the comparison group, similar to midline, saw a larger increase in CSI in comparison to the intervention group from baseline to endline. The DID estimate however found that there was not a statistically significant impact on CSI.

Table 3. Coping strategies index

Index	2019	2023	Change from baseline	DID estimate
Comparison	12.4	15.8	28%	-0.77
Intervention	13.7	16.4	20%	

¹⁴ Food and Agriculture Organization of the United Nations. 2003. Trade Reforms and Food Security: Conceptualizing the Linkages. Food and Agriculture Organization of the United Nations; Rome, Italy. p. 313. ([link](#)).

¹⁵ Maxwell, D., Caldwell, R., & Langworthy, M. 2008. Measuring food insecurity: Can an indicator based on localized coping behaviors be used to compare across contexts? Food Policy, 33(6), 533-540. ([link](#)).

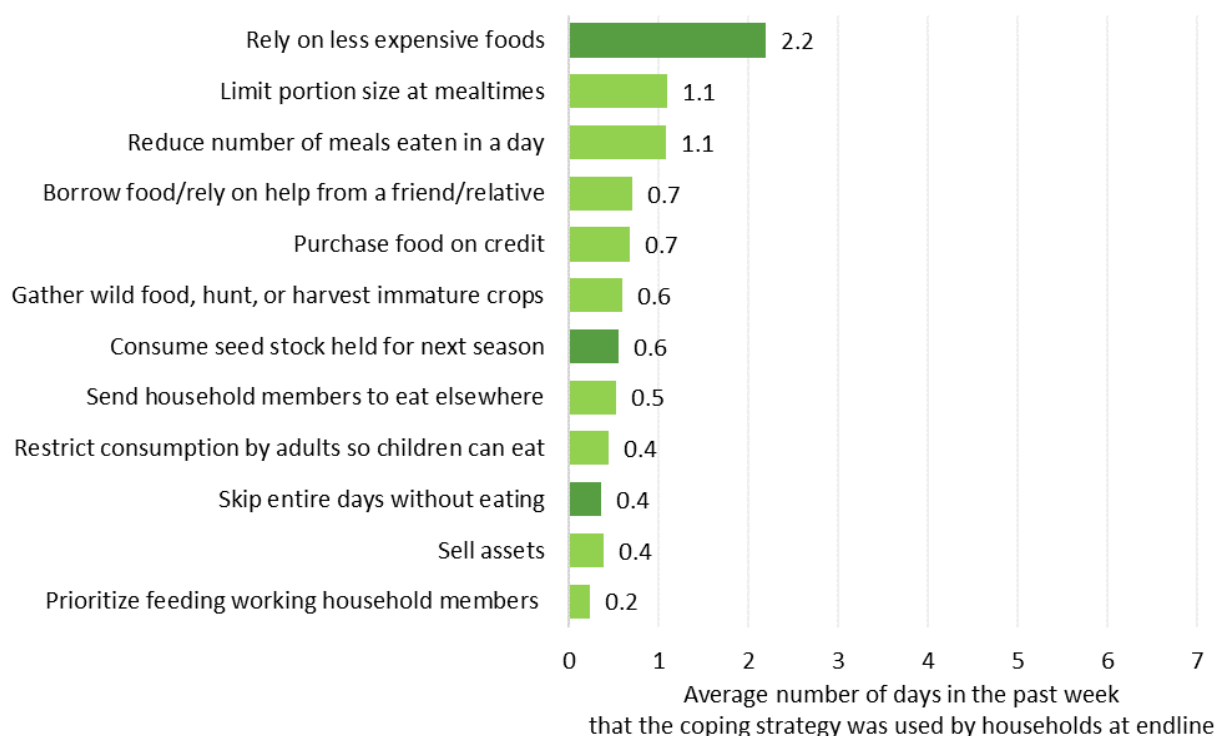
Figure 6. Coping strategies at endline

Figure 6 provides an account of the distinct coping methods used by both intervention and comparison households during the endline assessment to navigate shocks and stressors encountered. Notably, the coping strategies witnessed closely resembled those documented during the midline evaluation. Predominantly, the most prevalent approach to coping involved relying on less expensive foods, closely trailed by the practice of either reducing meal frequency or moderating portion sizes.

ABILITY TO RECOVER

Household resilience refers to how well a household can handle and bounce back from unexpected challenges and pressures. One way to measure this is by asking households themselves about their ability to recover from the tough situations they have faced. The ability to recover index estimates how well households can bounce back from the common types of challenges that happen in the program area. This estimation is based on information about the challenges households went through in the year before. The index can have scores from two to six, showing different levels of resilience. The study did not show any significant attributed change in ability to recover between the control and intervention group, although

notably both did increase over the baseline by a significant amount and the intervention group had a slight edge over the comparison group despite an inability to identify statistical significance with the current data.

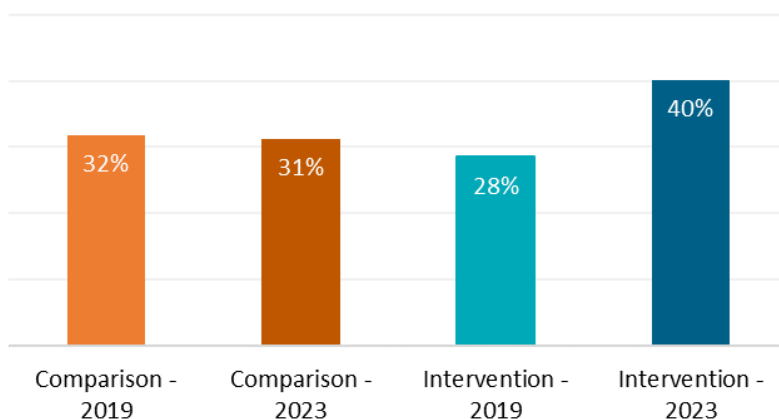
Table 4. Ability to recover index

Index	2019	2023	Change from baseline	DID estimate
Comparison	3.6	4.4	23%	0.19
Intervention	3.7	4.7	28%	

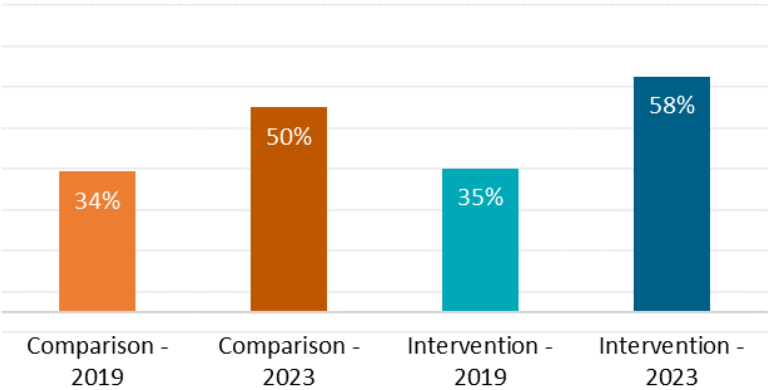
Figure 7 compares baseline to endline from 2019-2023 in terms of both the intervention and control group's ability to meet basic food needs. There were notable changes in the ability to currently meet food needs, with both groups reporting being able to meet current needs better at the endline than at baseline or midline. In addition, the second graph indicating participants' self-perceived ability to meet future food needs shows a promising trend in the intervention group's faith in future improvement, especially against comparison group participants.

Figure 7. Ability to recover sub-indicators

% of households reporting ability to meet basic food needs is currently better than before



% of households reporting ability to meet basic food needs will be better than before



SHOCK COPING STRATEGIES

Figure 8 below shows response methods that were most commonly employed against shocks and stressors that respondents may experience, independent of whether or not they were in the intervention or comparison group. In previous surveys, using in-kind savings was the most observed method to respond to shocks and stressors at over 30% at midline. At the endline, a trend is observed where individuals shifted to other methods of response such as taking out loans, or using cash savings, which increased by 5% and 4%, respectively. This may be an indication that there is more cash in the household. Notably, every response method increased, except the use of in-kind savings. This shows a diversity in response options of participants. The decline in the use of in-kind savings is a positive trend as it can be inferred that households are less dependent on a common negative coping mechanism when a shock arises. Negative coping mechanisms include, for example, selling productive assets.

Figure 8. Dealing with shocks sub-indicators

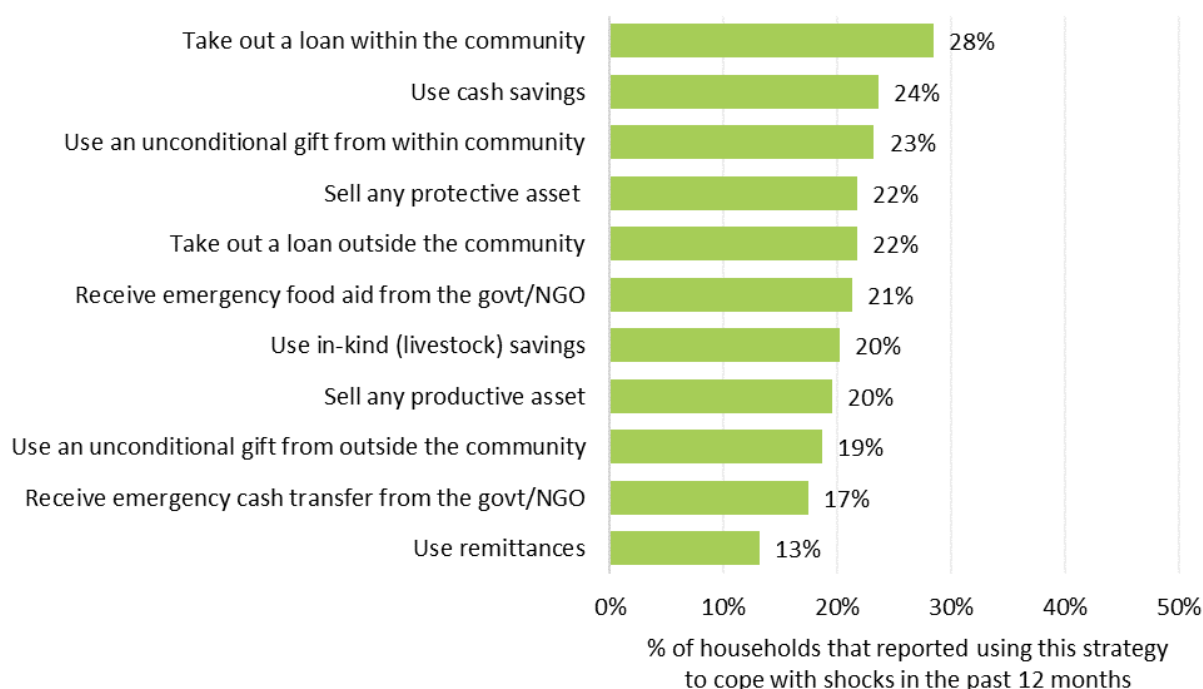
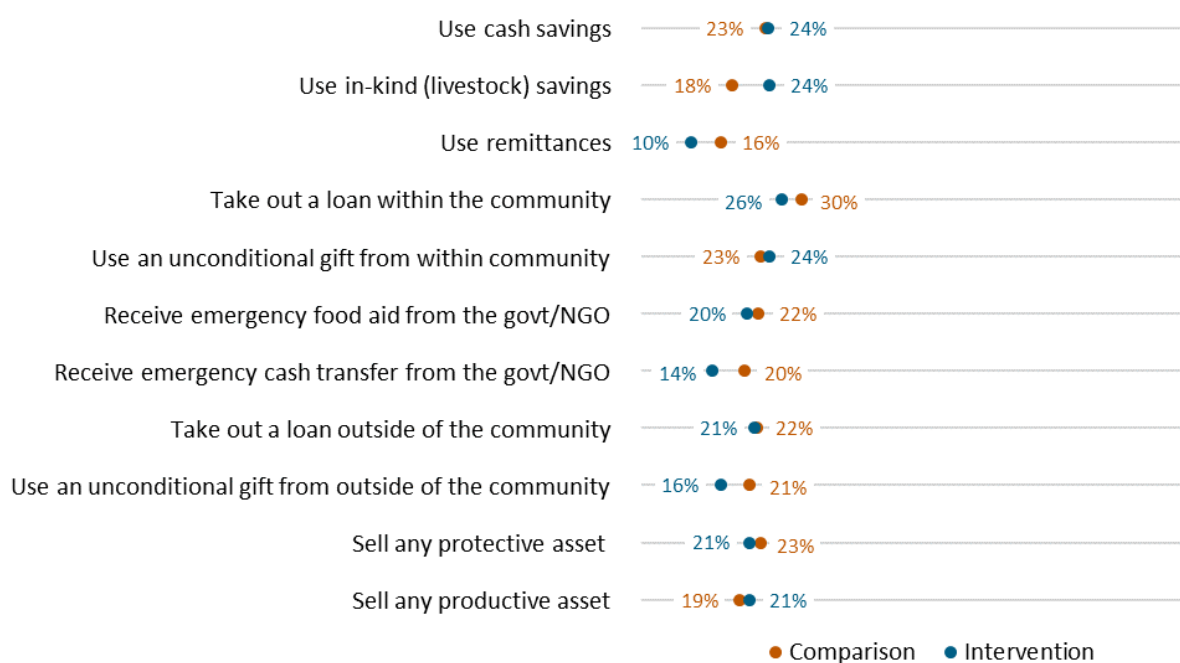


Figure 9 below reviews shock-coping strategies by type and across groups at the time of the endline study. There are some modest differences across intervention groups, however no statistically significant differences were identified with the currently available data.

Figure 9. Dealing with shocks sub-indicators by group at endline



CHAPTER 5. SHOCK EXPOSURE AND IMPACTS

Chapter 5 first explores the percentage of households, both intervention and control, that are exposed to various shocks and stressors. These shocks include a spectrum of various possible climate, biological, conflict, and economic shocks, among others. Qualitative data is used as above to triangulate quantitative findings with the experiences of participants observed in the focus group discussions.

SHOCK EXPOSURE

Resilience encompasses the capacity to anticipate, endure, and recover from unforeseen shocks and stressors. Consequently, assessing the extent of households' exposure to these events holds significance in comprehending their resilience levels. The shock exposure index quantifies the cumulative impact of shocks on individual households. This index draws on household-level data pertaining to two key dimensions: (1) the frequency of encountered shocks within the preceding 12 months, and (2) the perceived severity attributed to these shocks. In the context of Nigeria, Nuru conducted surveys addressing 21 distinct shocks and stressors, thereby giving the shock exposure index a potential range extending from one to 168, 1 being the lowest possible combined frequency and severity, and 168 being the highest. The comparative shock exposure indices for both baseline and midline evaluations for both intervention and comparison groups are shown in Table 5.

Table 5. Shock exposure index

Index	2019	2023	Change from baseline	DID estimate
Comparison	48.1	53.6	11%	8.945
Intervention	43.4	57.8	33%	

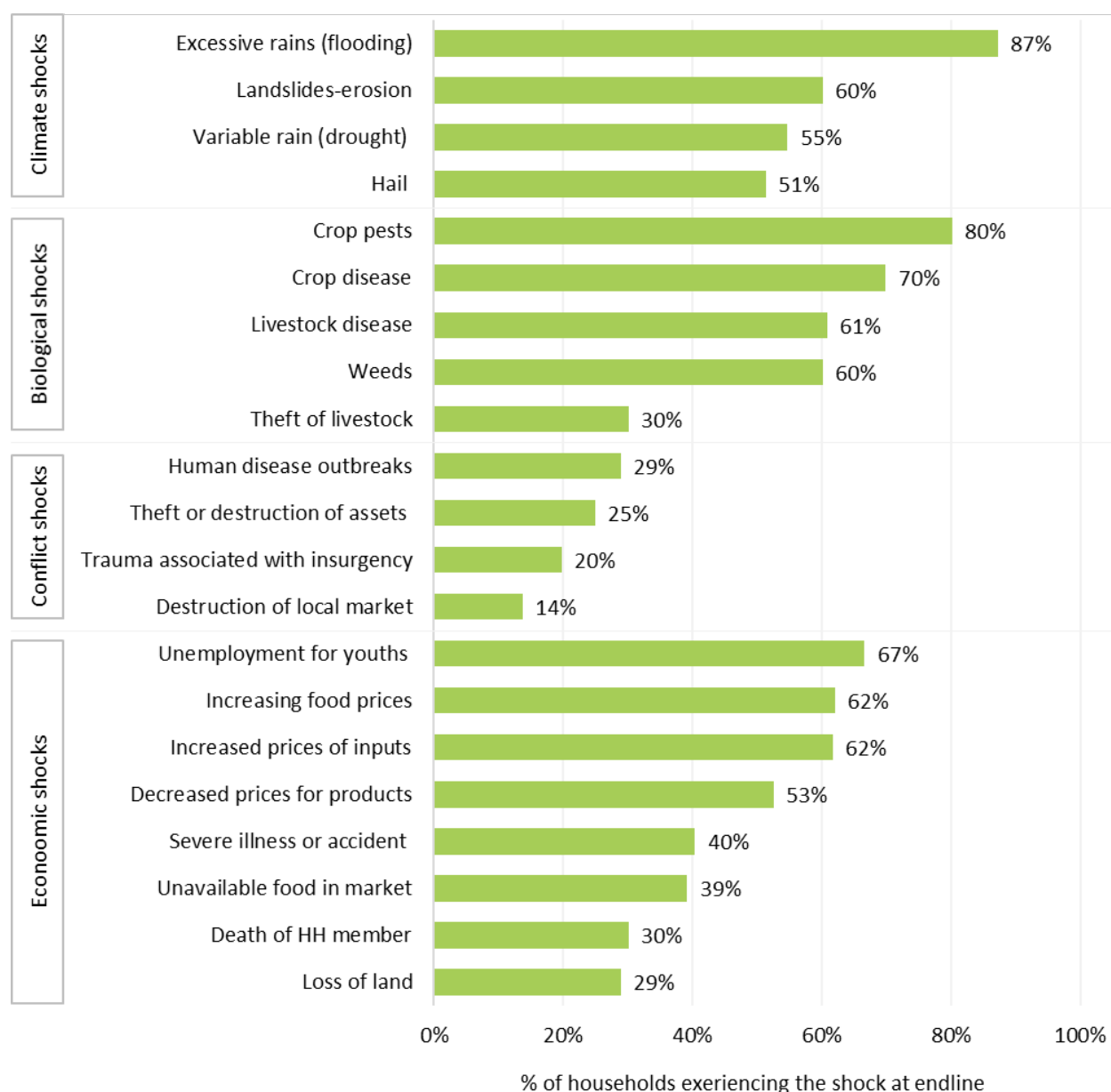
Figure 10. Shock exposure at endline

Figure 10 reports the shocks and stressors experienced by all intervention and control participants at endline. Of the 21 shocks listed, 12 were experienced by over 50% of the total population, with certain shocks such as variable rain, crop pests and crop disease, and general unemployment for youths yielding a very high response rate from respondents. Observations were similar to those at midline, although notable climate-related shocks experienced generally increased, with flood ranking as the highest shock experienced by respondents from both study groups; others are erosion, human and livestock diseases, whereas economic shocks generally decreased.

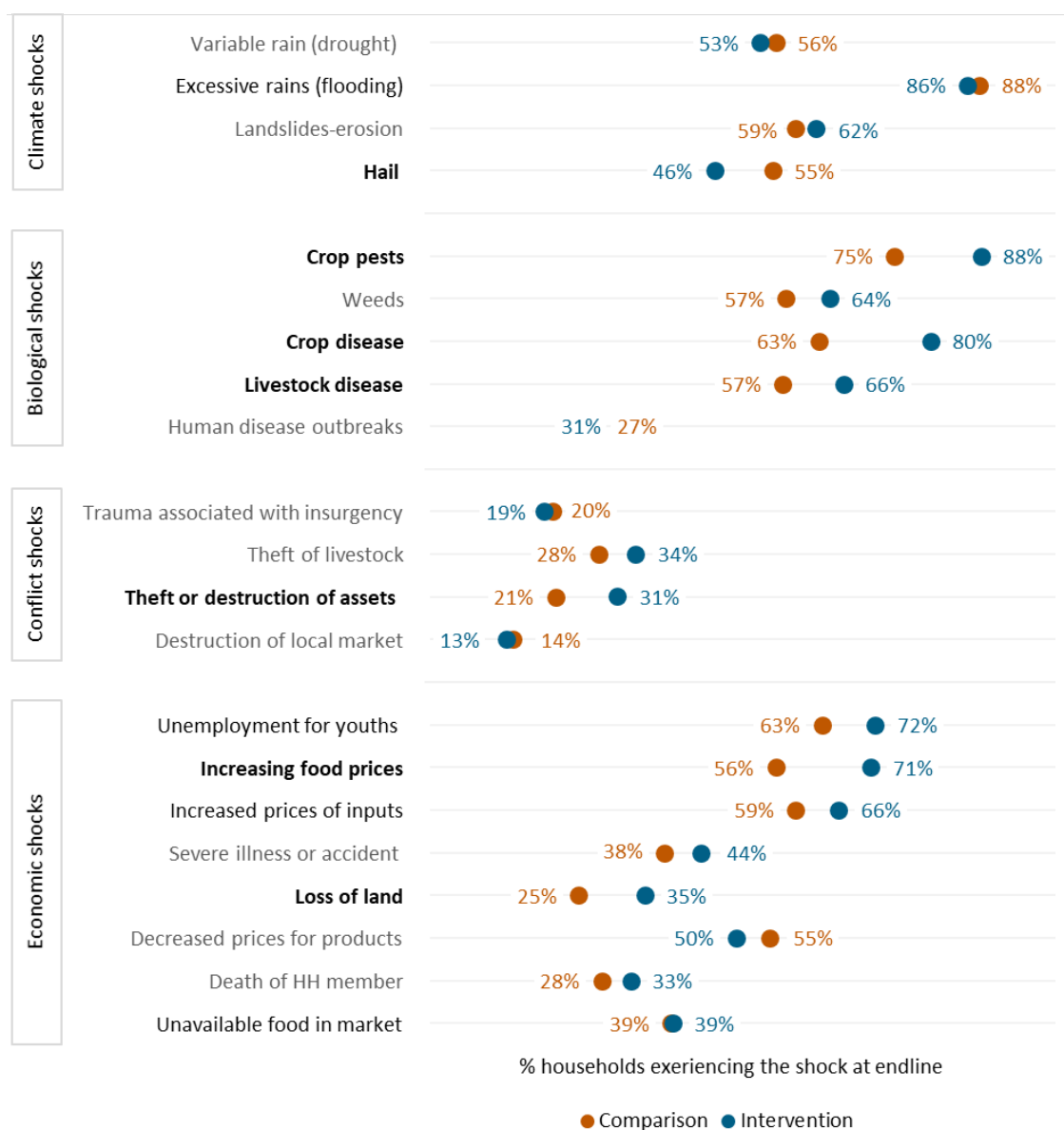
“Due to the flood, We didn't get much harvest, and some of our buildings even collapsed in fact, someone even died as a result”

- Female respondent from
comparison community.

SHOCK IMPACTS

Figure 11 shows the shocks experienced at the endline between the intervention and comparison groups. The shocks marked in bold were experienced significantly more by one group than the other. This analysis shows that the intervention group is still more likely to have experienced a higher number of negative shocks such as increasing food prices, crop pests and disease. However, four of the six of these shocks with significant differences between intervention and comparison declined for both groups since the midline analysis. The only significant shocks that increased since midline were hail and loss of land.

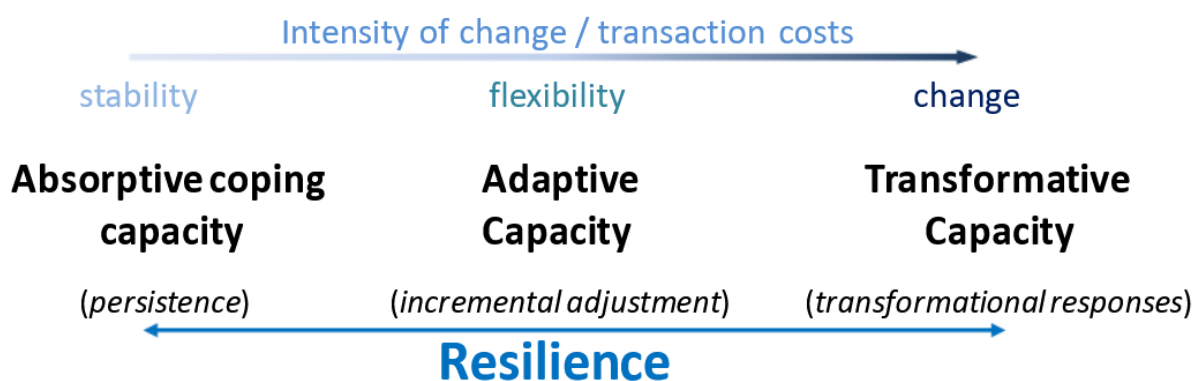
Figure 11. Shock impacts at endline



CHAPTER 6. HOUSEHOLD RESILIENCE CAPACITIES

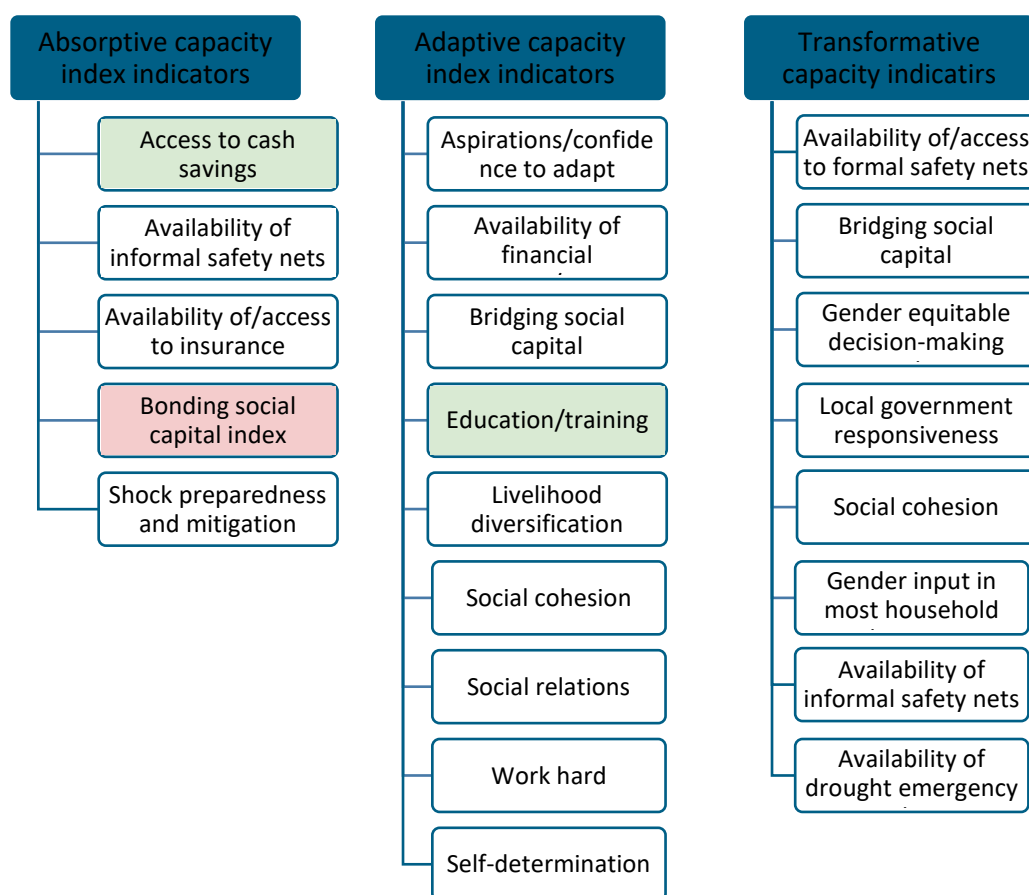
Resilience is defined by USAID in the 2022 Resilience Policy revision as “the ability of people, households, communities, countries, and systems to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth. Put simply, resilience is the ability to manage through adversity and change, without compromising future well-being.”¹⁶ The 3-D Resilience Framework posits that resilience materializes through the convergence of three distinct capacities: (1) absorptive resilience capacities, encompassing the skill to curtail exposure to shocks and swiftly recuperate from their impact; (2) adaptive resilience capacities, encapsulating the aptitude to make well-informed decisions pertaining to alternative livelihood strategies, contingent upon evolving circumstances; and (3) transformative resilience capacities, pertaining to the overarching systemic conditions fostering enduring resilience.¹⁷ The strategic development of these resilience capacities is key in households lifting themselves from poverty.

Figure 12. The 3D resilience framework (derived from Béné et al., 2012)



¹⁶ USAID. 2022. 2022 Resilience Policy Revision. ([link](#)).

¹⁷ Béné, C., R. G. Wood, A. Newsham and M. Davies. 2012. "Resilience: new utopia or new tyranny? Reflection about the potentials and limits of the concept of resilience in relation to vulnerability reduction programmes." IDS Working Papers 2012(405): 1-61. ([link](#)).

Figure 13. Household resilience capacities and indicators

RESILIENCE INDEXES

Table 6 below indicates the resilience indexes from baseline to endline, and by intervention group. Results of this factor analysis indicate that while both groups saw general increases in all resilience capacities from baseline to endline, the intervention group experienced statistically higher improvements in both the absorptive and adaptive resilience indices (indicated with bold lettering).

Resilience Index Methods

The research team developed an overall index score that ranks from 0-100, with 0 representing the least resilience, and 100 the most resilient in terms of the various capacities. This analysis involved 4 primary steps.

- 1. Factor Analysis:** The research team began by assessing the variables theoretically associated with each capacity per Figure 13 above to confirm correlations. For example, the absorptive capacity index was informed by 5 sub-indicators.

- 2. Weighting and Standardizing:** Each variable was standardized (by subtracting the mean and dividing by the standard deviation at baseline) and then multiplied by its predetermined weight (ranging from 0.15 to 0.35). These weighted variables were summed to create a raw score.
- 3. Scaling:** To achieve a 0-100 scale for the indices, the raw scores were adjusted by the baseline's minimum value, then normalized by the range, and multiplied by 100.
- 4. Difference in Difference Testing (DID):** This test was applied to determine significant changes between two groups across two time points.

Table 6. Resilience capacity indexes¹⁸

Resilience Index	Group	2019	2023	<i>DID Estimate</i>
Absorptive Index	Comparison	23.5	23.6	2
	Intervention	24.5	26.7	
Adaptive Index	Comparison	26.1	24.9	4.4
	Intervention	24	27.1	
Transformative Index	Comparison	37.9	51.5	0.7
	Intervention	34.9	49.2	
Overall Index	Comparison	24.6	26	3.1
	Intervention	23.6	28.1	

¹⁸ The index scores range between 0-100, are relevant only to Nuru Nigeria, and are meaningful to the extent that they permit us to track change in these indices over time and within the context of this intervention. They were created for the purposes of this intervention and, as such, are not comparable to similar indices created for other interventions.

RESILIENCE INDICATORS

Access to cash savings

Access to cash savings, a component measure of absorptive resilience capacity, is measured in table 7 as a binary variable equal to 1 if the respondent household indicates regularly saving cash. Notably, there is a distinct difference between comparison and intervention groups in terms of those with access to cash savings in the event of a shock or a stressor. Nuru Nigeria is able to attribute, using the PSM methods discussed above, an average impact of 20.3% increase in access to cash savings from those in the intervention group at the 1% level of statistical significance.

Table 7. Access to cash savings

Access to cash savings	2019	2023	Change from baseline	DID estimate
Comparison	0.31	0.18	-43%	0.203***
Intervention	0.30	0.40	30%	

Availability of informal safety nets

Similar to access to cash savings above, availability of informal safety nets is one component of absorptive resilience capacity, and is measured by the number of organizations within the respective community that serve as informal safety nets and have been active at least once in the past 12 months. Within this study, there are 5 different informal groups considered for this survey including savings groups, mutual help groups, religious groups, mothers' groups, and women's groups. As such, the values in table 8 can range from 0 (none of the informal safety net groups present) to 1 (all groups present and active within the past 12 months). When observing the differences between the control and intervention groups at the endline, the difference seen is not significant enough to attribute positive change to intervention status.

Table 8. Availability of informal safety nets

Availability of informal safety nets	2019	2023	Change from baseline	DID estimate
Comparison	2.8	2.7	-3%	0.385
Intervention	3.0	3.3	10%	

Availability of/access to insurance

A third component of absorptive capacity is the availability and access to insurance for the average household. The value is measured as 1 if the respondent has access to either crop, livestock, health or any other type of insurance. Whether or not they actually use the insurance in question is not part of the observed result. Table 9 below shows that there has been an increase in availability across both intervention and control groups, however overall access to insurance is low in the rural intervention areas.

Table 9. Availability of/access to insurance

Availability of/access to insurance	2019	2023	Change from baseline	DID estimate
Comparison	0.00	0.02	200%	0.036
Intervention	0.02	0.07	236%	

Bonding social capital

Bonding social capital is another measure of absorptive resilience capacity, and indicates whether there are relationships or associations within a group or community. The scale ranges from 0 to 6, and is based on two factors both scaled from 0-3; whether or not the household would be able to receive assistance from people within their community if they needed it, and whether or not the same household would be able to give help similarly. Although both intervention and comparison groups increased their bonding social capital since the baseline, the comparison group's bonding capital increased at a greater rate than the intervention group. The DID estimate below indicates that the intervention group had a negative and significant difference in bonding social capital over time.

There was some level of questioning by the research team as to the format of the questions and how they may have been communicated to respondents. For example, the local Nuru team indicated that responding "yes" to asking for assistance could potentially be seen as a sign of weakness or a generally poor economic state, and therefore the attributability of improvement on this particular indicator could be negative instead of positive as seen in table 10. In order to fully understand this indicator, Nuru Nigeria will continue to incorporate questions on giving and receiving "assistance" in various different formats moving forward to account for this particular concern.

Table 10. Bonding social capital

Bonding social capital index	2019	2023	Change from baseline	DID estimate
Comparison	1.6	3.0	86%	<i>-0.553***</i>
Intervention	1.5	2.4	53%	

Shock preparedness

Shock preparedness is the last component of absorptive capacity evaluated in this section. This indicator ranges from 0 to 4, indicating preparedness for shocks, and ability to mitigate their impacts. Figure 14 indicates the individual activities considered within this index. Both the direction of change as well as the results in terms of differences observed between intervention and control groups were insignificant as a result of the endline survey.

Table 11. Shock preparedness and mitigation

Shock preparedness and mitigation	2019	2023	Change from baseline	DID estimate
Comparison	1.3	1.5	10%	<i>-0.244</i>
Intervention	1.4	1.3	-8%	

Figure 14. Shock preparedness and mitigation sub-indicators**Availability of financial resources**

The assessment of financial resource availability, serving as an indicator of adaptive resilience capacity, is graded along a scale ranging from 0 (absence of financial services or institutions within the community) to 2 (presence of both credit and savings support). Table 12 indicates that there has been a slight negative shift in the availability of financial services within the community surveyed at endline. The difference

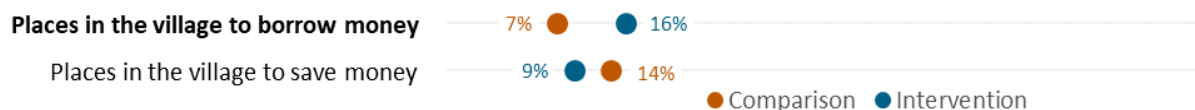
between comparison and intervention does not attribute a significant impact from the Nuru Nigeria intervention. Figure 15 below examines the individual components included.

Table 12. Availability of financial resources

Availability of financial resources/services	2019	2023	Change from baseline	DID estimate
Comparison	0.40	0.20	-49%	0.07
Intervention	0.36	0.23	-35%	

Figure 14 shows the change in comparison and intervention groups at the endline time point in terms of the individual components of availability and access to financial resources. There is a significant change in one of the sub-indicators, as intervention respondents had significantly more access to places within their communities to borrow money, with 16% of respondents having access to these services, versus only 7% in the comparison group.

Figure 15. Availability of financial resources sub-indicators



Aspiration, confidence to adapt, and locus of control

Aspirations, the confidence to adapt, and locus of control serve as gauges of adaptive resilience capacity. The aspirations index hinges on the presence of forward-looking perspectives and the absence of fatalism, yielding a potential range from 0 to 6. The confidence to adapt metric is predicated on the extent to which respondents are exposed to, and can access alternative options, with a scope also ranging from 0 to 6. The locus of control indicator is synthesized from four questions, each assessed on a 6-point agreement scale, and can assume values from 0 to 4. The combination and evaluation of these three indices—the aspirations index, the confidence to adapt indicator, and the locus of control indicator—culminates in an additive index known as the aspirations-confidence to adapt-locus of control index. This comprehensive index spans from zero to 16, capturing the interplay of these three facets in assessing adaptive resilience capacity.

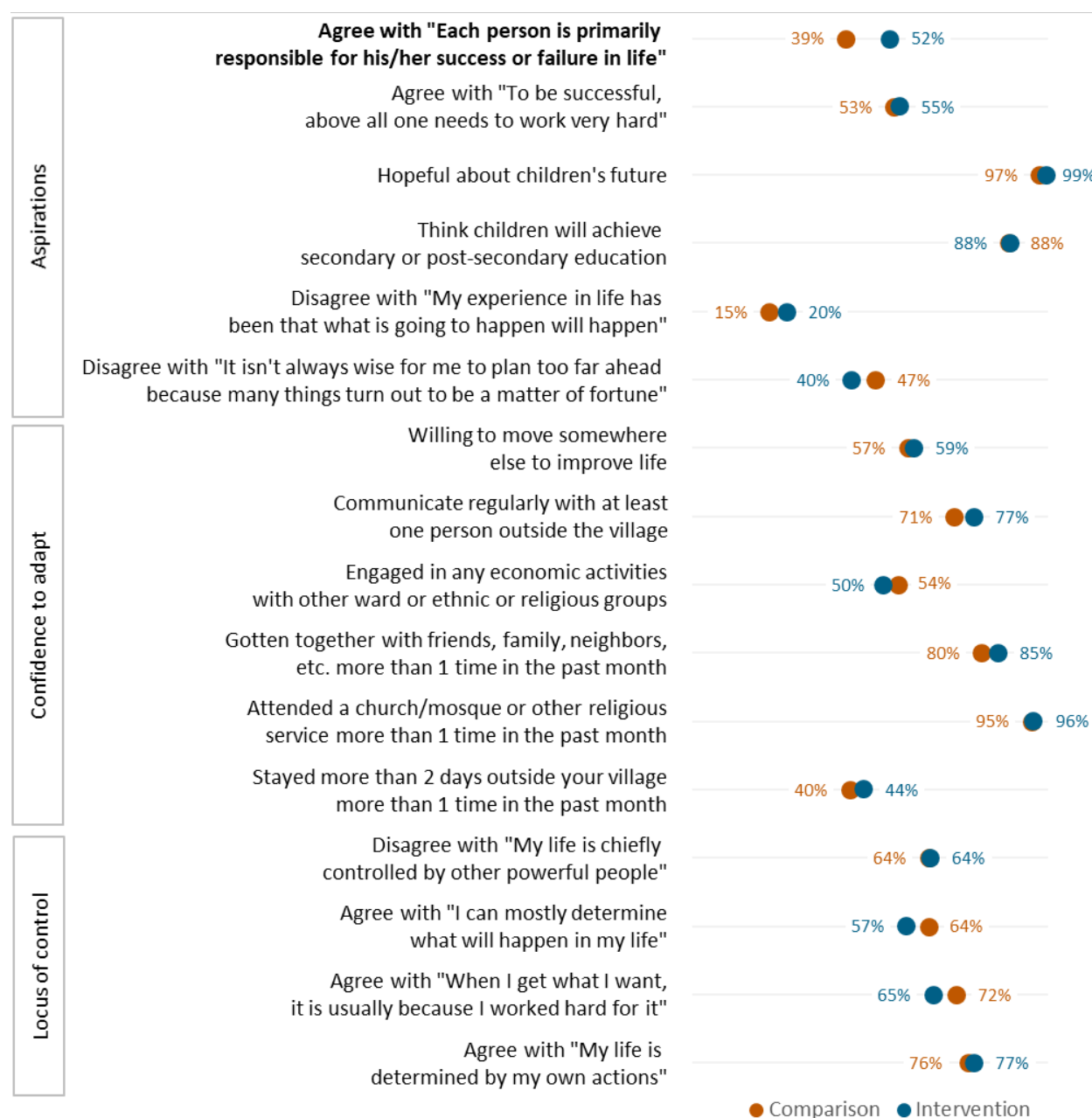
Table 13 below indicates that although there was an increase in both the intervention and control groups from baseline to endline, the difference between these two groups cannot be statistically attributed to the Nuru Nigeria intervention.

Table 13. Aspiration, confidence to adapt, and locus of control indexes

Aspirations/confidence to adapt	2019	2023	Change from baseline	DID estimate
Comparison	9.46	10.1	6.8%	0.031
Intervention	9.6	10.28	7%	

Figure 16 below shows the aspirations, confidence to adapt, and locus of control sub-indicator and individual questions in terms of the difference between intervention and control groups at endline in 2023. A significant difference was identified between the intervention and comparison groups. 52% of respondents expressed agreement with the sentiment that each person is primarily responsible for his/her success or failure in life compared to 39% agreement for the comparison group. The gap also appears to be widening compared to baseline where 44% of the intervention and 45% of the comparison expressed agreement with the previously stated sentiment. Sentiments were very similar for other elements of the comprehensive index and no other significant differences were identified in the analysis.

Figure 16. Aspirations, confidence to adapt, and locus of control sub-indicators



Bridging social capital index

Bridging social capital is a measure of both adaptive and transformative resilience capacities. It pertains to the connections and affiliations established between diverse social groups, encompassing factors such as social class, race, religion, and other pivotal sociodemographic or socioeconomic attributes. The bridging social capital index is calibrated on a scale spanning from zero to six, and its construction is rooted in responses to two pivotal inquiries: (1) The household's affirmation of its ability to receive assistance from a range of individuals residing beyond their immediate community, if the need arises, and (2) the household's assertion of its capacity to extend support to individuals residing outside of their own community who might require assistance. Table 14 below shows that although both intervention and control groups increased their bridging social capital significantly, there is no statistically significant difference between the two groups.

Table 14. Bridging social capital

Bridging social capital	2019	2023	Change from baseline	DID estimate
Comparison	2.0	2.9	46%	0.009
Intervention	1.6	2.5	57%	

Livelihood diversification

Diversification of livelihoods is part of the adaptive resilience capacities, and measures the total number of livelihoods that respondents engaged in the previous year. The individual livelihoods practiced were explored near the beginning of this report in Figures 4 and 5. There is no exact range as the number of livelihoods practiced by individuals varies, however as seen here, the average respondent practiced about 2 differing livelihoods during the past year. Both intervention and control groups diversified their livelihoods practices slightly during the study, however the difference between the two groups does not statistically point to attribution of impact by the Nuru Nigeria program.

Table 15. Livelihood diversification

Livelihood diversification	2019	2023	Change from baseline	DID estimate
Comparison	1.9	2.1	12%	0.287
Intervention	1.8	2.3	29%	

Education and training

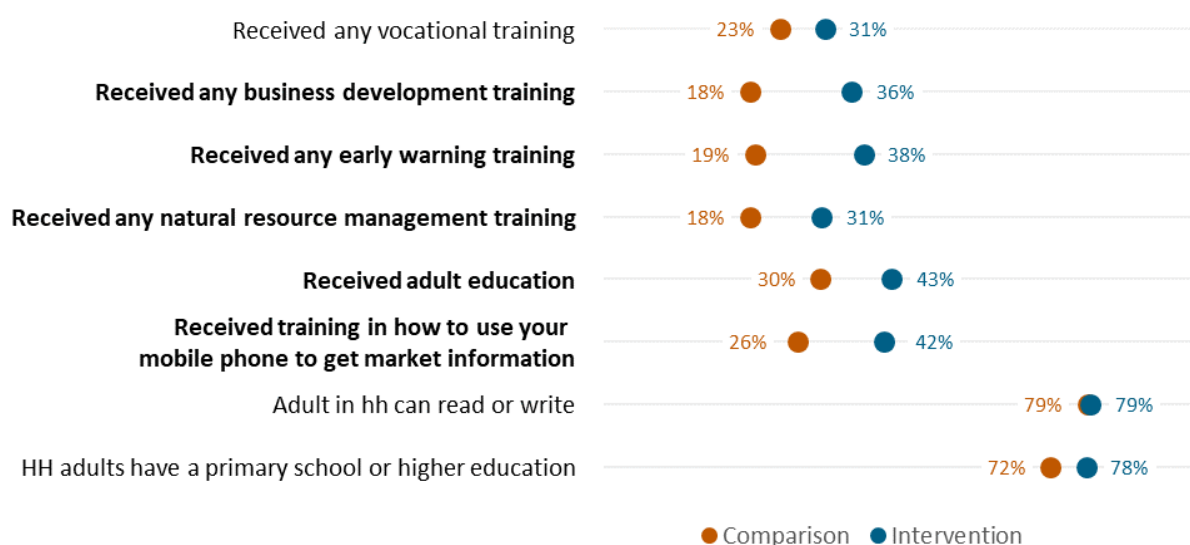
The education and training index can range from 0 to 3, representing various aspects of individual participants' education (level and literacy), as well as their access to several sorts of training they may have, such as vocational training, business development training, or other. Notably, the average education and training level for comparison respondents decreased by 13% from baseline, whereas the intervention group experienced a slight increase. The difference between these two groups over the study timeline represents a significant impact by the Nuru Nigeria program in ensuring individuals within the intervention group are able to access various forms of education and training.

Table 16. Education & training

Education/training	2019	2023	Change from baseline	DID estimate
Comparison	2.25	1.95	-13%	0.271*
Intervention	1.8	2.2	1%	

As seen in Figure 17, the intervention group reported higher levels of access to *every category* of education and training as compared to the comparison group. Notable differences as reported in the focus group discussions include significant increases in a number of the sub-indicators for the intervention group in particular.

Figure 17. Education and training sub-indicators



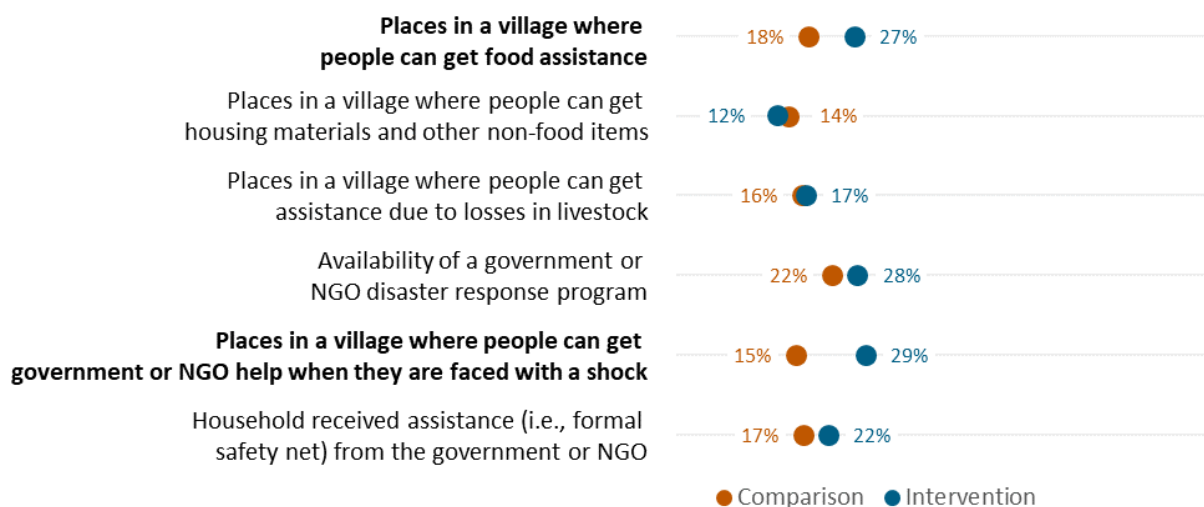
Availability of formal safety nets

Formal safety nets represent one of the aspects within *transformative* resilience. This particular index ranges from 0 to 6, with 0 representing a low level of access in terms of formal safety nets. Table 17 shows that there was a slight increase for both intervention and comparison groups during the study period in terms of access to formal safety nets. However, changes in the two indices were not able to be attributed to the interventions. Looking at the sub-indicators for this index in Figure 17, the intervention group expressed greater access to all but 1 formal safety net with significant differences in food assistance access and government/NGO assistance.

Table 17. Availability of formal safety nets index

Availability of/access to: formal safety nets	2019	2023	Change from baseline	DID estimate
Comparison	0.91	1.0	6%	0.264
Intervention	0.85	1.16	37%	

Figure 18. Availability of formal safety nets sub-indicators



Gender equitable decision-making index

Gender equitable decision-making, also a measure of transformative resilience capacity, is based on four aspects of decision-making at the household level including control over income, control over health and nutritional decisions, control over purchases for the household, and control over children's education. The summary index variable ranges from zero to 20, with each decision on a scale from zero to five. Table

18 shows an increase in gender equitable decision-making from the baseline to endline for both the comparison and intervention groups, which represents a positive overall trend for those involved in the study. However, the difference between those in the intervention group and comparison group was minimal and resulted in an insignificant difference upon further evaluation, meaning that this increase cannot be attributed directly to the impact of Nuru Nigeria programming. Nuru Nigeria is in the pursuit of further understanding related to women's decision-making, and will continue to survey on these topics beyond the scope of the resilience study to analyze this trend over time using various survey tools such as the Women's Economic Empowerment in Agriculture tool.¹⁹

Table 18. Gender equitable decision-making index

Gender equitable decision-making index	2019	2023	Change from baseline	DID estimate
Comparison	13.3	15.8	18%	-0.571
Intervention	14.0	15.8	13%	

Local government responsiveness

Local government responsiveness is a measure of transformative resilience capacity. Local government responsiveness is based on whether and how the local government responded to community requests for improving community assets or services over the five years prior to the survey. Local government responsiveness is measured in a mean score, calculated as the sum of the response value for identified community asset/service needs divided by the total number of community asset/service needs for which any community member requested assistance from the local government. The mean score ranges from zero to three. The results from table 19 below indicate that although there was an increase for both intervention and comparison groups, the difference between the two was not significantly attributable to Nuru Nigeria interventions.

¹⁹ IFPRI. 2023. Uncovering more than a decade of WEAI use in USAID projects. ([link](#)).

Table 19. Local government responsiveness

Local government responsiveness	2019	2023	Change from baseline	DID estimate
Comparison	0.38	0.68	79%	<i>-0.063</i>
Intervention	0.41	0.65	57%	

Social cohesion

Another component of transformative resilience capacity can be evaluated by looking at social cohesion, which can connect aspects of social capital to violent conflict. Social cohesion involves the norms and networks that allow people to take collective action. More cohesive societies are thought to be more resilient. Along the same lines, weak social bonds increase the chance of social fragmentation, exclusion, and ultimately, incidents of violence and conflict. To measure social cohesion, we assess the extent to which groups unite socially or to assist others. This is quantified using an additive index from zero to five. Table 20 indicates that the social cohesion index increased for both the treatment and comparison group respondents but not significant differences were identified.

Table 20. Social cohesion index

Social cohesion	2019	2023	Change from baseline	DID estimate
Comparison	2.6	2.8	7%	<i>-0.113</i>
Intervention	2.55	2.63	3%	

Conclusion

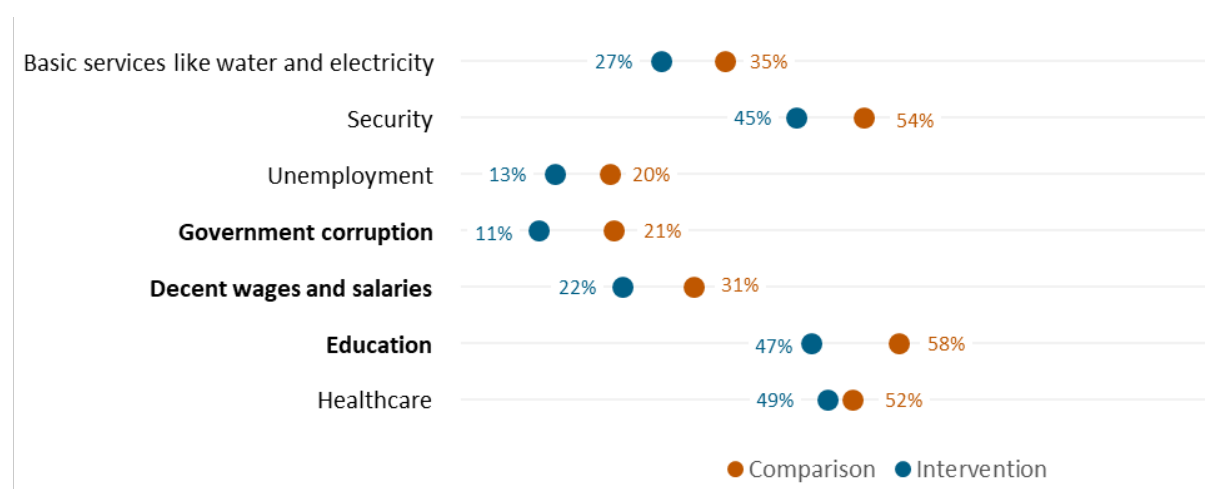
These sub-indicators across the absorptive, adaptive, and transformative indexes all work to inform the overall index that has shown positive effects of the Nuru Nigeria intervention in both adaptive and absorptive resilience. Although many of these indicators showed insignificant trends between intervention and control groups, some significant trends were observed such as positive trends in education and training, and access to cash savings. Although some others may be insignificant as standalone indicators, as an index they are weighted together in order to assume overall resilience in the three capacities. More on this factor analysis using these indicators can be found above in the resilience index methods section.

CHAPTER 7. COUNTERING VIOLENT EXTREMISM (CVE) INDICATORS

CONFIDENCE IN GOVERNMENT

Information on confidence in government was also collected during the period of this study as a set of informative context variables to accompany other noted results. Nuru Nigeria did not necessarily anticipate changing the respondents' perceptions of government. In figure 19 below, it can be noted that in general, the intervention group had significantly lower confidence in the government across corruption, wages and salaries, and education provision.

Figure 19. Confidence in state government indicators by intervention status



SOCIAL RELATIONS

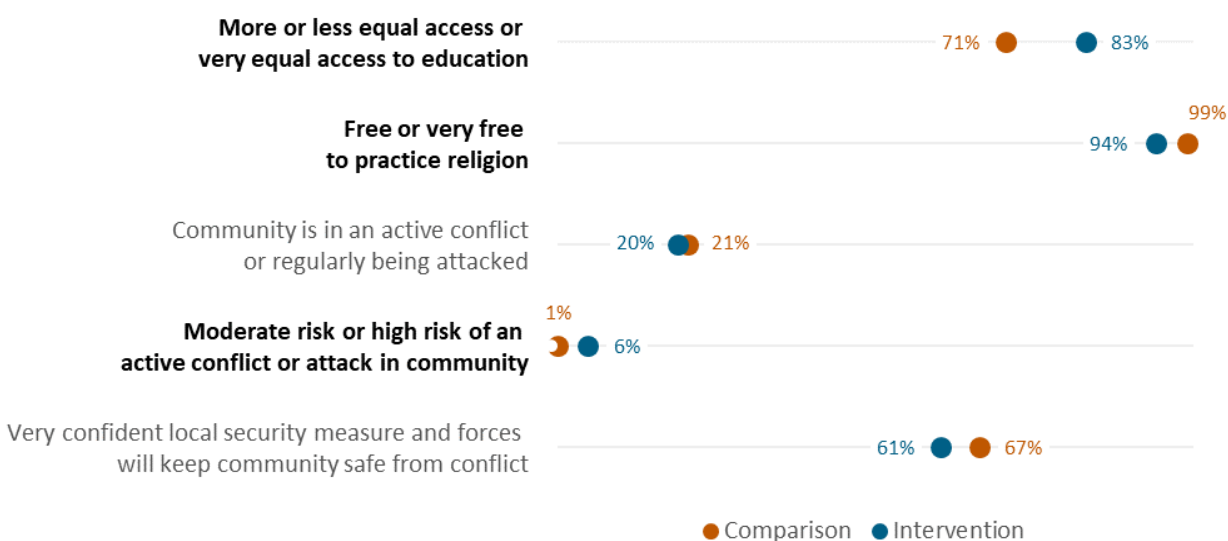
Indicators of social relations including shared values, shared approaches to resolving conflicts, and the need to protect oneself and others appear to be similar to both midline and baseline observations, as seen in figure 20. Generally, social relations are seen similarly across the comparison and intervention group, with the largest difference representing a relatively small 5% difference in perceptions on marrying individuals from a different ethnic group.

Figure 20. Social relations indicators at endline



ADDITIONAL SOCIETAL INDICATORS

Figure 21. Additional societal indicators at endline by intervention status



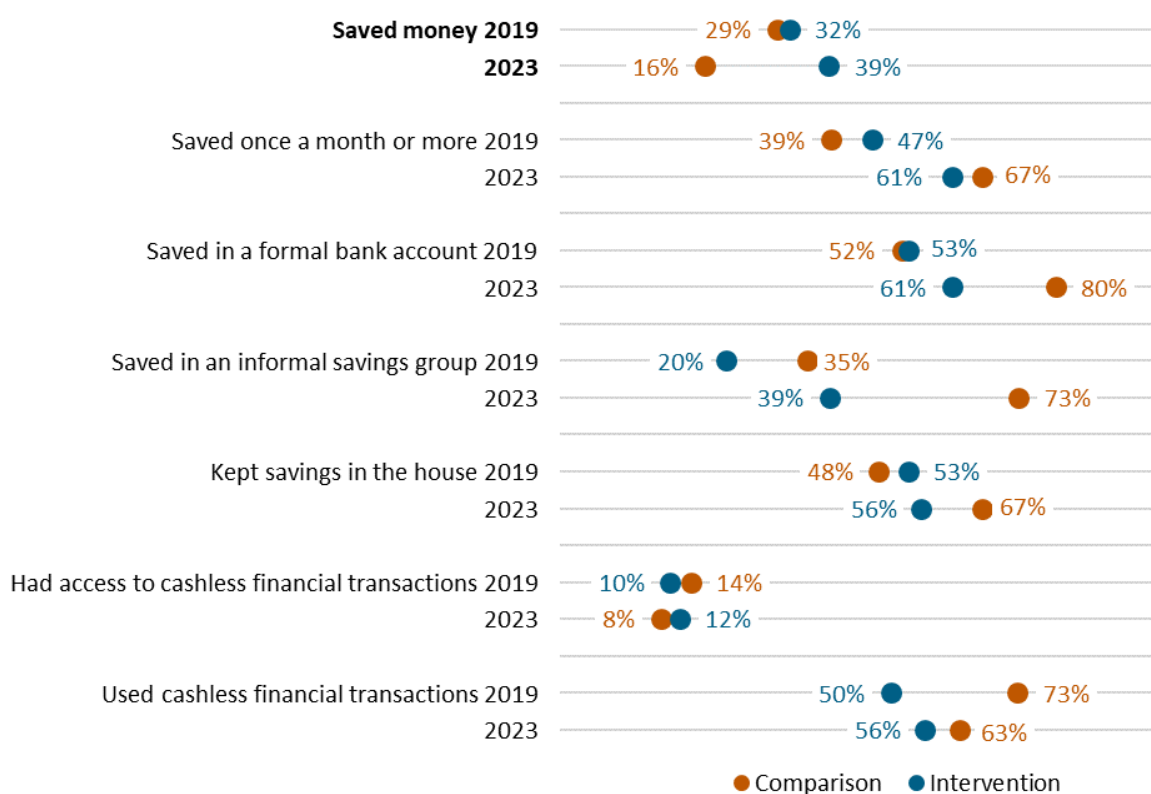
CHAPTER 8: SHORT-TERM PROGRAM IMPACTS

The following examines the impact Nuru Nigeria programming had on a variety of short term outcomes. Between the study periods, Nuru Nigeria conducted two additional surveys in 2020 and 2022 with a smaller group of specifically intervention households. Intervention households made several gains in short term outcomes over the course of the study, and in the interim between evaluation periods. At the endline, RMC used further difference-in-difference testing to validate some of the observed trends during the short term impact surveys.

FINANCIAL SAFETY NET

Figure 21 represents the savings behavior of both intervention and comparison groups at the baseline and the endline time points. For the intervention group, every financial safety net indicator increased except for savings kept in the household, which saw a decrease overall between both intervention and comparison households. The comparison group saw slightly less consistency as individuals reported saving money less overall, and experienced a lower level of access to financial transactions.

Figure 22. Financial safety net indicators

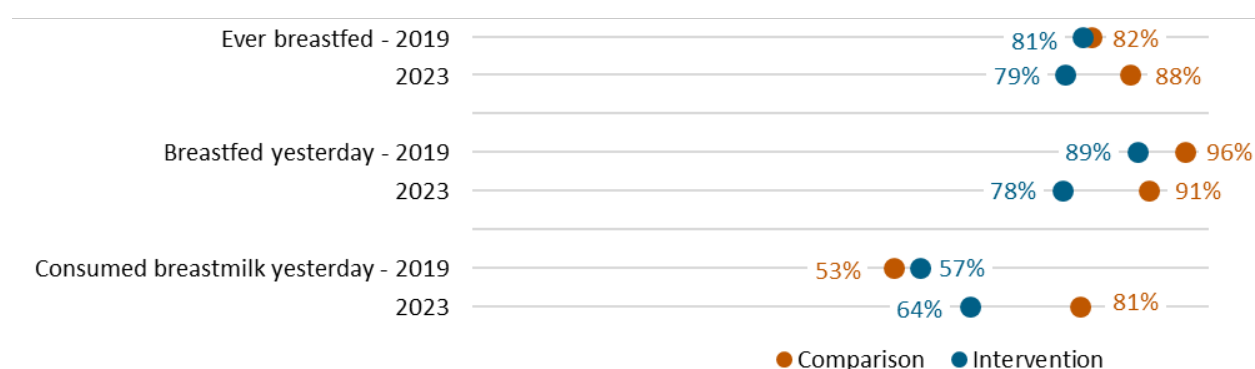


HEALTH

Breastfeeding

Figure 23 below describes the breastfeeding behaviors at both baseline and endline. The survey asked mothers with children under the age of 3, and the majority of women responded by frequently breastfeeding their children. Although some small changes can be seen between baseline and endline in terms of breastfeeding habits for mothers in both the comparison and intervention groups, significance testing indicated no significant trends attributable to the intervention.

Figure 23. Breastfeeding indicators



Household dietary diversity

Household dietary diversity for the purposes of this survey is considered the number of different unique foods consumed by members of the household over the previous year prior to the survey. The score for dietary diversity ranges from zero to 12, with 12 indicating the highest level of food access. This intervention found no significant differences in household dietary diversity between the intervention and control groups.

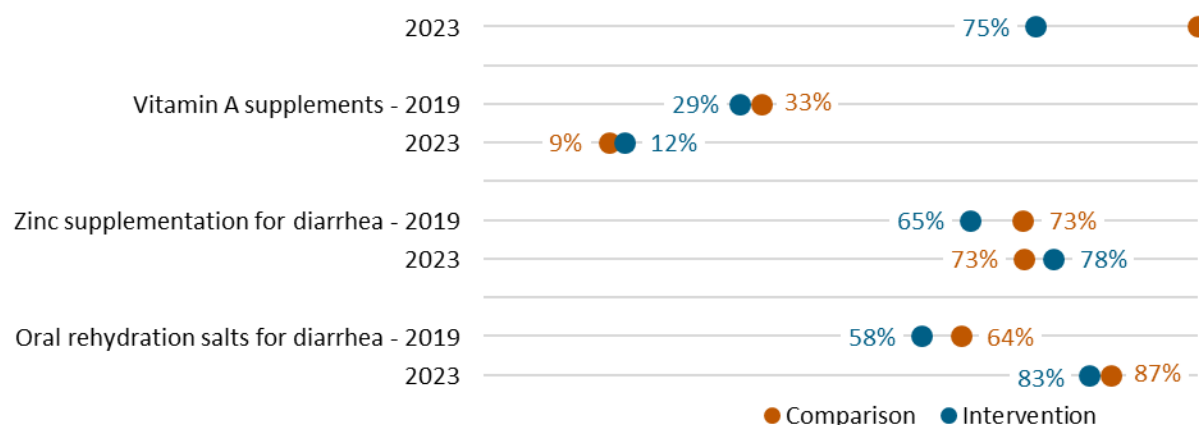
Table 21. Household dietary diversity

HDDS	2019	2023	Change from baseline	DID estimate
Comparison	5.0	6.2	23%	0.417
Intervention	5.0	6.5	32%	

Micronutrients

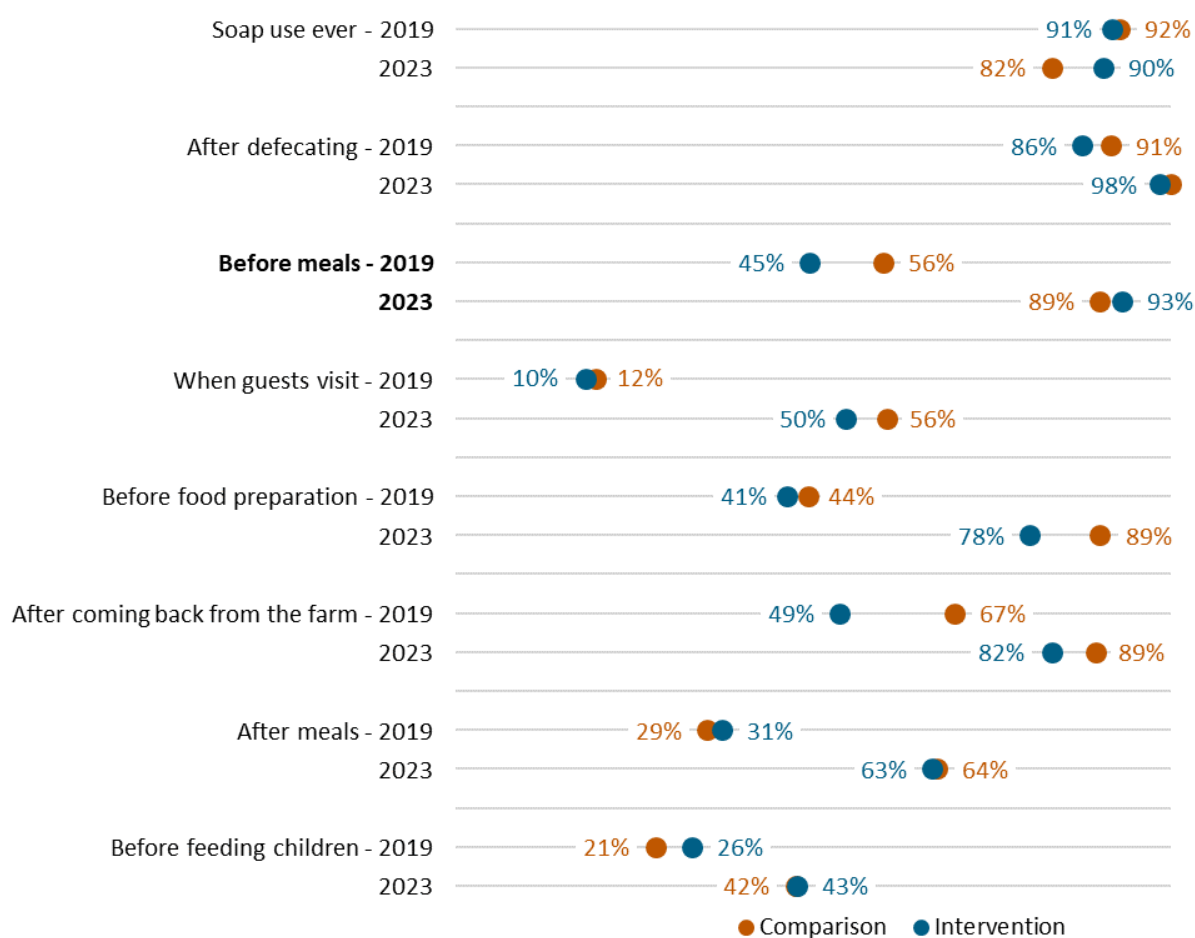
Figure 24 presents data on household-level micronutrient access at both the baseline and endline of our study. Our analysis revealed no statistically significant difference in micronutrient access between the intervention and control groups as a result of the program. Notably, at the midline assessment, we observed a statistically significant increase in access to zinc supplements within the intervention group. However, by the endline, this difference between the two groups had ceased to be statistically significant. Interestingly, the utilization of prenatal vitamins and oral rehydration salts exhibited a consistent upward trend in both the intervention and comparison groups over the course of the five-year study. Nuru Nigeria is currently partnered with an organization in Northeast Nigeria to distribute vitamins to *both* the intervention and control communities, so the likelihood of seeing a significant difference between groups is small.

Figure 24. Micronutrient indicators



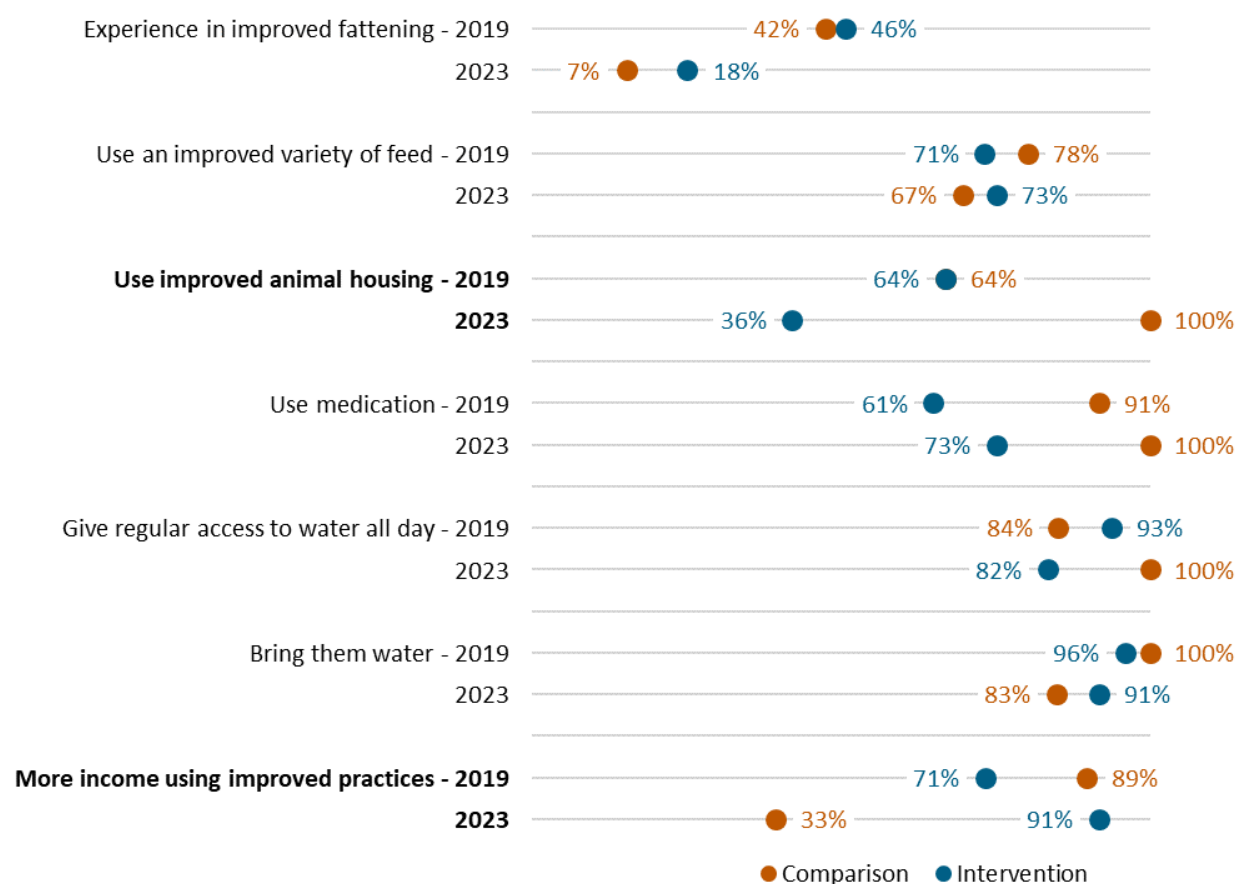
Hygiene

Figure 25 depicts the utilization of soap from baseline to endline, revealing notable trends in both the intervention and control groups across various subcategories of use. In nearly every sub-category, there were general increases in soap usage. Notably, difference-in-difference testing revealed a significant increase in soap use before meals within the intervention group. This significant trend in soap use before meals was also observed at the midline survey. Substantial increases in soap use before guest visits and food preparation were also observed in both the intervention and control groups from the baseline to the endline.

Figure 25. Soap use behaviors

LIVESTOCK

Figure 26 shows livestock practices at the household level from baseline to endline. The difference-in-difference analysis found two significant differences between the intervention and control groups in relation to the practices used for livestock at the household. The first significant difference was a decrease in use of improved animal housing. The second significant difference occurred in the income generation category, with a greater percentage of intervention respondents reporting a higher income from using improved practices with their livestock, whereas the reported number of comparison individuals reporting higher income from livestock practices decreased dramatically.

Figure 26. Sheep & goat livestock practices

POST-HARVEST

Figure 27 shows indicators of post-harvest for households across the baseline and endline. The difference-in-difference testing showed no significant differences between the comparison and intervention groups. At midline, there was a significant decrease in intervention respondents losing cash crops which can no longer be found at the endline. However, it is worth noting that these variables in particular fluctuate to a great extent depending on other external factors such as the market, pests, climate change, and crop disease which are likely to shift on an annual basis. In general, it appears that regional trends in crop loss for both cash crops and consumption crops continue to be elevated.

Figure 27. Post-harvest indicators

CROP YIELD

Each year, Nuru uses an income model independent of the resilience study in order to estimate increases in income for farmers participating in crop interventions with Nuru Nigeria. The farmers who participate receive training and extension services focused on groundnuts and soybeans, with the aim to increase yields of both crops and subsequently the income they are able to achieve from the sale of surplus crops. In order to capture both crops, Nuru uses a Crop Equivalent Yield (CEY) method, by multiplying the average crop yield of each by the prevailing local market price for each crop. One way that Nuru interprets this calculation is by asking: “If Nuru farmers only grew soybean this season, how much more/less soybean would they have produced compared to the baseline season?” At the endline, farmers saw a CEY yield increase of 121% over baseline, exceeding the target of a sustained 32% increase.

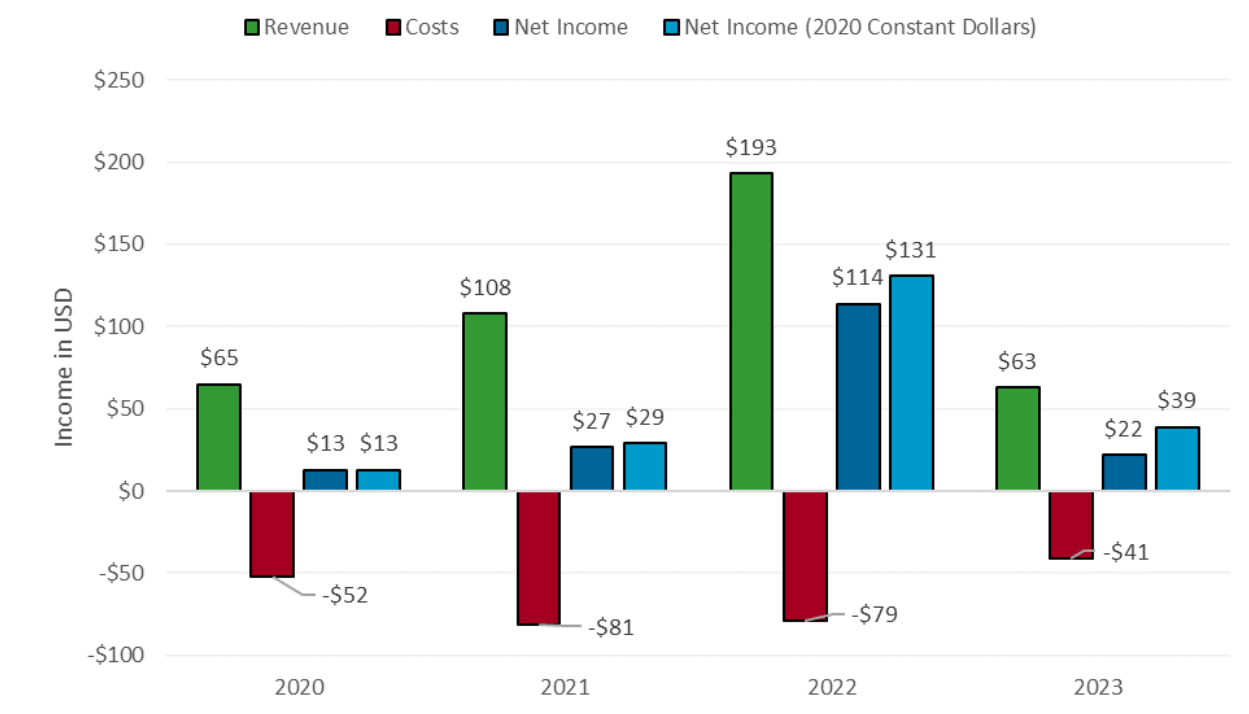
AGRICULTURAL INCOME

As part of the yield and income mapping exercise, Nuru estimates income increase by multiplying the average crop yield by the local market prices during the season of sale. Due to ongoing currency crises in Nigeria, the model also considered annual inflation and currency conversion when considering the conversion to USD. The income model is cost-inclusive, meaning that the costs farmers incur during production are part of the net income calculation. These costs generally involve the loan farmers take in order to acquire an improved input package, which differs slightly depending on the crop and season. The net gain for farmers participating in the activities is calculated by subtracting these costs from the increase in revenue, leaving Nuru with an estimated return on investment per farmer participating in the agricultural interventions.

At the endline, farmers who increased their yields by the aforementioned 121% also were able to increase incomes by an average 65% over baseline, against a target of 30%. In conversion to USD, this represents farmers earning an average of \$22 of surplus income from farming activities, for many that used to be living close to subsistence. Notably, during the previous year, the average farmer was earning \$114. This decrease from the previous year is due to significant negative externalities on programming and farming, including the currency crisis in Nigeria, ongoing presidential and regional elections, greater than average erratic rainfall, and continued regional insecurity.

The following figure 28 shows the revenue, costs, and net income from crop production based on the crop yield of a randomly selected sample of Nuru Nigeria farmers. The farmers asked for yield values are not necessarily the same as those responding to the resilience survey questions, although they are receiving similar programming and inputs. Shown here, farmers were making an average \$13 of net income per year in 2020 prior to the provision of improved inputs, and had gradually increased production over time through 2022, before a significant decrease in 2023 due to increased input costs, political turmoil and significant climate shocks, as well as inflation (shown as both constant and real dollars).

Figure 28. Crop revenue per 0.5 hectare



CHAPTER 9. CONCLUSION AND DISCUSSION

The endline report describes a number of varying outcomes from Nuru Nigeria's program implementation across demographics and livelihoods, shock exposure and coping mechanisms, well-being outcomes, resilience capacities, and several other immediate program outputs. The difference-in-difference (DID) methodology was used to measure the impact and significance of key outcomes between the intervention and control groups.

KEY FINDINGS

This 5-year RCT study concluded that, at endline, Nuru interventions had a significant and positive impact on both adaptive and absorptive resilience capacities of smallholder farmers in the intervention communities. The study did not find any significant changes in transformative resilience. Aside from the high-level indexes, this study noted several positive outcomes within each indicator, such as improvements in access to cash savings, education, and positive trends in improving farming as a business in both the production of crops and livestock.

Alongside this study, Nuru farmers have been continuously earning more from their crop production. Tangential crop yield surveys indicated that farmers, at endline, were earning 121% more from cash crop activities as calculated using a Crop Equivalent Yield (CEY) methodology to incorporate both soybean and groundnut production. As a whole, Nuru interventions have ensured farmers in intervention communities are earning more, and are more resilient in terms of their adaptive and absorptive resilience capacities. Nuru hopes to continue studying these outcomes and incorporating successes into programming to continue this positive impact in the future across multiple intervention regions and smallholder farmer communities.

DISCUSSION

The methods in this study rely heavily on the REAL Consortium, including the index methods and much of the background on the need for measuring resilience. The REAL Consortium has distilled several insights about effective resilience programming into a narrative framework. Emphasizing the effectiveness of early warning systems, they note such measures can significantly mitigate the impacts of environmental and economic shocks. Additionally, the strength of community bonds—or bonding social capital—is highlighted as a critical factor in building both immediate and long-term resilience.²⁰ However, as noted in this study, the format of the bonding social capital questions and how they are communicated to respondents should be closely considered by researchers based on cultural context.

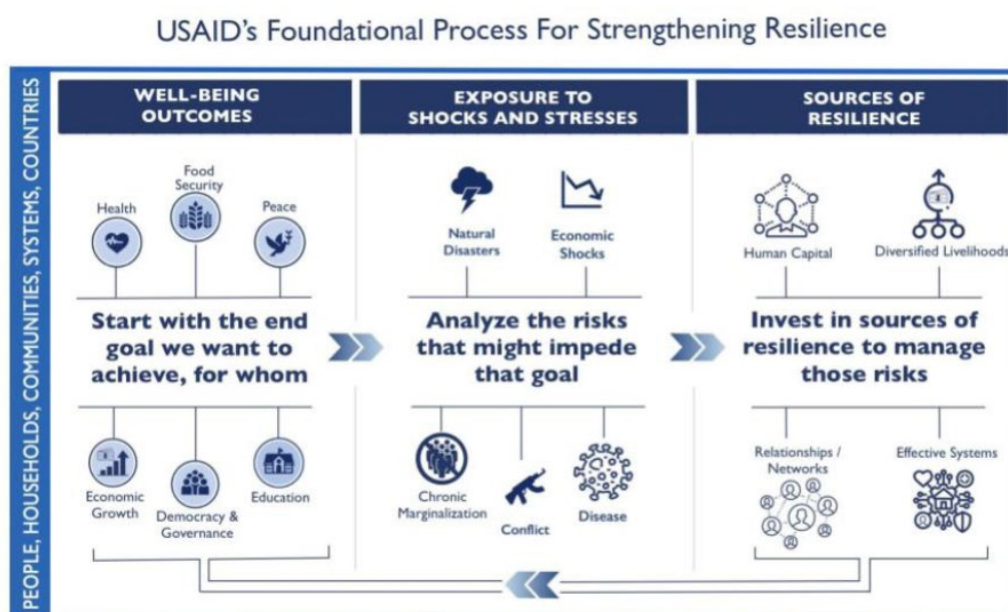
Information is power, and for communities facing uncertainties, access to essential information is a key to resilience. Livelihood diversification also emerges as a crucial strategy, providing households with a buffer against potential crises. Implementing safety nets goes hand-in-hand with this approach, protecting assets and reinforcing a community's ability to weather shocks.

Directly involving households in comprehensive 'systems-level' interventions tends to result in more profound resilience impacts, and programs that champion women's empowerment are particularly potent in fostering community resilience.

When designing resilience interventions, the Consortium advises looking beyond short-term economic relief to consider long-term shock implications and the complex interplay of social structures. There's a call for more nuanced, context-aware programs, especially those that integrate climate considerations and disaster risk reduction into their core activities. Additionally, gender and social inclusion dynamics are crucial; they must be understood and integrated into program design. Encouraging community participation in these designs, as part of co-creation activities, fosters social cohesion, leading to more resilient outcomes. In sum, the Consortium advocates for a layered approach to resilience programming that centers on community involvement, agency building activities, and adaptive strategies to ensure sustainable resilience.

²⁰ REAL Consortium. 2020. Synthesis of Evidence from Resilience Programming; Measuring Effects and Effectiveness of Resilience Programming. ([link](#)).

Figure 29. USAID’s Foundational Process for Strengthening Resilience (USAID, Global Resilience Partnership, 2023)



Recently, in 2023, a summit by USAID and the Global Resilience Partnership (GRP) in South Africa brought together a global community to reassess the resilience frameworks within the development sector. This critical reflection comes at a time when the world has been battered by a cascade of crises – conflicts, the COVID-19 pandemic, and waves of economic and political instability.

Although the fundamental concept of resilience remains consistent – the ability of systems to endure, adapt, and evolve amid change – there's a shifting emphasis towards fostering equity and inclusivity. The GRP defines resilience as “...the capacity to persist, adapt, and transform in the face of change. This is supported by five key attributes that reinforce resilience systems: diversity, redundancy, inclusivity and equity, connectivity and modularity, and adaptive learning.”²¹

In this context, organizations like Nuru Nigeria are pivotal to understanding how programs influence resilience as they continue to expand in operations over the coming years. The constant evolution of resilience evaluation is vital, and while large-scale symposiums like the USAID-GRP gathering are influential, the sector has yet to settle on a universal approach or consensus regarding the most critical facets of resilience in reducing poverty. The journey towards an all-encompassing resilience strategy continues, with adaptive learning at its core.

²¹ Global Resilience Partnership. 2023. Global Resilience Forum Synthesis Report. ([link](#)).

IMPLICATIONS FOR POLICY AND PRACTICE

This comprehensive four-year study conducted by Nuru Nigeria has yielded critical insights with far-reaching implications for both policy and practice in the realms of agriculture and resilience-building. The study's findings conclusively demonstrate that Nuru Nigeria's interventions significantly enhanced the adaptive and absorptive resilience capacities of farmers in a region impacted by Boko Haram's activities, where extreme poverty and subsistence living are prevalent.

Policy and Funding Implications:

The study's results underscore the efficacy of agricultural interventions in fostering resilience among smallholder farmers in post-conflict zones. This should encourage both the Nigerian government and international entities to consider directing resources toward organizations like Nuru Nigeria, as such investments can markedly improve livelihoods and resilience against regional challenges.

Strategic Insights for Nuru Nigeria:

These positive outcomes serve as a valuable feedback mechanism for Nuru Nigeria, highlighting potential areas for programmatic adjustments to further benefit farmer communities as the organization expands within Nigeria.

Model for Related Organizations:

Beyond Nuru Nigeria, the study provides a replicable model for other organizations within the Nuru collective operating in Kenya, Ethiopia, and Burkina Faso. It emphasizes the importance of robust monitoring, evaluation, and learning systems to facilitate similar in-depth analyses and resilience outcomes across different geographical and contextual landscapes. Related organizations also include those working in the domain of agricultural development with smallholder farmers, outside of the Nuru Collective, as their models could look towards the results of this study to prove community-level approaches to working with smallholder farmers, and their linkages to lasting resilience outcomes.

Community-Driven Development:

A crucial takeaway is the affirmation that community-driven development programs yield significant and lasting results, reinforcing the core principles of the Nuru collective of organizations, and underscoring the push to localize development efforts and involve those closest to the program in the design, evaluation, and implementation stages.

Future Research Directions:

The study opens avenues for further research, suggesting that increases in resilience could be correlated with other factors such as conflict dynamics, gender disparities, political shifts, and economic changes. To facilitate such explorations, it is recommended that this dataset, along with others measuring similar improvements, be made publicly accessible to both researchers and practitioners aiming to refine and enhance their programs.

One area in which Nuru looks immediately to investigate further involves the substantial dataset of conflict events that Nuru has collected in the period from 2020 to the present. This dataset shows instances of conflict, unrest, kidnapping, security force actions, and other events that are linked with specific groups and timepoints and geolocated to various communities and significant locations in northeast Nigeria. Using this data to understand how shifting conflict dynamics may contribute to a lack of resilience, or increased resilience as the number of these events diminish, could offer a unique insight into the relationship between physical security, economic development, and social cohesion for fragile, marginalized communities. This improved understanding could influence the operation of Nuru Nigeria and others working in post-conflict and conflict-proximate zones.

APPENDIX

REPRODUCIBILITY

The authors of this study were committed to ensuring that the findings are reproducible. To uphold this principle, meticulous strategies were implemented at every stage of the evaluation:

- Methodology Selection: The study adopted the REAL Consortium methodology.
- Resilience Index Modules: Modules for inclusion in the resilience index were predetermined before the baseline. These modules were consistently used during the midline and endline evaluations.
- Survey Translation: Questions were translated into Hausa to cater to the local audience. A double-blind translation process ensured the accuracy and consistency of understanding, with the same translated text applied at each study time point.
- Data Accessibility: The data, scrubbed of any personally identifiable information, are made available upon request to interested parties. They can be accessed through a gated system, with users agreeing to adhere to usage terms. This data is stored on a secure server, adhering to rigorous physical and data security standards.
- Open Access: The initial evaluation plan, including methodological descriptions as well as a dataset to reproduce results and explore additional relationships can be requested [here](#).

METHODOLOGICAL NOTES

Clustered Randomized Control Trial Approach

- To ensure a comprehensive and effective sample for this study, a cluster randomization technique was employed during the baseline phase. This process involved the random allocation of two wards to the intervention group, two wards to the comparison group, and two wards earmarked for future scaling initiatives by Nuru Nigeria. Consequently, there were three distinct groups assigned to both the treatment and non-treatment categories. It's worth noting that although the program's scope extended beyond the initially chosen wards, the participants monitored within the program and the originally selected wards remained consistent throughout the study's duration.

Respondent Retention

- During the baseline phase, 496 households undergoing treatment were surveyed in two wards. Additionally, 1,136 households were randomly selected from another two wards to create the comparison group. Both groups participated in the study for five years, with some natural attrition occurring in both control and intervention participants. Non-intervention household selection during the baseline phase utilized a geospatial technique, identifying housing units through remote sensing and determining their inclusion or exclusion through random number generation.

Propensity Score Matching

- To counteract the relatively high attrition rates in both the treatment and comparison groups during the endline data collection, Propensity Score Matching (PSM) was utilized. PSM involves matching endline treatment households with endline comparison households based on their baseline characteristics. This approach enables us to reasonably evaluate the intervention's impact on treated households, even as overall group representativeness diminishes over time.

ADAPTIVE MANAGEMENT

As a non-profit organization focused on continually improving impact and resilience across various rural livelihoods and regions, Nuru local organizations establish strong adaptive management practices to ensure a culture of learning is established for all projects. At a minimum, this means understanding the evaluative impact of project activities on an annual basis while quarterly reviewing monitoring data and gathering informal community feedback at regular intervals. Throughout the resilience study, reports were published on a yearly basis. Aside from the baseline in 2019 and the midline in 2021, additional short-term impact reports were published in 2020 and 2022, which were used to inform an annual operational planning process. In 2021, a multi-day intervention adaptation workshop was held in the LGA of study modeled on USAID's Collaborating, Learning, and Adapting (CLA) methodology. The results from this study's interim reports were used to inform substantive changes in programming. Moreover, various exchange visits, webinars, and regular meetings were conducted between Nuru Nigeria and other Nuru local organizations in Kenya, Ethiopia, and Burkina Faso. Nuru International played a facilitative role throughout these adaptive management events. It is important to mention that even though programmatic changes were conducted, this did not change the survey methodology or approach, as consistency is one of the key aspects of a rigorous RCT study.

Furthermore, during this program, adaptive management was taken into consideration as Nuru Nigeria initiated the implementation of two large institutional donor-funded projects (GIZ and USAID). These donors have their own internal adaptive management techniques that require various intervals of reflection on programming and additional surveys to understand the impact of programming. As an example, during the 2-year Building Sustainable Livelihoods Local Works Award with USAID, Nuru Nigeria employed a monthly CLA workshop that allowed the team to share lessons learned, obstacles, and areas for improvement that may otherwise go unnoticed or unshared.

FUTURE RESEARCH DIRECTIONS

Continuation of Study

The authors of this study have envisioned several avenues for future research. It is essential to acknowledge that given the multifaceted nature of this study, there exist numerous potential directions for its continuation, drawing from a combination of the various indicators and results observed in the extensive 5-year dataset. Some recommended areas for further investigation include the following:

1. Ex-Post Evaluation in Nigeria: Following the conclusion of this study, Nuru Nigeria intends to sustain reporting on its impact, albeit in a more concise format, with an emphasis on outcome evaluation as opposed to the impact evaluation carried out using the methods presented here. Farmers will continue to be monitored over time for their progress in terms of increased yields and income. However, certain indicators examined in this study may not be assessed at regular intervals. Therefore, it may prove beneficial to periodically replicate specific methods to comprehend the impact, such as conducting evaluations after concluding support in one community, before initiating an intervention in another community, or during expansion into new regions.
2. Replication and Resilience Evaluation in Different Geographies: Another promising avenue for future research involves replicating the methods used in this study or conducting similar evaluations of resilience in entirely different geographic regions, either within Nigeria or in other countries within the Nuru collective. A secondary evaluation of resilience can offer valuable context for gauging the impact of this specific intervention and the findings of this study in comparison to an external benchmark. This benchmark might employ a similar intervention model but involve farmers in distinct socioeconomic circumstances, value chains, and environments.
3. Longitudinal Study of Sub-Indicators: This study has focused on numerous sub-indicators, including responses to environmental shocks and stressors, recovery from extremist activities in the region, gender-related outcomes, and more. Additional research can delve into how these data points change over time. This might entail integrating external datasets from the region and conducting further analysis using the publicly available resilience dataset to identify trends and consistencies with Nuru Nigeria's programs and other external variables. While this study has uncovered many correlations and results, it is certain that numerous others exist which were not explored in the present research.

Integrating new methods and fields of study

The study described above introduced a distinctive approach to resilience evaluation, capturing specific indicators that were considered pivotal during the study's inception in 2017 and 2018. However, like many resilience measurement methods, this approach does not encompass the full spectrum of potential questions or outcomes related to resilience assessment. Various tools for measuring resilience are available, and their relevance varies significantly depending on the sector, organization, or field in question.

Interconnected systems have the potential to enhance resilience while also reducing it and increasing risk. In short, the impacts of natural hazards can cascade across systems, leaving people and places vulnerable and weakening their ability to rebound. The integration of environment and natural resource management-related indicators will provide a better understanding of a community's ability to rebound after a natural disaster and more incremental weather shocks linked to climate change. As stated by UN Deputy Secretary-General Amina J. Mohammed on May 18, 2023 “Nothing erodes sustainable development like disasters, which can often destroy decades of progress in minutes. The failure to identify, prevent and reduce risks before they manifest as disasters not only places the Sustainable Development Goals in jeopardy — it affects the most vulnerable people in the world first and worst.”²² By exploring and potentially adopting an environmental dimension of resilience measurement there is significant potential to support better overall resilience assessment and programming impact as communities cope with shifting weather patterns and an increased frequency of floods, droughts, and other hazards.

In the future, Nuru, in collaboration with the Ray Marshall Center, will explore opportunities to refine or adapt the questions and methods employed in this study. Additionally, the incorporation of methods from different realms of resilience research, including gender, environmental, and conflict-related aspects, could prove invaluable for Nuru in gaining a comprehensive understanding of unique interventions across diverse geographies and contexts. All research partners involved here would additionally welcome further ideas or collaborations on the above as it relates to external research, whether academic or implementation-focused.

²² <https://www.undrr.org/disaster-risk-and-2030-agenda-sustainable-development>

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