

# Baseline Study of the Maharo Resilience Food Security Activity (RFSA) in Madagascar



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## ACRONYMS

ANC	Antenatal Care
BHA	Bureau for Humanitarian Assistance
BL/EL	Baseline/Endline
CRS	Catholic Relief Services
F&M	Female and Male Adults
FAO	Food and Agriculture Organization
FCS	Food Consumption Score
FIES	Food Insecurity Experience Scale
FNM	Adult Female No Adult Male
HAZ	Height-for-Age Z-Score
IE	Impact Evaluation
IMPEL	Implementer-Led Evaluation & Learning Associate Award
IP	Implementing partner
MAD	Minimum Acceptable Diet
MDD	Minimum Dietary Diversity
MNF	Adult Male No Adult Female
NGO	Non-Governmental Organization
ORS	Oral Rehydration Solution
ORT	Oral Rehydration Therapy
PPP	Purchasing Power Parity
RCT	Randomized Controlled Trial
RFSA	Resilience Food Security Activity
WASH	Water, Sanitation and Hygiene
WAZ	Weight-for-Age Z-Score
WHZ	Weight-for-Height Z-Score

## EXECUTIVE SUMMARY

This report captures baseline (BL) round data and observations collected from February to March 2021 of the Maharo Resilience Food Security Activity (RFSa) that is being implemented by Catholic Relief Services (CRS) in southern Madagascar. This activity attempts to address and mitigate acute levels of food insecurity experienced by communities in this region of Madagascar. Apart from general demographics, study indicators include food security; child nutrition and health; women’s maternal nutrition and reproductive health; water, sanitation, and hygiene practice; agricultural practice and production; poverty measurement; gender dynamics; and resilience. A complementary endline (EL) survey is anticipated to be conducted from February to March of 2025.

### Baseline Study Methodology

The Impact Evaluation (IE) of the Maharo RFSa relies on a Clustered Randomized Controlled Trial (RCT) design to analyze differences between treatment and control groups. In the case of the Maharo RFSa IE, the primary difference between treatment and control is the presence of additional community tailored livelihood support. As a result, the analysis will focus on the additional marginal effect of these livelihood activities on food security and other development outcomes. Overall analysis at BL suggests that the IE is well placed to estimate these differences at EL, and that treatment and control groups are similar enough on key characteristics.

### Study Limitations

Several factors posed potential challenges that the research team will adjust for or monitor throughout the course of the IE activity. High levels of drought condition in the southern area have contributed to higher-than-normal levels of outmigration. This is complicated by the challenges imposed by the coronavirus. The research team will work closely with implementing partners (IPs) to gauge this issue and take steps ahead of EL data collection to mitigate, if necessary. Finally, safety protocols that limited contact with beneficiaries and enforced social distancing measures ruled out the possibility of collecting some BL indicators, specifically height measurements for women of reproductive age and children.

### Key Findings

#### Demographic Profiles

By the end of data collection efforts 4,595 households had been surveyed. There were little to no observed trends of variance between the treatment and control group on both the individual and household level, suggesting that the two groups are similar in terms of overall demographic characteristics. Demographic data from 2011 demonstrating that 24% of the population were under the age of 5 match the distribution found at BL (25%). Self-reported household head characteristics follow a similar trend as other individual indicators in showing little difference between treatment and control households.

#### Food Security

Reported severe drought conditions in the area suggest reduced food security across the entire region of the study. Food security was estimated using two standard measurement approaches, the Food Insecurity Experience Scale (FIES) and the Food Consumption Score (FCS) index. Based on the FIES, 60% of the population is facing severe food insecurity, and over 97% are at least moderately food insecure.

Severe food insecurity is lower in treatment areas compared to control (56% versus 63%). The FCS, which calculates overall consumption levels across food groups while accounting for cultural and regional weights for food preference and importance, finds that fewer than 20% of all households have an acceptable FCS and more than 45% of households are considered to have a poor FCS. Consistent with the FIES, control areas have slightly worse FCS outcomes (p-value = 0.05). Disaggregation by household adult type show some differences as well with fewer than 9% of MNF households having an acceptable score, compared to 19% of households with both male and female adults present.

### **Child Nutrition and Health**

Overall quality of diet for children 6 to 23 months of age appears to be poor across the survey population. Only 3% of all children ages 6 to 23 months met Minimum Dietary Diversity (MDD) criteria and only 2% met Minimum Acceptable Diet (MAD) standards. Dietary diversity was slightly poorer in control areas while they were more equal in terms of children receiving a MAD. Approximately 34% of children under 5 years old are reported to have experienced diarrhea within the last 2 weeks. Of those that experienced diarrhea, only 14% reported use of oral rehydration therapy (ORT) to treat symptoms. There does not appear to be any observed trend across treatment status or the gender of the child. Given the ongoing COVID-19 pandemic, weight of children under 5 years of age was the only anthropometric indicator captured in the BL round of surveys. More than a third of children are underweight and approximately 15% are severely underweight. Observations of the distribution also show a high concentration of children around thresholds suggesting larger populations on the cusp of being underweight.

### **Women’s Health, Maternal Nutrition, and Reproductive Health**

Observations around the health and reproductive decisions of women of reproductive age among surveyed households suggest poor food consumption diversity but minimally acceptable levels of access to health personnel during pregnancy. Altogether, less than 2% of women consumed a diet that meets the MDD criteria. Nearly 69% of women consumed two or fewer food groups. On average 65% of women received the recommended number of antenatal care (ANC) visits (at least four) during their most recent pregnancies. Additionally, contraceptive use is not widespread with 13% of women reporting using a modern method of birth control. Injectable contraception accounts for more than half of all contraception methods used.

### **Water, Sanitation, and Hygiene (WASH) Practices**

Based on indicator criteria, 13% of all households have access to basic drinking water services. While most water sources are available year-round, fewer than a third of households have water within 30 minutes and less than half (43%) have access to an improved source. Regarding treatment, sanitation, and hygiene practice only 4% of households were observed to have handwashing facilities available in the home and less than half (41%) report treating water with filtering or disinfecting process. Most households (57%) practice open defecation and only 15% have household-level improved sanitation facilities. Among those not practicing open defecation, 83% utilized unimproved technology (uncovered pit latrine), and 23% share the facility with other households.

### **Agriculture**

More than 93% of households are engaged in farming (either crops or livestock), and over 96% of farmers in the Maharo region own the land they cultivate. Reported crops of focus include cassava,

cowpea, and sorghum. Yield estimates for farmers that were able to successfully harvest all three crops are in the range of what would be expected in southern Madagascar under drought conditions, however, because of the prolonged, severe drought, many farmers (70%) are omitted from the yield calculation because they had likely abandoned or stopped working their plots well before harvest. Regarding other support practices, use of credit and savings is not common among farmers, and crop insurance is almost non-existent and value chain participation is generally low—less than 1% of farmers report participation in value chain activities. Livestock of focus in the BL include goats and poultry, though the BL did also explore fishing practice among surveyed households. Of significant note is that 42% of poultry farmers report poultry dying in the last year with most farmers (87%) reporting that they had not used any vaccination methods for their animals. Responses around fishing suggest that fewer than half of the population engage in the practice, though confusion around the survey question may have led to underreporting.

### **Poverty Measurement**

Based on daily per capita expenditures of less than \$1.90 per day (2011 purchasing power parity (PPP)), the poverty rate among households surveyed is approximately 90%. The depth of poverty of the poor is 57%, which means that the average poor person is 57% below the poverty line. In monetary terms, this means it would require an additional \$1.08 per person per day to bring every poor person out of poverty.

### **Gender Dynamics**

Gender dynamics are captured through the eight indicators in this section. Among women who are earning cash, a large majority (82%) reported that they participate in decisions about how to use the cash, whether solely or jointly with others. Women and men in a union report borrowing at similar rates across any source (36%). However, men in a union participate in decisions about credit at a much higher rate than women in a union ( $p$ -value = 0.00), with 89% of men reportedly making credit decisions, which is consistent across age groups. Almost half of women have a medium or high input when making decisions in their home (50%).

### **Resilience**

Resilience indicators were captured through several questions including indices that were constructed to assess overall resilience capacities. Generally, households perceived their ability to meet their current needs as worse than the previous year and suspect that their future ability to meet these needs will deteriorate. Nearly all households (98%) listed the drought as one of the shocks affecting them. Other common shocks listed included rising food prices and crop pests. Out of the average of 3.1 shocks experienced across the sample, households perceived those shocks to be severe in nature, likely impacting perceived ability to recover. There appears to be limited difference across treatment and control communities when gauging exposure to shocks and overall capacities that might mitigate their impact. Resilience capacity sub-scores suggest that households may have limited access to networks and services that could be leveraged to mitigate and adapt to further disasters.

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# 1. INTRODUCTION

## 1.1 Overview of the Evaluation Research

Southern Madagascar is experiencing a prolonged drought and much of the population is facing a severe food security crisis. The Maharo RFSa aims to provide development, and nutritional support to a large population of households in southern Madagascar. In addition to these services, the RFSa package also includes a range of community-tailored livelihood support activities. The primary objective of the IE is to measure the impact of this livelihood support on reducing food insecurity and increasing well-being for households in southern Madagascar. This report summarizes the results of the BL study conducted in February–March 2021.

The evaluation uses a randomized controlled trial design which randomized the communities which would receive the additional activities. Given that general support was planned to be delivered unconditionally in the region of focus, while livelihood activities were designed to be more targeted and tailored to specific community needs, the Maharo RFSa created the potential to design an experimental IE to estimate the marginal effect of a set of livelihood activities on the "standard" RFSa package. The evaluation seeks to inform the larger knowledge base around the efficacy of the RFSa among vulnerable populations and how benefits to vulnerable households can be further maximized. Based on this, the IE of the RFSa focuses on the following research question:

- What is the additional impact on food security and nutrition outcomes in communities that receive additional tailored livelihood activities in conjunction with development, emergency, and nutritional support activities?

The BL study relies on quantitative methods to measure BL indicators collected in the RFSa target area. The survey provides BL estimates on the status of communities and households across BHA standard indicators. Causal Design has worked closely with the BHA and relevant stakeholders to identify key learning objectives, and to ensure that the BL survey and study are able to contribute to this learning where possible.

## 2. METHODOLOGY AND LIMITATIONS

The IE of the Maharo activity uses a clustered RCT design. Rather than a true control group with no intervention, however, eligible households in the control areas will receive food assistance and maternal support from CRS, and treatment areas will receive this assistance plus additional livelihood support activities, such that the estimated effect reflects the marginal impact of this additional livelihood support. While the project started in October 2021, a BL survey of households was conducted in February–March 2021 due to COVID-19. The EL survey is planned for February–March 2025.

### 2.1 Evaluation Design

#### 2.1.1 Randomization and Sampling Strategy

##### Level of Randomization

After discussion with the CRS team, village or fokontany-level randomization was deemed infeasible because (1) a single village or fokontany is too small for practical project implementation, and (2) the definitions and demarcations of fokontany are highly subject to change in these areas. Furthermore, there are only 20 communes in the Maharo intervention areas, which eliminated this as the level of randomization. CRS proposed defining “clusters” as groups of adjacent fokontany that could be served by a CRS team. The initial list from CRS proposed around 218 clusters, each with an average of three fokontany.

##### Matched Pair Randomization

We chose a matched pair randomization approach to ensure better balance across treatment and control cluster characteristics prior to BL data collection compared with stratified random sampling. In a matched pair randomization approach, units are first matched based on variables related to outcomes. In other words, areas that look “similar” based on available data are paired together. One unit from each pair is then randomly assigned to treatment and the other to control. CRS provided us with a complete list of clusters and potential matching criteria. Data available at the time included location, proximity to a market, proximity to a health clinic, proximity to the coast, road and river access, and population. Preliminary matches were made and confirmed with CRS staff. This resulted in 98 pairs. Unmatched clusters were excluded from the BL, and CRS was free to operate in these areas as they saw fit.

##### Sample Size and Power Calculation

- A cluster randomized design.
- Intra-class correlation of 0.10.<sup>1</sup>
- Significance level.
- Power level of 80%.
- Expected reduction in poverty over the life of the project of 8 percentage points.

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<sup>1</sup> The ICC estimate comes from HAZ scores in the Madagascar Enquête Anthropométrique et Développement de l'Enfant 2011 household data. A range of ICC numbers were tested to ensure that the ultimate sample size was not sensitive to this choice.

- Inflation Factor for number of households with children under 5 years of age to sample. Using a household data set from 2011, 24% of the population is under 5 in the provinces of Toliara and Fianarantsoa. This implies an inflation factor of 1.2.
- Non-response factor is 5%.

To capture sufficient children under 5 years old and to account for attrition, we would need  $3,724 * 1.18 * 1.05 = 4,614$  households total, or 24 households per cluster.

## 2.1.2 Sampling Frame

CRS completed a census of households in their area of intervention in June 2020. These data were not available when the initial matching was done. These data provided both the population numbers for each fokontany and a list of all households in these areas. Based on the census, the total population was slightly higher in control areas (49,739 compared to 48,021).

The power calculation was based on an average of 24 households per CRS cluster, but because some of these clusters are large, it was not feasible to randomly sample households at that level. Sampling two fokontany per CRS cluster and 12 households per fokontany would be equivalent. The CRS clusters, however, vary widely in both size and number of fokontany (villages). The sampling strategy adopted, therefore, involved sampling 1–4 fokontany per cluster, based on total cluster population. Table 1 below summarizes the number of fokontany, and households sampled.

Households were then randomly sampled from these fokontany based on the census list. A list of households in each sampled fokontany, numbered 1–100, was provided to the survey teams. Households 1–12 were the primary households and teams were instructed to make several attempts to contact these households. Replacement households were then contacted in sequential order, starting with 13.

## 2.1.3 Questionnaire Development

The BL survey was developed using previous BL surveys used by BHA and refined in consultation with BHA and the IPs.

The following survey modules were included:

- Module A: Household identification.
- Module B: Roster.
- Module C: Food access.
- Module D: Child nutrition and health.
- Module E: Women’s nutrition and health.
- Module F: WASH.
- Module G: Agriculture.
- Module H: Household expenditure.
- Module J: Gender and cash use.
- Module K: Gender and credit.
- Module CRS: Female household input.
- Module R: Resilience.

In addition, we created a short, commune-level survey to capture community-level variables such as public service availability, the activities of development or aid projects, and the presence of local community groups.

## 2.1.4 Field Preparation

Training was conducted in the southern city of Toliara. Restrictions related to the COVID-19 pandemic prevented international travel. During the first week of the survey, therefore, the United States-based team members checked in daily via live video feed to take questions about the survey instrument and about the BL data collection in general. The training was conducted over a 2-week period (January 26 to February 10) to allow more time for refining the tablet survey and for addressing enumerator questions. Two doctors assisted the team for 1 day of the training and covered three topics: infant nutrition, maternal nutrition, and anthropometry. Two survey pilots were conducted in two separate fokontany accessible from Toliara.

In terms of organization, there were 90 field staff organized into teams. Each team was composed of four enumerators, one supervisor, and one person charged with anthropometry and survey verification. Two lead supervisors oversaw the entire data collection effort and worked to resolve any problems (with tablets, for example).

## 2.1.5 Data Collection

### Overview

Data collection began on February 10 and ended March 24. A total of 4,595 households were surveyed in the Maharo BL. Slightly more households were surveyed in the control areas (2,317) compared to treatment areas (2,278), but this was expected because of the higher population in control areas.

**Table 1. Planned versus actual survey numbers by CRS cluster and assignment**

Number fokontany sampled	CRS cluster population category	Treatment			Control		
		Number of clusters	Number of fokontany sampled	Number of households to be surveyed	Number of clusters	Number of fokontany sampled	Number of households to be surveyed
1	<20 percentile	32	32	384	31	31	372
2	20–70	45	90	1,080	46	92	1,104
3	70–90	15	45	540	14	42	504
4	>90	6	24	288	7	28	336
Planned	Total	98	191	2,292	98	193	2,316
Actual	Total	98	191*	2,278	98	193	2,317

\*Local authorities in one sampled treatment fokontany did not allow the team to conduct the surveys. This fokontany was replaced by random selection from the remaining fokontany in that cluster.

**Table 2. Individual response rate**

Outcome	Number in roster	Number surveyed	Response Rate
Women of reproductive age	4,497	4,112	91.44%
Children under 5	6,145	5,985	97.40%

Outcome	Number in roster	Number surveyed	Response Rate
Farmers	4,748	4,478	94.31%
Women in a union	2,667	2,410	90.36%

The names, definitions, and boundaries of fokontany in this region are particularly fluid. In at least one case, households listed in the census were not found in the fokontany identified, and in another, the named fokontany was not recognized locally. In the former instance, the listed households were found in a different fokontany in the same cluster and were surveyed. Authorities in one sampled fokontany refused to allow the survey team access and this fokontany was replaced.

### Data Quality Control

Each enumerator was introduced to a household by a supervisor or controller. The supervisor assisted at the beginning of each interview to ensure that the interviews began well, and that the interviewer recorded key household data (including number of members of the households, number of children, number of women of childbearing age, number of cash-earners in the household, etc.) in the interviewer's notebook in addition to recording these data in a tablet. The notes served to confirm that data was properly entered and that the correct numbers of people were included in the different modules.

Two lead supervisors were tasked with permanently monitoring the field teams until the end of the surveys to verify the data and to promptly solve problems. In the cases of households with unusual responses (a case of 0 expenses, for example), the lead supervisors confirmed responses in-person. Each team was visited by the lead supervisors at least twice while in the field. This was necessary not only to ensure the survey was conducted properly but also to solve equipment issues, which was a problem all teams experienced.

## 2.2 Limitations and Challenges

### 2.2.1 Non-response and List Issues

Only nine households refused to participate in the survey outright. There were some discrepancies between the information available in the June 2020 census and the situation on the ground at the time of the survey that have prevented us from being able to calculate the non-response rate. Many sampled households were not found in the fokontany in which they were listed on the CRS census and were replaced. Because the CRS census, which was finalized in June 2020, was the most current list and the only list with household names that focused on the areas of intervention, we did not anticipate this issue. This means we are unable to distinguish between households which were not residents and those which were residents but were not present or who otherwise were not available at the time of the survey. Approximately 78% of households that responded were primary households, i.e., one of the 12 initially chosen to be surveyed in the fokontany. The reasons given by the field staff for the discrepancies between the CRS census and what our team found in the field include: (1) recent out-migration as a result of the ongoing drought and poor economic conditions in the region, (2) households that may reside in rural areas during the agricultural season and elsewhere during the rest of the year, and (3) local leaders claiming additional households that may not belong to that fokontany with the goal of attracting additional aid. We found at least two cases of households which were listed under two

different fokontany. Table 3 displays the percent of primary households that the field team was unable to locate but were replaced with other randomly selected households from the same community.

**Table 3. Percent of sampled households not located and replaced**

	Control		Treatment		Total	
	Percent	SD	Percent	SD	Percent	SD
Percent of sampled households not located and replaced	22.3%	17.46	20.7%	15.82	21.5%	16.68

CRS signaled in early meetings that this local administrative unit, “fokontany,” which is roughly equivalent to a village, is not a fixed entity in the region. This was one reason for choosing not to randomize at the fokontany level. Local leaders create, divide, and rename fokontany at will for various political or even personal reasons. Nevertheless, because the unit of randomization (the CRS-defined cluster) was usually too geographically dispersed to use for the household sample, we did need to sample fokontany within clusters.

The movement of households and the fluid definition of fokontany in the region will likely present challenges at EL. We can expect a relatively high attrition rate and the need to devote extra resources to finding households.

### 2.2.2 Other Issues

Because of early problems with some of the tablets, there were several dozen duplicate surveys in the raw data. Some enumerators were initially unable to upload their surveys and transcribed them onto other tablets. It appears that most of the original surveys eventually did upload. The duplicates have been identified and removed.

### 2.2.3 Limitations

- There are several other large organizations providing food assistance and other development aid in the region. This will present challenges in identifying effects of the Maharo activity. CRS is working with these organizations to better track where organizations are working, and we are collecting information at the community level at both BL and EL. This information will help us to control for other interventions in our analysis.
- Because of issues found in the field with the census list used, we do not know the true non-response rate. If, in fact, the local population numbers in the CRS census are higher than the current population, this would have implications for our BL estimates. We do not expect, however, that this will meaningfully affect our findings, as even adjusted population weights will necessarily be rough estimates.
- The survey was conducted during the COVID-19 pandemic. In order to maintain distance between enumerators and respondents and to minimize contact, only one anthropometric measure was collected at BL. After discussions with BHA and the IP, it was determined that child weight could be safely measured if the caretaker were asked to weigh the child. Thus, we can calculate the weight-for-age z-score (WAZ) for children under 5 years old. Height for adults and children was not collected. Because of the randomized design, however, collecting these measures at EL will still be informative.

### 3. FINDINGS

This section provides summary statistics for the Maharo BL survey. Unless otherwise indicated, all mean and standard deviations are calculated using sampling weights. The number of observations reported are the actual (unweighted) respondent numbers. Results are not reported for cells with less than 30 observations and are denoted with an N/A for not available.

#### 3.1 Characteristics of the Study Population

This section provides the basic demographic information for the BL sample. As mentioned previously, 4,595 households were surveyed. Table 4 shows that most households have both a male and a female adult present. For the whole sample, 27% of households have only an adult female present, and only 3.6% have only an adult male present. The average household has 5.5 people, including 1.4 children under 5 years old.

**Table 4. Basic household-level statistics (weighted)**

	Control	Treatment	All
Number surveyed	2,317	2,278	4,595
Percent households with adult male and female	70.1%	68.7%	69.4%
Percent households with adult female only	25.8%	28.2%	27.0%
Percent households with adult male only	4.1%	3.1%	3.6%
Household size	5.6	5.4	5.5
Household with children under 5	1.4	1.4	1.4
Households with children 5–14	1.9	1.9	1.9

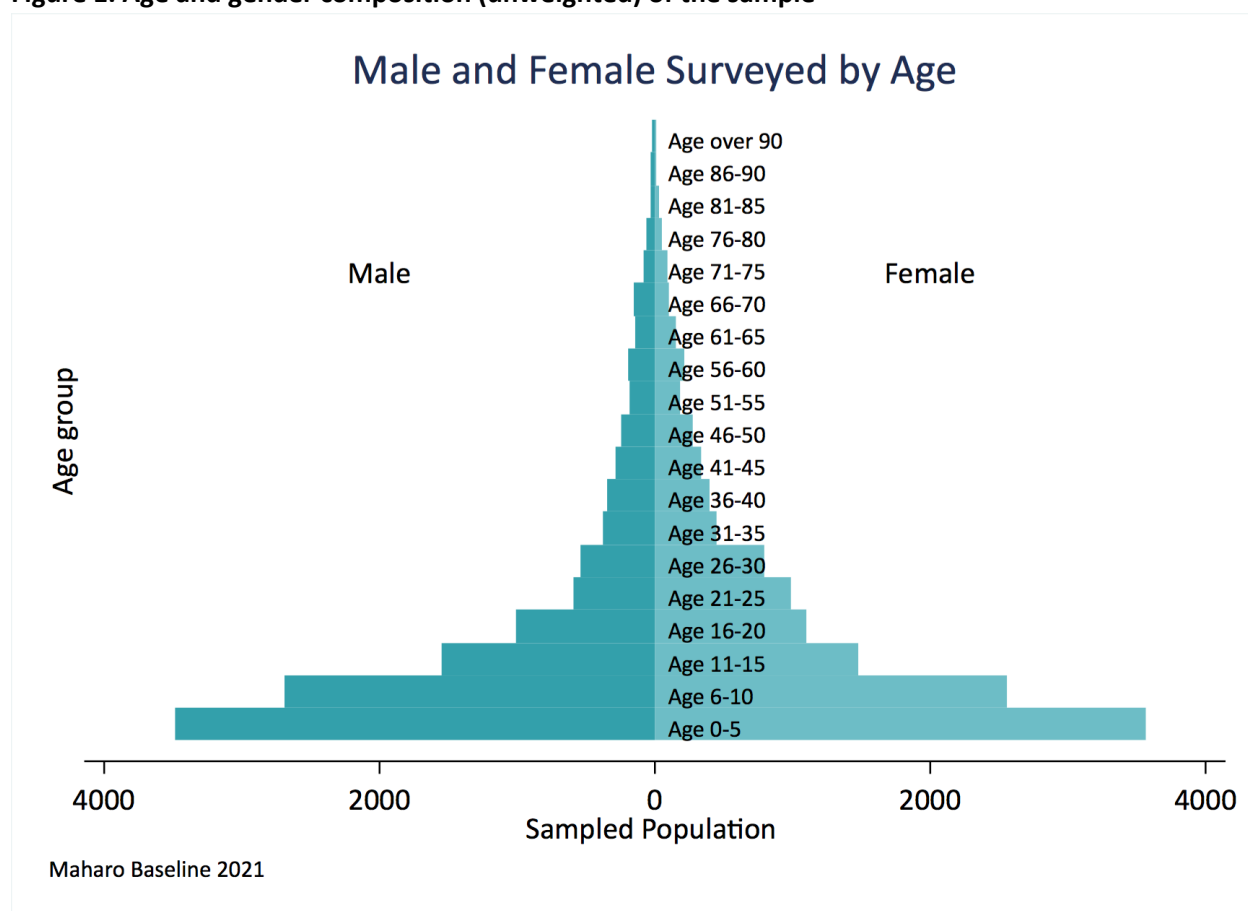
Table 5 provides basic, individual demographic information on the sample. The household sample includes nearly 25,000 individuals. The average age is 17 and approximately 52% of those in the sample are female. Figure 1 shows the population by age and gender. Among adults, 46% engage in some type of farming or livestock activity and 42% worked for cash in the previous year.

**Table 5. BL individual-level demographic information**

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Age	17.46	(0.20)	12,664	17.52	(0.19)	12,248	17.49	(0.14)	24,912
Percent of sample who are female	52.4%	(0.55)	12,665	52.5%	(0.55)	12,248	52.5%	(0.39)	24,913
Percent of adults who are farmers	45%	(0.86)	5,134	46.2%	(0.86)	4,992	45.6%	(0.61)	10,126
Percent of adults who worked for cash	41.3%	(0.77)	5,134	41.6%	(0.76)	4,992	41.5%	(0.54)	10,126
Percent of school age household members with at least some schooling	52.1%	(0.64)	9,550	52.3%	(0.64)	9,207	52.2%	(0.45)	18,757

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Percent of sample women of reproductive age	34.3%	(0.53)	12,665	34.0%	(0.52)	12,248	34.2%	(0.37)	24,913
Percent of sample under 5	24.6%	(0.48)	12,665	24.9%	(0.48)	12,248	24.7%	(0.34)	24,913
Percent of sample 5–14	34.7%	(0.53)	12,665	34%	(0.52)	12,248	34.3%	(0.37)	24,913

Figure 1. Age and gender composition (unweighted) of the sample



The characteristics of the head of household are presented in Table 6.<sup>2</sup> Female-headed households make up 38% of the sample. Roughly 68% of household heads have no formal schooling, and only 16% completed primary school.

<sup>2</sup> Head of household is self-reported by the household.

**Table 6. Summary statistics for household head**

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Age of the head of households	42.42	(0.44)	2,317	42.34	(0.45)	2,274	42.38	(0.32)	4,591
Percent of female head of households	36.8%	(1.26)	2,319	38.7%	(1.25)	2,275	37.8%	(0.89)	4,594
Percent of head of households with no schooling	69%	(1.21)	2,319	67.9%	(1.18)	2,275	68.4%	(0.84)	4,594
Percent of head of households with some schooling, less than primary	15%	(0.91)	2,319	16.9%	(0.94)	2,275	16%	(0.66)	4,594
Percent of heads of households that completed primary or more	15.9%	(0.97)	2,315	15.1%	(0.90)	2,272	15.5%	(0.66)	4,587

## 3.2 Food Security

This section presents findings on household food security. The first indicator in this section is the prevalence of food insecurity, which is measured using the FIES developed by the Food and Agriculture Organization of the United Nations (FAO).

The responses to these questions are analyzed by estimating a Rasch model using tools developed by the FAO in R software. Only households that responded to all questions are included in the analysis. Furthermore, extreme responses—those that responded either yes or no to all questions—are excluded from the estimation but included in the final calculation of the prevalence rates.

Overall, a majority (70%) of households responded yes to all eight questions, as illustrated in Table 6. This is especially notable as the recall period was changed to “During the past 30 days” from “During the past 12 months” to reflect the serious food insecurity situation. Only 11 households answered “no” to all questions. Consistent with the assumption that each question captures a progressively more severe experience, the proportion of “yes” answers generally declined with each question. The exception is that more people answered “yes” to question 4 than 5.<sup>3 4</sup>

**Table 7. Percent of households responding yes to "During the past 30 days, was there a time when you or others in your household..."**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Were worried you would not have enough food to eat because of a lack of money or other resources?	99.6%	2,241	99.1%	2,223	99.4%	4,464
Were unable to eat healthy and nutritious food because of a lack of money or other resources?	99.1%	2,241	99.1%	2,223	99.1%	4,464

<sup>3</sup> The model produced a reliability score of 0.71, which suggests a good model fit.

<sup>4</sup> Cafiero et al., *Methods for Estimating Comparable Prevalence Rates of Food Insecurity Experienced by Adults throughout the World*, (Rome, Italy.: FAO, 2016)

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Ate only a few kinds of foods because of a lack of money or other resources?	99.3%	2,241	99.1%	2,223	99.2%	4,464
Had to skip a meal because there was not enough money or other resources to get food?	94.0%	2,241	92.7%	2,223	93.4%	4,464
Ate less than you thought you should because of a lack of money or other resources?	98.8%	2,241	97.1%	2,223	98.0%	4,464
Did not have food because of a lack of money or other resources?	82.6%	2,241	80.2%	2,223	81.4%	4,464
Were hungry but did not eat because there was not enough money or other resources?	83.5%	2,241	80.4%	2,223	82.0%	4,464
Went without eating for a whole day because of a lack of money or other resources?	79.2%	2,241	75.1%	2,223	77.2%	4,464

Table 8 summarizes the prevalence of moderate and severe food insecurity in the household based on the Food Insecurity Experience Scale (FIES). Approximately 60% of individuals are facing severe food insecurity and over 97% are considered to be at least moderately food insecure. This is unsurprising given the severe drought conditions. Severe food insecurity is lower in treatment areas compared to control (56% versus 63%).<sup>5</sup> The answers to the eight questions are disaggregated by household type in Table 9. The answers to the first few questions are consistent across groups.

**Table 8. Prevalence of moderate and severe food insecurity in the household based on the Food Insecurity Experience Scale (FIES)**

	Control	Treatment	All
Prevalence of severe food insecurity in households	62.9%	56.3%	60.4%
Prevalence of moderate and severe food insecurity in households	97.1%	97.7%	97.4%

**Table 9. Disaggregated by household type, percent of households responding yes to “During the past 30 days, was there a time when you or others in your household...”**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Were worried you would not have enough food to eat because of a lack of money or other resources?						
F&M	99.7%	1,530	98.9%	1,500	99.3%	3,030
FNM	99.4%	612	99.6%	649	99.5%	1,261
MNF	100.0%	99	99.3%	74	99.7%	173
Were unable to eat healthy and nutritious food because of a lack of money or other resources?						
F&M	99.0%	1,530	99.0%	1,500	99.0%	3,030
FNM	99.5%	612	99.5%	649	99.5%	1,261

<sup>5</sup> The FIES model does not generate individual prevalence rates, which makes testing statistical difference challenging. However, the difference in the raw score (the number of "yes" responses) is statistically significant with a p-value of <0.01.

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
MNF	100.0%	99	100.0%	74	100.0%	173
Ate only a few kinds of foods because of a lack of money or other resources?						
F&M	99.2%	1,530	98.9%	1,500	99.1%	3,030
FNM	99.6%	612	99.7%	649	99.7%	1,261
MNF	100.0%	99	100.0%	74	100.0%	173
Had to skip a meal because there was not enough money or other resources to get food?						
F&M	93.5%	1,530	92.0%	1,500	92.8%	3,030
FNM	95.3%	612	95.0%	649	95.2%	1,261
MNF	99.5%	99	95.3%	74	97.8%	173
Ate less than you thought you should because of a lack of money or other resources?						
F&M	98.9%	1,530	96.8%	1,500	97.9%	3,030
FNM	98.3%	612	98.1%	649	98.2%	1,261
MNF	99.5%	99	98.6%	74	99.2%	173
Did not have food because of a lack of money or other resources?						
F&M	81.7%	1,530	79.4%	1,500	80.6%	3,030
FNM	84.5%	612	82.4%	649	83.4%	1,261
MNF	95.3%	99	85.4%	74	91.3%	173
Were hungry but did not eat because there was not enough money or other resources?						
F&M	82.8%	1,530	79.7%	1,500	81.2%	3,030
FNM	85.4%	612	82.5%	649	83.9%	1,261
MNF	92.6%	99	86.8%	74	90.2%	173
Went without eating for a whole day because of a lack of money or other resources?						
F&M	78.3%	1,530	74.2%	1,500	76.2%	3,030
FNM	81.8%	612	77.8%	649	79.7%	1,261
MNF	87.0%	99	83.7%	74	85.7%	173

\*Gendered Household Type: Female and Male Adults (F&M), Adult Female no Adult Male (FNM), Adult Male no Adult Female (MNF)

The second indicator is the percent of households with poor, borderline, and acceptable food consumption score (FCS). This is a weighted sum of eight food groups consumed by the household in the previous 7 days. The weights are based on the food group's importance in the diet. For example, meat and dairy have a weight of 4, staples have a weight of 2, and sugars have a weight of 0.5. The FCS ranges from 0 to 112. Scores below 22 are considered to be a poor consumption score, scores 22–35 are considered borderline, and acceptable scores are above 35. As shown in Tables 10 and 11 the mean FCS is 25 and more than 45% of individuals are considered to have a poor FCS. Fewer than 20% of households have an acceptable FCS. As with the high FIES scores, the prevalence of households with

poor FCS is likely driven by the extreme drought conditions. Consistent with the FIES, control areas have slightly worse outcomes (p-value = 0.05).

The FCS disaggregated by household type and by overall score category is illustrated in Tables 10 and 11 below. Fewer than 9% of MNF households have an acceptable score, compared to 19% of households with both male and female adults present.

**Table 10. Mean scores of households with poor, borderline, and acceptable FCS**

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Household FCS (0–112)	24.87	(0.34)	2,241	25.84	(0.33)	2,223	25.36	(0.24)	4,464
F&M	25.35	(0.34)	1,530	26.01	(0.33)	1,500	25.68	(0.24)	3,030
FNM	23.67	(0.41)	612	25.46	(0.39)	649	24.6	(0.28)	1,261
MNF	19.69	(0.61)	99	23.28	(0.60)	74	21.16	(0.43)	173

\* Gendered Household Type: Female and Male Adults (F&M), Adult Female no Adult Male (FNM), Adult Male no Adult Female (MNF)

**Table 11. Percent of households with poor, borderline, and acceptable FCS**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Percent of households with poor consumption score (<22)	47.2%	2,241	43.1%	2,223	45.1%	4,464
F&M	44.7%	1,530	41.5%	1,500	43.1%	3,030
FNM	53.7%	612	47.8%	649	50.7%	1,261
MNF	69.6%	99	50.8%	74	61.9%	173
Percent of households with borderline consumption score (22–35)	35.8%	2,241	36.6%	2,223	36.2%	4,464
F&M	37.5%	1,530	38.1%	1,500	37.8%	3,030
FNM	30.4%	612	31.6%	649	31.0%	1,261
MNF	25.0%	99	35.7%	74	29.4%	173
Percent of households with acceptable consumption score (>35)	17.0%	2,241	20.3%	2,223	18.7%	4,464
F&M	17.7%	1,530	20.4%	1,500	19%	3,030
FNM	15.9%	612	20.6%	649	18.3%	1,261
MNF	5.4%	99	13.5%	74	8.8%	173

\* Gendered Household Type: Female and Male Adults (F&M), Adult Female no Adult Male (FNM), Adult Male no Adult Female (MNF)

### 3.3 Child Nutrition and Health

This section presents findings on child nutrition and health covering aspects around quality of diet, breastfeeding practice, as well as incidence of diarrhea. This section also includes anthropometric data,

however, due to safety concerns brought about by COVID-19, the collection of the full range of anthropometric measurements was not possible at BL.<sup>6</sup>

### 3.3.1 Nutrition

Prevalence of children 6-23 months consuming a diet of minimum dietary diversity (MDD) and percent of children 6-23 months receiving a minimum acceptable diet (MAD) are the indicators of nutrition reported for children under 2 years old. The MDD-Children (MDD-C) uses the following eight food groups: (1) breastmilk, (2) grains, roots, and tubers, (3) legumes and nuts, (4) dairy products (milk, yogurt, and cheese), (5) flesh foods (meat, fish, poultry, and liver/organ meats), (6) eggs, (7) vitamin A-rich fruits and vegetables, and (8) other fruits and vegetables. The criterion for achieving an MDD-C is consuming at least five of the eight food groups. Table 12 shows the percentage of children meeting these criteria. Only 3% of children consumed a MDD-C and the percentage was lower for girls, particularly in the control areas. Looking at the consumption of the individual food groups. Grains are the most consumed (71%), followed by vitamin A-rich fruits and vegetables (54%), other fruits and vegetables (21%), and legumes and nuts (11%). Dairy and flesh foods are consumed by 6% and 7% of children, respectively, and eggs are consumed by less than 1%.

**Table 12. Prevalence of children 6–23 months consuming a diet of minimum diversity (MDD-C)**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Children (ages 6–23 months)	2.4%	814	3.8%	823	3.1%	1,637
Male children (ages 6–23 months)	3.3%	396	3.6%	415	3.4%	811
Female children (ages 6–23 months)	1.5%	418	4.1%	408	2.8%	826

A MAD is defined as eating a certain number of times per day (minimum meal frequency) in addition to having a MDD. MDD for the MAD is defined using six or seven food groups depending on whether the child is breastfed or not.<sup>7</sup> As shown in Table 13, only 2.3% of children are receiving a MAD. Female and male children are similarly likely to receive a MAD (p-value = 0.15).

Minimum meal frequency (MMF) is used to calculate the MAD. The MMF is calculated for both breastfed and non-breastfed children. The criteria to meet this for breastfed children is to have three or more feedings of solid, semi-solid, or soft foods and be between the ages of 9 and 23 months. In total 25.3% of breastfed children met these criteria, which is illustrated in Table 14. The criterion for non-breastfed children is to have four or more feedings of solid, semi-solid, or soft foods in addition to two or more milk feedings and be between the ages of 6 and 23 months. Table 14 shows that 3.8% of non-breastfed children surveyed met this standard. The low rates of children eating a MAD could be driven by the extreme drought conditions.

<sup>6</sup> This includes Prevalence of wasted (WHZ < -2) children under 5 years old (0–59 months), Prevalence of stunted children (HAZ < -2) under 5 years old (0–59 months) (BL 4), and Prevalence of underweight (BMI < 18.5) women of reproductive age (BL 7)

<sup>7</sup> The MAD does not include breastmilk as a food group. It includes dairy products as a food group for breastfed children and excludes it for non-breastfed children.

**Table 13. Percent of children ages 6–23 months receiving a minimum acceptable diet (MAD)**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Children (ages 6–23 months)	1.8%	814	2.8%	823	2.3%	1,637
Male children (ages 6–23 months)	2.7%	396	3.1%	415	2.9%	811
Female children (ages 6–23 months)	0.8%	418	2.5%	408	1.7%	826

**Table 14. Minimum meal frequency, breastfed and non-breastfed children 6-23 months**

Outcome	Control			Treatment			All		
	Percent	SE	N	Percent	SE	N	Percent	SE	N
Minimum meal frequency for breastfed children ages 6–23 months	22.5%	(0.027)	597	27.8%	(0.021)	617	25.3%	(0.016)	1,214
Minimum meal frequency for non-breastfed children ages 6–23 months	4.6%	(0.017)	219	2.9%	(0.013)	206	3.8%	(0.011)	425

The prevalence of exclusive breastfeeding children under 6 months is illustrated in Table 15. This is defined as the children under the age of 6 months who were exclusively breastfed during the day preceding the survey, excluding any oral rehydration solution (ORS). Survey responses at BL indicate that exclusive breastfeeding practice is fairly even across treatment and control areas between 37–40% across all children under 6 months. Rates are similar across male and female children (p-value = 0.50).

**Table 15. Prevalence of exclusive breastfeeding of children under 6 months of age**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Children (under 6 months of age)	38.9%	222	38.4%	200	38.7%	422
Male children (under 6 months of age)	40.9%	117	39.5%	94	40.3%	211
Female children (under 6 months of age)	36.2%	105	37.5%	106	36.9%	211

The following two indicators focus on the percent of children under 5 (0-59 months) who had diarrhea in the prior two weeks and percent of children under five (0-59 months) with diarrhea treated with Oral Rehydration Therapy (ORT). A positive incidence is defined as a child experiencing an episode of diarrhea any time in the 2 weeks that preceded the survey while ORT is defined as receiving an ORS, recommended home fluids, or increased fluids.

**Table 16. Percent of children under 5 (0–59 months) who had diarrhea in the prior 2 weeks**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Children (ages 0–59 months)	34.7%	2,682	34.1%	2,468	34.4%	5,150
Male children (ages 0–59 months)	35.1%	1,333	35.8%	1,209	35.5%	2,542
Female children (ages 0–59 months)	34.2%	1,349	32.5%	1,259	33.4%	2,608

**Table 17. Percent of children under 5 (0–59 months) years old with diarrhea treated with oral rehydration therapy (ORT)**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Children (0–59 months)	14.5%	875	13.3%	817	13.9%	1,692
Male children (0–59 months)	15%	448	12.2%	422	13.6%	870
Female children (0–59 months)	14%	427	14.5%	395	14.2%	822

### 3.3.2 Anthropometry

Anthropometric indicators traditionally include measures of prevalence rates of wasting (weight-for-height z-score (WHZ)), stunting (height-for-age z-score (HAZ)), and being underweight (weight-for-age z-score (WAZ)). Given limitations to data collection due to the ongoing COVID-19 pandemic, only the weight of children under 5 years of age was captured in the BL round of surveys. Children without a known birth month and year were excluded. Children with WAZ scores of less than -2 standard deviations are considered underweight and those with scores of less than -3 standard deviations are considered severely underweight.

More than a third of children are underweight and approximately 15% are severely underweight. Figure 2 is a histogram showing the distribution of WAZ scores. The dark blue lines mark the cutoff points for underweight and severely underweight. The figure shows that there are many children close to being underweight with scores just above -2.

**Table 18. Prevalence of underweight children under 5 years old**

Outcome	Control		Treatment		All	
	Mean	N	Mean	N	Mean	N
Weight-for-age z-score	-1.64	2,900	-1.59	2,848	-1.62	5,748
Percent of children under 5 years old underweight	37.7%	2,900	35%	2,848	36.3%	5,748
Percent of children under 5 years old severely underweight	15.6%	2,900	14.2%	2,848	14.9%	5,748
Percent of children under 5 years old with a normal weight for age	31.0%	2,900	30.8%	2,848	30.9%	5,748

**Figure 2. Distribution of weight-for-age z-score**

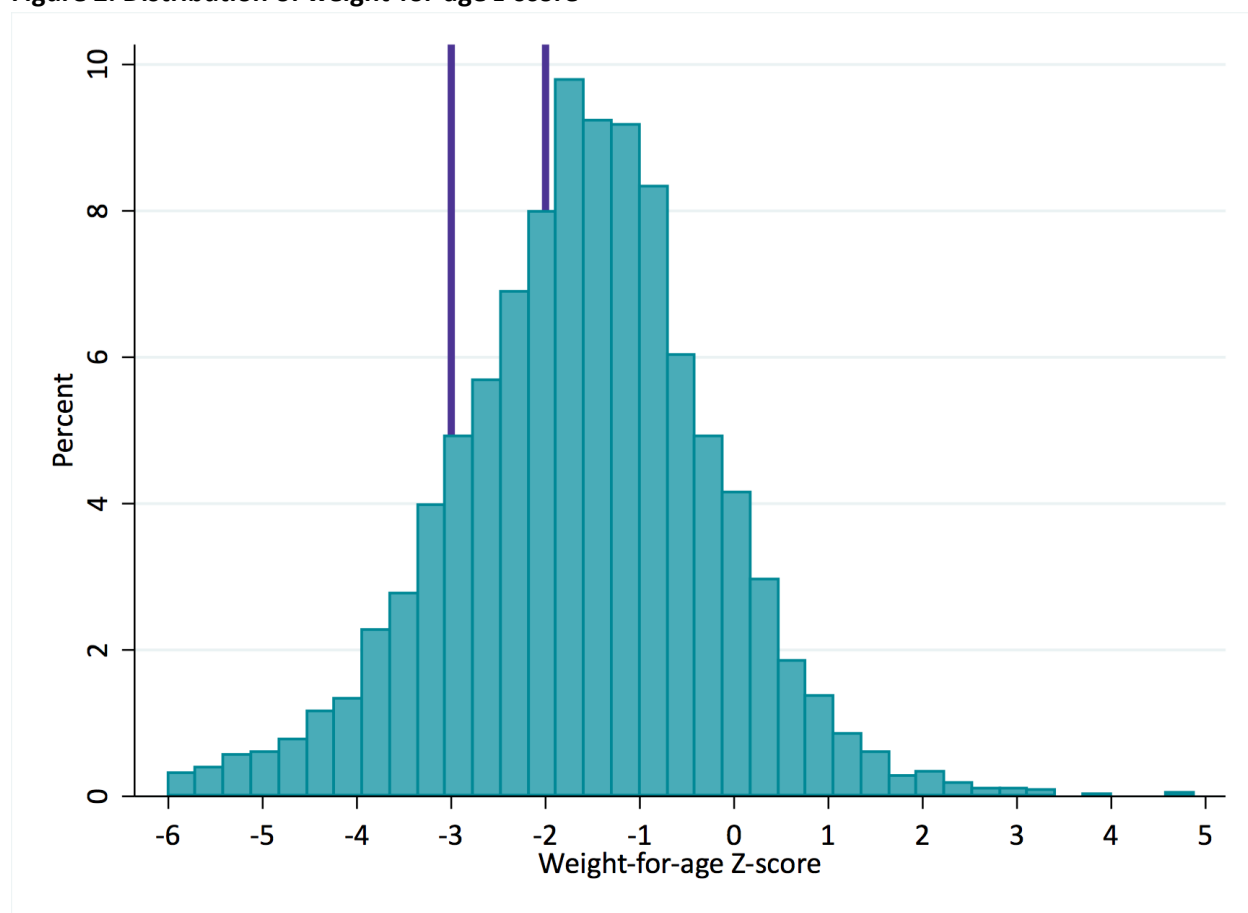


Table 19 shows the underweight statistics disaggregated by gender and by age group. Boys have slightly lower (worse) WAZ on average than girls and the older group (2–5 years) has lower z-scores than infants under 2 years ( $p$ -value = 0.00). This pattern is also reflected in the percent underweight and severely underweight ( $p$ -value = 0.00).

**Table 19. Disaggregated statistics for underweight**

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Weight-for-age z-score									
Female (0–59 months)	-1.61	(0.04)	1,477	-1.49	(0.04)	1,452	-1.55	(0.03)	2,929
Male (0–59 months)	-1.68	(0.05)	1,423	-1.69	(0.05)	1,396	-1.68	(0.03)	2,819
0–23 months	-1.3	(0.06)	1,032	-1.34	(0.06)	1,027	-1.32	(0.04)	2,059
24–59 months	-1.83	(0.04)	1,868	-1.73	(0.04)	1,821	-1.78	(0.03)	3,689
Percent children underweight									
Female (0–59 months)	37.46	(1.61)	1,477	31.35	(1.42)	1,452	34.37	(1.08)	2,929
Male (0–59 months)	37.92	(1.62)	1,423	38.69	(1.59)	1,396	38.31	(1.13)	2,819

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
0–23 months	31.78	(1.82)	1,032	31.42	(1.71)	1,027	31.6	(1.25)	2,059
24–59 months	40.88	(1.45)	1,868	36.9	(1.36)	1,821	38.89	(1.00)	3,689
Percent children severely underweight									
Female (0–59 months)	14.75	(1.18)	1,477	12.53	(1.02)	1,452	13.63	(0.78)	2,929
Male (0–59 months)	16.38	(1.27)	1,423	15.85	(1.13)	1,396	16.12	(0.85)	2,819
0–23 months	12.71	(1.29)	1,032	12.93	(1.18)	1,027	12.83	(0.87)	2,059
24–59 months	17.09	(1.14)	1,868	14.83	(0.98)	1,821	15.96	(0.75)	3,689
Percent children normal weight									
Female (0–59 months)	32.77	(1.52)	1,477	31.95	(1.50)	1,452	32.36	(1.07)	2,929
Male (0–59 months)	29.19	(1.50)	1,423	29.64	(1.53)	1,396	29.42	(1.07)	2,819
0–23 months	41.4	(1.91)	1,032	38.4	(1.89)	1,027	39.87	(1.34)	2,059
24–59 months	25.39	(1.25)	1,868	26.59	(1.27)	1,821	25.99	(0.89)	3,689

### 3.4 Women’s Health, Maternal Nutrition, and Reproductive Health

This section focuses on the health and reproductive decisions of women of child-bearing age. The first indicator measures the percent of women of reproductive age (WRA) consuming a diet of minimum diversity (MDD-W). WRA includes all women in the household 15–49 years old. MDD is measured by counting the number of food groups a woman consumed during the previous day and night. The food groups are grains, white roots and tubers, and plantains, pulses (beans, peas, and lentils), nuts and seeds, dairy, meat, poultry and fish, eggs, dark green leafy vegetables, other vitamin A-rich fruits and vegetables, other vegetables, and other fruits. The criteria for MDD are met when a woman eats at least five of the 10 food groups specified.

As shown in Table 20, fewer than 2% of women consumed a diet that meets the MDD criteria. Figure 3 shows the distribution of the MDD score. Nearly 69% of women consumed two or fewer food groups. The most common food groups consumed were grains (72%) and dark green vegetables (72%). The next most common food group, other fruits, is only consumed by 37% of women. Other vegetables, eggs, and dairy were consumed by less than 2% of women. A small number of women (78) reported consuming none of the groups. This is plausible given the responses to the questions in the FIES discussed previously.

**Table 20. Percent of women of reproductive age consuming a diet of minimum diversity**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Women 15–49 years with MDD	1.2%	2,069	1.9%	2,010	1.6%	4,079
Women (age 15–18)	0.5%	378	2.6%	342	1.5%	720
Women (age 19+)	1.4%	1,691	1.7%	1,668	1.6%	3,359

\*Minimum dietary diversity (MDD)

**Figure 3. Dietary diversity scores for women of reproductive age**

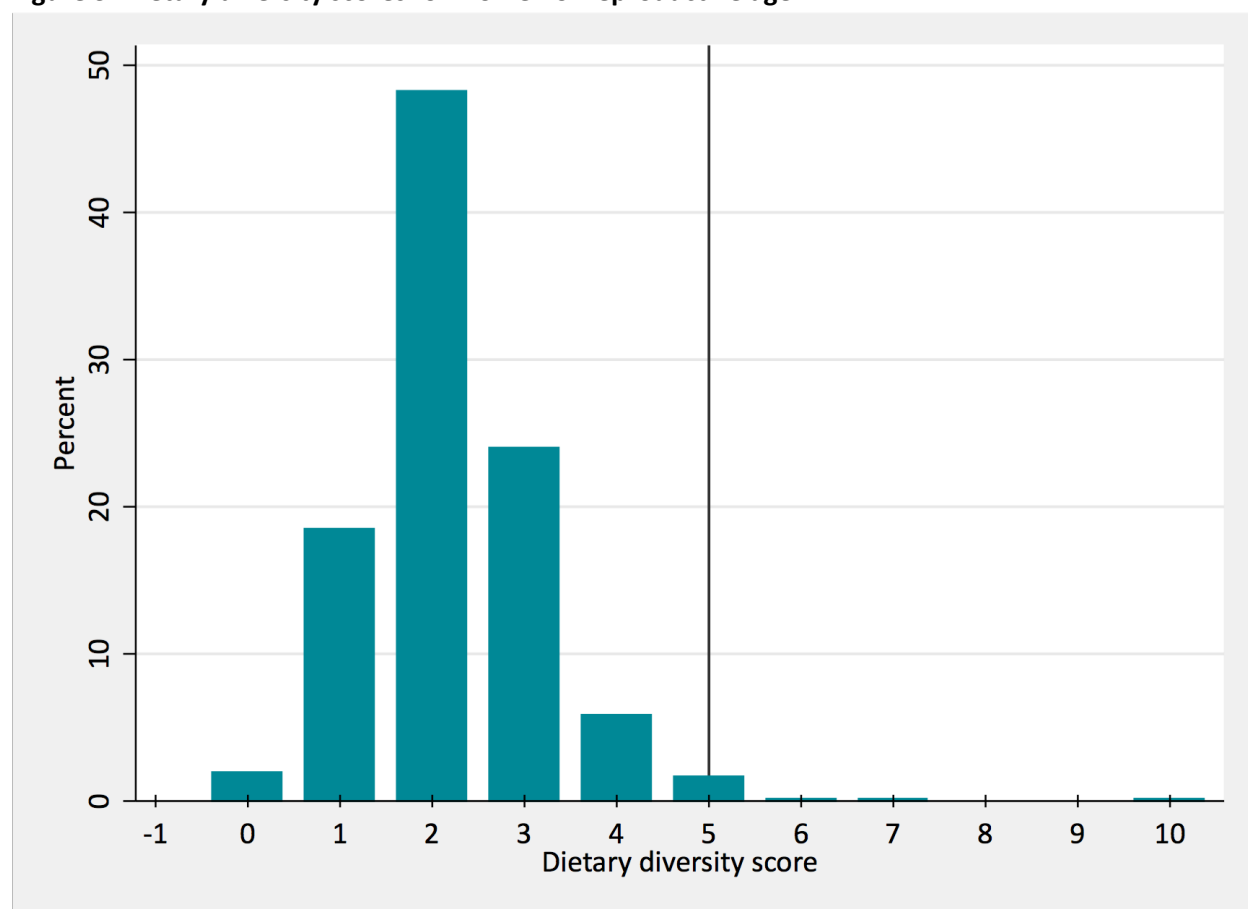


Table 21 shows the percent of women of reproductive age with a birth in the past five years who received at least four antenatal care (ANC) visits from skilled health personnel during their most recent pregnancy. The recommendation is that pregnant women receive at least four ANC visits. On average 53% of these women received at least four ANC visits during their most recent pregnancy. More than 80% of these visits were with a midwife.

**Table 21. Percent of births receiving at least four antenatal care visits during pregnancy**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
ANC of WRA who had a live birth during the last 5 years	53.2%	1,292	52%	1,275	52.6%	2,567

\* Women of reproductive age (WRA) ages 15-49

\*Antenatal care (ANC)

Contraceptive use is not widespread. Table 22 depicts Contraceptive Prevalence Rate (CPR). Approximately 13% of non-pregnant women 15–49 years in a union are using birth control, and nearly all these women use a modern method. Injectable contraception accounts for more than half of all contraception methods used.

**Table 22. Contraceptive prevalence rate (CPR)**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Non-pregnant aged women 15–49 in a union using birth control	11.7%	913	13.7%	871	12.7%	1,784
Non-pregnant women aged 15–49 in a union using modern birth control	11.6%	919	13.7%	877	12.7%	1,784
Non-pregnant women aged 15–49 in a union traditional birth control	0.1%	919	0%	877	0.0%	1,784

As Table 23 shows the percent of women in a union who have knowledge of modern family planning methods that can be used to delay or avoid pregnancy. The vast majority of women in a union are aware of modern family planning methods. Specifically, women are counted as having knowledge of these methods if they are aware of at least three modern family planning methods. Younger women are more likely to be aware of these methods than older women (p-value = 0.07).

**Table 23. Percent of women in a union who have knowledge of modern family planning methods that can be used to delay or avoid pregnancy**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Women ages 15–49 in a union	74.4%	1,056	76.2%	1,000	75.3%	2,056
Women in a union (ages 15–19)	58.1%	117	75.5%	117	67.4%	234
Women in a union (ages 20–29)	75.8%	476	77.8%	444	76.8%	920
Women in a union (ages 30–49)	76.8%	463	74.7%	439	75.7%	902

Table 24 presents findings on decision-making about family planning. Of those women using modern family planning methods, 90% report making that decision.

**Table 24. Percent of women in a union who made decisions about modern family planning methods**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Women ages 15-49 in a union	89.6%	124	89.5%	134	89.5%	258
Women in a union (ages 15–19)	n/a	8	n/a	7	n/a	15
Women in a union (ages 20–29)	88.9%	57	92.6%	72	91.2%	129
Women in a union (ages 30–49)	88.7%	59	86%	55	87.3%	114

### 3.5 Water, Sanitation, and Hygiene (WASH) Practices

The percent of household using basic drinking water services indicator is defined by three criteria: (1) having access to an improved water source, such as a public tap or protected well, (2) having that source within 30 minutes round-trip of the home, and (3) having that source available year-round.<sup>8</sup> Only 13% of all households meet all three of these criteria. While most water sources are available year-round, less than a third of households have water within 30 minutes and 43% have access to an improved source.

**Table 25. Percent of households using basic drinking water services**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Percent of households with access to basic drinking water services	9.6%	2,312	15.7%	2,272	12.7%	4,584
F&M	8.9%	1,579	15.0%	1,541	11.9%	3,120
FNM	11.4%	632	18.0%	656	14.8%	1,288
MNF	10.5%	101	12.8%	75	11.5%	176
Percent of households with improved water source	42.1%	2,313	42.9%	2,274	42.5%	4,587
F&M	42.7%	1,580	42.5%	1,542	42.6%	3,122
FNM	39.9%	632	44.0%	656	42.1%	1,288
MNF	46.5%	101	41.4%	76	44.3%	177
Percent of households with water source within 30 minutes	29.0%	2,315	35.9%	2,272	32.5%	4,587
F&M	28.0%	1,582	36.1%	1,541	32.0%	3,123
FNM	32.1%	632	35.7%	656	34.0%	1,288
MNF	27.8%	101	33.9%	75	30.4%	176
Percent of households with water available year-round	84.3%	2,316	80.4%	2,274	82.3%	4,590
F&M	84.0%	1,583	79.7%	1,542	81.9%	3,125

<sup>8</sup> The final criteria having the water source available year-round includes a measure of the water volume used. However, that data is not available for all households. The indicator reported in Table 25 does not include that component.

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
FNM	85.7%	632	81.8%	656	83.6%	1,288
MNF	81.6%	101	81.4%	76	81.5%	177

\* Gendered Household Type: Female and Male Adults (F&M), Adult Female no Adult Male (FNM), Adult Male no Adult Female (MNF)

Water use was calculated by asking respondents about the containers they use to carry water and the frequency of trips. On average households that treat water report using 8 liters of water per person per day<sup>9</sup> and there is little difference between treatment and control households (Table 26).

Table 26 provides the full water availability indicator, which includes the additional criteria that household water use should be at least 20 liters per person per day. The water use questions were only asked of those who treated their water and therefore the full indicator cannot be calculated for all households. While nearly 13% had access to basic drinking water services definition without water use, this falls to less than 1% when the minimum water use criteria is added. Roughly 4% of households responding reported water use of at least 20 liters per person.

**Table 26. Water use per capita per day**

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Percent of household with access to basic drinking water services including water use	0.8%	(0.29)	1,086	0.78%	(0.31)	1,016	0.77%	(0.21)	2,102
F&M	0.8%	(0.36)	731	1.00%	(0.44)	680	0.91%	(0.28)	1,411
FNM	0.7%	(0.53)	317	0.28%	(0.28)	301	0.50%	(0.30)	618
MNF	0	(.)	38	0	(.)	35	0	(.)	73
Water use per capita per day (liters)	7.47	(0.28)	1,086	8.28	(0.27)	1,016	7.86	(0.19)	2,102
F&M	7.13	(0.49)	731	8.02	(0.48)	680	7.56	(0.35)	1,411
FNM	7.90	(0.60)	317	8.43	(0.55)	301	8.16	(0.41)	618
MNF	11.18	(1.59)	38	12.40	(1.33)	35	11.77	(1.05)	73

\* Gendered Household Type: Female and Male Adults (F&M), Adult Female no Adult Male (FNM), Adult Male no Adult Female (MNF)

Regarding water treatment and sanitation, only 4% of households were observed to have handwashing facilities available in the home as illustrated in Table 27. Only 41% of households report treating water, with flocculation and solar disinfection being the most common methods (Table 28).

<sup>9</sup> Water use was estimated for those treating water. This was done by asking what containers were used to collect water and how often water was collected. The volume of the containers was verified by the enumerator by sight.

**Table 27. Percent of households with soap and water at a handwashing station on premises**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Percent of households with handwashing available	4.9%	2,039	3.6%	2,038	4.3%	4,077
F&M	4.9%	1,405	4.3%	1,380	4.6%	2,785
FNM	5.0%	545	2.3%	590	3.6%	1,135
MNF	4.4%	89	0.0%	68	2.5%	157

\*Gendered Household Type: Female and Male Adults (F&M), Adult Female no Adult Male (FNM), Adult Male no Adult Female (MNF)

**Table 28. Percent of households in target areas practicing correct use of recommended household water treatment technologies**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Percent of households treating water	43.12%	2,316	39.9%	2,274	41.5%	4,590
Percent of households with treated water by adding bleach or chlorine before drinking	5.1%	2,316	4.7%	2,274	5.0%	4,590
Percent of households with treated water by flocculation before drinking	27.2%	2,316	24.6%	2,274	25.9%	4,590
Percent of households with treated water by filtration before drinking	3.5%	2,316	3.3%	2,274	3.4%	4,590
Percent of households with treated water by solar disinfection	13.5%	2,316	13.5%	2,274	13.5%	4,590
Percent of households with treated water by boiling before drinking	0.3%	2,316	0.4%	2,274	0.4%	4,590

Tables 29 and 30 summarize the use of sanitation facilities, specifically the percent of population in the target areas practicing open defecation and percent of households with access to basic sanitation service. The majority of households (57%) practice open defecation and only 15% have household-level basic sanitation facilities. Among those not practicing open defecation, 83% use a pit latrine without a slab, which is considered unimproved, and 23% share the facility with other households. Lack of water due to the drought conditions may be affecting household hygiene practices.

**Table 29. Percent of households in target area practicing open defecation**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Percent of households practicing open defecation	55.8%	2,316	58%	2,274	56.9%	4,590
F&M	54.3%	1,583	58.9%	1,542	56.6%	3,125
FNM	58.8%	632	55.7%	656	57.1%	1,288
MNF	64.0%	101	58.3%	76	61.5%	177

\* Gendered Household Type: Female and Male Adults (F&M), Adult Female no Adult Male (FNM), Adult Male no Adult Female (MNF)

**Table 30. Percent of households with access to basic sanitation services**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Percent of households with access to basic sanitation facilities	14.1%	2,316	16.3%	2,274	15.2%	4,590
F&M	14.0%	1,583	14.6%	1,542	14.3%	3,125
FNM	15.7%	632	20.9%	656	18.4%	1,288
MNF	6.5%	101	10.7%	76	8.3%	177

\*Gendered Household Type: Female and Male Adults (F&M), Adult Female no Adult Male (FNM), Adult Male no Adult Female (MNF)

## 3.6 Agriculture

### 3.6.1 Crops

More than 93% of households are engaged in farming (either crops or livestock), and over 96% of farmers in the Maharo region own the land they cultivate. The targeted crops identified by the IP are cassava, sorghum, and cowpea. As shown in Table 31, cassava and cowpea are widely grown, cultivated by 74% and 76% of farmers, respectively. Sorghum is much less common, grown by only 9% of farmers. Other crops grown by at least 5% of the population are also included in the table.

**Table 31. Crops grown**

Percent of farmers growing ...	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Cassava	74.7%	2,069	73.1%	2,090	73.9%	4,159
Sorghum	9.3%	2,069	9.4%	2,090	9.3%	4,159
Cowpea	75.3%	2,069	77%	2,090	76.2%	4,159
Maize	70.6%	2,069	73%	2,090	71.8%	4,159
Peanut	8.2%	2,069	9.9%	2,090	9.1%	4,159
Sweet potatoes	31.8%	2,069	33%	2,090	32.4%	4,159
Melon	13.2%	2,069	12.6%	2,090	12.9%	4,159
Lablab beans	15.8%	2,069	13.9%	2,090	14.9%	4,159
Chickpeas	15.2%	2,069	16.7%	2,090	16.0%	4,159

The use of credit and savings is not common among farmers, and crop insurance is almost non-existent. Value chain participation is generally low. One-quarter of farmers purchase crop inputs and fewer than 2% of farmers purchase inputs for livestock. None of the other practices listed, including the use of extension, contract farming, drying or processing produce, and formal marketing for crops or livestock, were used by more than 1% of farmers.

**Table 32. Percent of farmers who used financial services (savings, agricultural credit, and/or agricultural insurance) in the past 12 months & Percent of farmers who practiced the value chain interventions promoted by the activity in the past 12 months<sup>10</sup>**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Percent of farmers using agricultural credit	4.8%	2,167	4.6%	2,187	4.7%	4,354
Percent of farmers who saved	3.6%	2,196	2.5%	2,208	3.0%	4,404
Percent of farmers using insurance	0.1%	2,196	0.1%	2,208	0.1%	4,404
Percent of farmers reporting at least one value chain activity	23.3%	1,398	21.6%	1,385	22.4%	2,783
Percent of farmers who are in a value chain that purchase inputs for crops	21.6%	1,398	18.9%	1,385	20.2%	2,783
Percent of farmers who are in a value chain that purchase inputs for livestock	1.9%	1,398	1.8%	1,385	1.8%	2,783
Percent of farmers who are in a value chain that use of training and extension services	0.5%	1,398	0.4%	1,385	0.4%	2,783
Percent of farmers who are in a value chain that contract farming	0.0%	1,398	0.0%	1,385	0.0%	2,783
Percent of farmers who are in a value chain that drying produce	0.7%	1,398	0.8%	1,385	0.8%	2,783
Percent of farmers who are in a value chain that processing produce	0.0%	1,398	0.2%	1,385	0.1%	2,783
Percent of farmers who are in a value chain that trading, or marketing produce through agro dealers and/or community associations	0.3%	1,398	0.4%	1,385	0.3%	2,783
Percent of farmers who are in a value chain that use of formal marketing systems for livestock	0.0%	1,398	0.5%	1,385	0.3%	2,783

The agricultural module included a list of agricultural practices of interest to the IP. Tables 33–35 summarize the most common practices used by farmers for each crop.<sup>11</sup> The most improved management practices/technologies common practice across all three crops was waiting for sufficient rain to plant. Intercropping, the use of wind breaks, and crop rotation were also common. However, 41%, 36%, and 22% of cassava, cowpea, and sorghum farmers, respectively, used none of the listed practices.

**Table 33. Improved management practices/technologies for cassava**

Outcome	Control			Treatment			All		
	Percent	SE	N	Percent	SE	N	Percent	SE	N
Percent of farmers using at least one practice for cassava	60.5%	(1.55)	1,536	57.5%	(1.54)	1,509	59.0%	(1.09)	3,045

<sup>10</sup> The full list of value chain activities in the survey is: Purchase inputs for crops, purchase inputs for livestock, use of training and extension services, contract farming, drying produce, processing produce, trading or marketing produce through agro dealers and/or community associations, and use of formal marketing systems for livestock

<sup>11</sup> Only those practiced by at least 5% of farmers are shown. The full list of practices included in the survey for all three crops is: Organic manure, compost, performing weeding, sowing after useful rain, crop association, crop rotation, use of improved seeds, use of climate information (rain forecast, disaster risks, etc.), wind break, and soil cover.

Outcome	Control			Treatment			All		
	Percent	SE	N	Percent	SE	N	Percent	SE	N
Percent of farmers interplanting for cassava	36.6%	(1.52)	1,564	34.8%	(1.50)	1,524	35.7%	(1.07)	3,088
Percent of farmers sowing after significant rain for cassava	27.7%	(1.46)	1,564	27.3%	(1.44)	1,524	27.5%	(1.02)	3,088
Percent of farmers wind break for cassava	16.1%	(1.15)	1,564	13.4%	(1.03)	1,524	14.7%	(0.77)	3,088
Percent of farmers that did not use modern practices one for cassava	40.2%	(1.54)	1,564	42.6%	(1.54)	1,524	41.4%	(1.09)	3,088

**Table 34. Improved management practices/technologies for cowpea**

Outcome	Control			Treatment			All		
	Percent	SE	N	Percent	SE	N	Percent	SE	N
Percent of farmers using at least one practice for cowpea	64.7%	(1.56)	1,525	64.4%	(1.48)	1,602	64.5%	(1.07)	3,127
Percent of farmers interplanting for cowpea	46.4%	(1.60)	1,532	43.5%	(1.51)	1,613	44.9%	(1.10)	3,145
Sowing after significant rain for cowpea	34.4%	(1.54)	1,532	34.2%	(1.44)	1,613	34.3%	(1.05)	3,145
Wind break for cowpea	16.3%	(1.14)	1,532	15.7%	(1.09)	1,613	16.0%	(0.79)	3,145
Crop rotation for cowpea	7.0%	(0.80)	1,532	5.4%	(0.65)	1,613	6.1%	(0.51)	3,145
None for cowpea	35.9%	(1.56)	1,532	35.9%	(1.47)	1,613	35.9%	(1.07)	3,145

**Table 35. Improved management practices/technologies for sorghum**

Outcome	Control			Treatment			All		
	Percent	SE	N	Percent	SE	N	Percent	SE	N
Percent using at least one practice for sorghum	85.3%	(2.67)	192	72.3%	(3.79)	198	78.7%	(2.38)	390
Interplanting for sorghum	70.8%	(3.53)	193	59.6%	(4.05)	200	65.1%	(2.73)	393
Sowing after significant rain for sorghum	49.8%	(4.04)	193	44.1%	(4.08)	200	46.9%	(2.87)	393
Crop rotation for sorghum	30.2%	(3.74)	193	22.0%	(3.31)	200	26.0%	(2.50)	393
Wind break for sorghum	23.8%	(3.55)	193	20.6%	(3.02)	200	22.2%	(2.33)	393
None for sorghum	14.6%	(2.65)	193	28.1%	(3.77)	200	21.5%	(2.37)	393

Table 36 presents the percent of producers who have applied targeted improved management practices or technologies. These practices include purchasing inputs for crops or livestock, use of training or extension services, contract farming, drying or processing produce or trading or marketing produce. Overall, the majority of farmers (78%) are not implementing any improved practices. Approximately one-fifth (21%) are implementing one practice. Less than 1% are implementing two or more.

**Table 36. Percent of producers who have applied targeted improved management practices or technologies**

Outcome	Control			Treatment			All		
	Percent	SE	N	Percent	SE	N	Percent	SE	N
Percent of farmers implementing no improved practices	77.0%	(0.03)	1,413	79.0%	(0.03)	1,381	78.0%	(0.02)	2,794
Percent of farmers implementing one improved practice	22.0%	(0.03)	1,413	20.0%	(0.03)	1,381	21.0%	(0.02)	2,794
Percent of farmers implementing two or more improved practices	1.0%	(0.00)	1,413	1.0%	(0.00)	1,381	1.0%	(0.00)	2,794

The yield estimates for the three crops are presented in Table 37. As a result of the prolonged, severe drought, most farmers who planted one of the targeted crops reported no production. These farmers are omitted from the yield calculation because many of these farmers may have abandoned or stopped working their plots well before harvest. Because the yield calculation is based on farmer recall of production and the farmer's estimate of the area planted, these numbers should be taken as rough estimates.<sup>12</sup>

Yield estimates for all three crops are in the range of what would be expected in southern Madagascar under drought conditions. Figure 4 shows the distribution of yields. The estimated mean yield for cassava is 1,338 kg per hectare for the 867 farmers reporting any production. One study of cassava production in southwestern Madagascar cited historical yields in the region from various studies, most ranging from 3,000–6,000 kg per hectare.<sup>13</sup> Thus, our lower estimate is reasonable given the current drought.

The cowpea yield was estimated to be 362 kg per hectare. A technical sheet from GIZ on cowpea production in the region estimated yields of 400–1,000 kg per hectare in 2011, Sorghum is not widely cultivated and only 65 farmers reported any production. While this small number might raise concerns about the yield estimate, 351 kg/ha is within the range of yields (300–1,000) cited by another GIZ technical document for the Androy region.

**Table 37. Yield of targeted agricultural commodities within target areas**

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Percent of producers reporting zero cassava production	66.7%	(3.58)	1,548	67.5%	(3.58)	1,522	67.1%	(2.53)	3,070
Producers of cassava reporting yield in kg per ha	1,401.99	(144.37)	458	1,269.36	(131.26)	409	1,337.67	(98.61)	867

<sup>12</sup> The survey first asks farmers about the number of plots, the area of each plot, and how much of each plot was devoted to each of the three crops. Next, farmers are asked to recall total production of each crop across all plots in the previous year. While most farmers measure land in acres (1/100 of a hectare), many farmers measure production in volume, not weight, and this must be converted to kilograms.

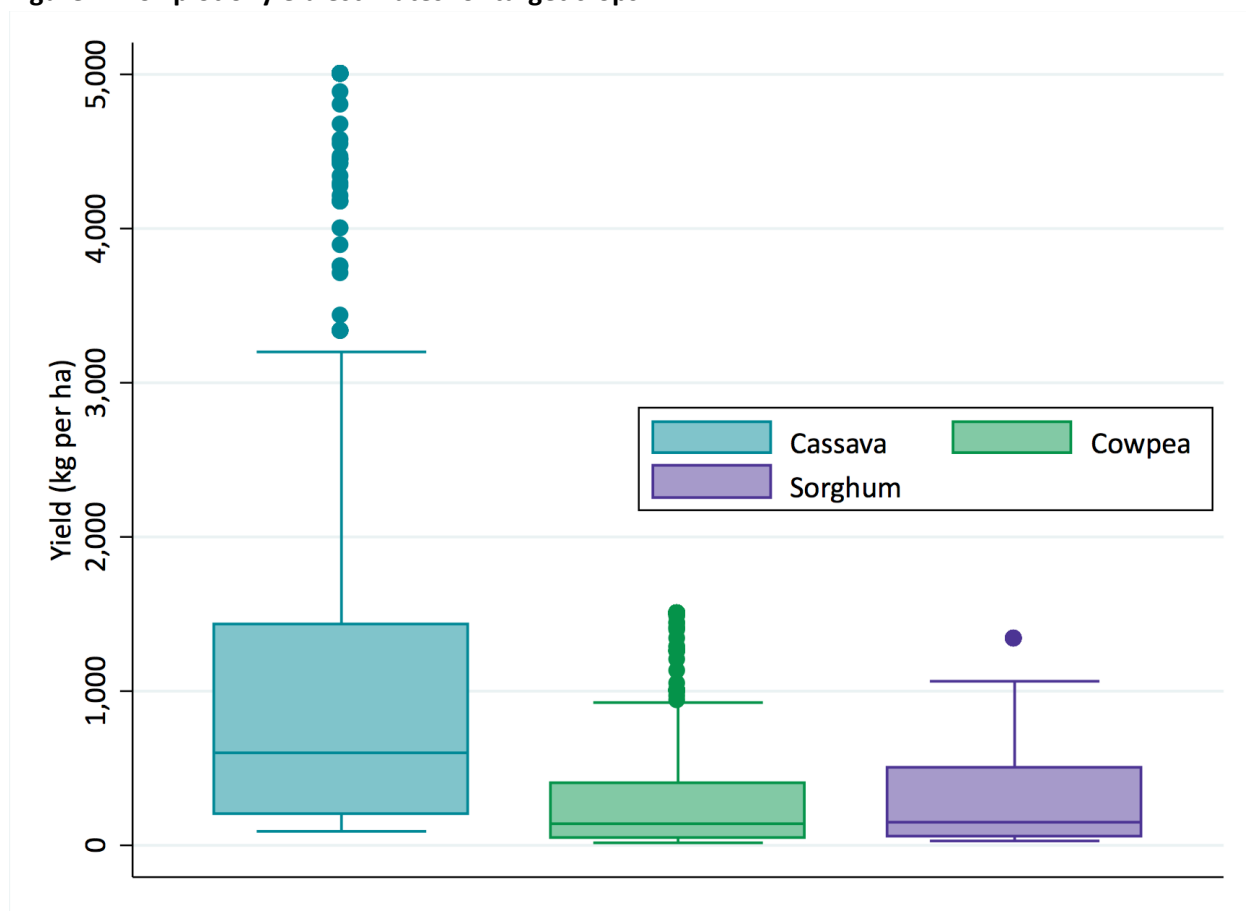
<sup>13</sup> Jacques Arrivets, *Situation actuelle de la culture du manioc dans le Sud-Ouest malgache perspectives d'amélioration*, (Montpellier, France.: Centre de coopération internationale en recherche, 1996)

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Percent of producers reporting zero cowpea production	73.8%	(2.99)	1,529	75.7%	(2.44)	1,611	74.8%	(1.93)	3,140
Producers of cowpea reporting yield in kg per ha	386.71	(57.02)	304	336.36	(43.34)	320	362.12	(36.38)	624
Percent of producers reporting zero sorghum production	69.%	(3.84)	193	73%	(4.58)	211	71.3%	(3.04)	404
Producers of sorghum reporting yield in kg per ha	364.6	(83.72)	37	n/a	n/a	28	350.94	(66.16)	65

\*Kilogram (kg)

\*Hectare (ha)

Figure 4. Box plot of yield estimates for target crops



### 3.6.2 Livestock

The primary targeted livestock are goats and poultry. The summary statistics for goat farmers are in Table 38. In our sample, 37% of farmers raised goats. The average herd size for goat farmers was 11 animals. Goat yield is calculated as the estimated weight of animals sold or consumed divided by the herd size.<sup>14</sup> The most commonly used modern livestock practices were vaccinations, treatment for parasites, and castration.

**Table 38. Goat farming**

Outcome	Control		Treatment		All	
	Mean	N	Mean	N	Mean	N
Percent of all farmers raising goats	37.7%	2,235	37%	2,243	37.4%	4,478
Average herd size for goat farmers	11.41	859	10.57	798	10.99	1,657
Average number of adult male goats per farmer	2.5	859	2.33	798	2.42	1,657
Average number of adult female goats per farmer	4.81	859	4.29	798	4.55	1,657
Average number of young male goats per farmer	1.75	859	1.72	798	1.73	1,657
Average number of young female goats per farmer	2.36	859	2.23	798	2.29	1,657
Average livestock weight in kg	208.47	859	192.1	798	200.33	1,657
Goat yield (weight of offtake in kg/herd size)	16.61	859	18.94	798	17.77	1,657
Percent of farmers using vaccinations	32.0%	892	26.1%	837	29.0%	1,729
Percent of farmers using anti-parasitic treatments	13.5%	892	8.5%	837	11.0%	1,729
Percent of farmers using castration	10.6%	892	6.5%	837	8.6%	1,729
Percent of farmers using none of the practices	61.3%	892	69.8%	837	65.6%	1,729

Nearly 48% of farmers raise poultry and on average farmers raised 13 birds in the last year. Only 12% of farmers reported any egg production from chickens in the previous week. Farmers are much more likely to have sold poultry in the last year (81%) than to have consumed any (21%). A significant share of farmers (42%) reported poultry dying in the last year. Vaccinations were the only practice used by more than 5% of farmers and most farmers (87%) did not use any of the listed practices. Poultry yield is calculated as the total weight of poultry sold and consumed divided by the number raised.<sup>15</sup>

<sup>14</sup> Weights are based on the "Fiche Technique Chaîne de Valeur Caprin/Ovin," developed for the regions of Anosy and Androy, which estimates weights of 1–2 year old goats and sheep to be 15–30 kg. Based on this, 25kg is used for adult males, 20 for adult females, 15 for young males and 10 for young females.

<sup>15</sup> Based on the following, 2 kilograms is used for the weight of poultry.

[https://agritrop.cirad.fr/585447/7/Fiches%20produits\\_march%C3%A9s%20%20VF%2020\\_10\\_2017.pdf](https://agritrop.cirad.fr/585447/7/Fiches%20produits_march%C3%A9s%20%20VF%2020_10_2017.pdf)

**Table 39. Poultry farming**

Outcome	Control		Treatment		All	
	Mean	N	Mean	N	Mean	N
Percent of all farmers raising poultry	47.2%	2,235	48%	2,243	47.6%	4,478
Number of poultry raised by farmers in the last year	12.58	1,123	13.06	1,134	12.83	2,257
Percent of farmers reporting eggs in previous week	12.4%	1,122	12.5%	1,131	12.4%	2,253
Percent of farmers selling poultry in the last year	81.3%	1,123	81%	1,134	81.2%	2,257
Percent of farmers consuming own poultry in the last year	18.9%	1,121	23%	1,133	21%	2,254
Percent of farmers experiencing poultry dying in the last year	40.7%	1,122	43.9%	1,132	42.4%	2,254
Poultry yield in kg per bird	1.41	(0.17)	1,123	1.24	(0.03)	1,134
Percent of farmers vaccinating	13.3%	1,066	12.8%	1,086	13.1%	2,152
Percent of farmers not using any of the poultry practices	86.6%	1,066	86.6%	1,086	86.6%	2,152

Some households in the coastal areas in the region fish, and the IP is interested in developing this sector. In our sample, however, only 246 individuals fished.<sup>16</sup> More than half of the communes have no fishermen. One-quarter of fishermen are in the commune of Itampolo. The vast majority of fishermen fish for both own consumption and for sale (Table 40).

**Table 40. Fishing**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Percent of fishers fishing for food only	12.7%	108	4.6%	138	7.7%	246
Percent of fishers fishing for market only	4.7%	108	0.8%	138	2.3%	246
Percent of fishers fishing for both food and market	82.6%	108	94.6%	138	90%	246
Percent of fishers using a pirogue	43.1%	108	63.6%	136	55.6%	244
Percent of fishers using nets	39.6%	108	60.9%	136	52.6%	244
Percent of fishers using containers	30.3%	108	34.7%	136	33%	244

Table 41 presents the average number of cattle and sheep owned by households.<sup>17</sup> On average, households own 0.41 cattle and 0.29 sheep.

<sup>16</sup> It is possible that this is because the survey was conducted during the rainy season when many fishermen self-identify as farmers and because the survey question was interpreted as whether one currently fishes.

<sup>17</sup> Note that sheep and cattle are captured in the section on household productive assets and were not included in the livestock section so we do not have disaggregated information about male versus female sheep and cattle.

**Table 41. Livestock ownership**

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Average number of cattle per household	0.435	(0.06)	2,312	0.391	(0.05)	2,276	0.413	(0.03)	4,588
Average number of sheep per household	0.267	(0.04)	2,311	0.309	(0.04)	2,277	0.288	(0.02)	4,588

### 3.7 Poverty Measurement

This section presents three measures of poverty, all based on household expenditure. The measures are daily per capita expenditure, the percent living on less than \$1.90 per day (2011 PPP) and the depth of poverty of the poor. The equivalent of \$1.90 was determined to be 2,443 Malagasy Ariary.<sup>18</sup>

The poverty measures are summarized in Table 42. The mean per capita expenditure is 1,272 Ariary, or less than \$1 per day. The poverty rate is approximately 90%. The depth of poverty of the poor is 57%, which means that the average poor person is 57% below the poverty line. In monetary terms, this means it would require an additional \$1.08 per person per day to bring every poor person out of poverty.

**Table 42. Poverty measures**

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Daily per capita expenditure (Ariary) per household	1,243.12	(23.77)	2,317	1,302.02	(21.83)	2,278	1,272.47	(16.15)	4,595
Daily per capita expenditure (2011 Dollars) per household	0.97	(0.02)	2,317	1.01	(0.02)	2,278	0.99	(0.01)	4,595
Prevalence of Poverty: Percent of people living on less than \$1.90/day	89.9%	(0.80)	2,317	89.7%	(0.74)	2,278	89.8%	(0.54)	4,595
Depth of Poverty of the Poor: Mean percent shortfall of the poor relative to the \$1.90/day 2011 PPP poverty line	58.1%	0.00	2,007	55.2%	0.00	1,944	56.7%	(0.03)	3,951

Table 43 presents measures further broken down by household type. Interestingly, expenditure is higher and poverty is lower among both female-headed households and male-headed households compared to those households with both adult males and adult females present (p-value = 0.00). There has been

<sup>18</sup> The expenditure module of the survey followed standard practices for expenditure calculation. Frequent items, primarily foods, used 7-day recall. Less frequent purchases used 30-day or 12-month recall. A rental equivalent is used to value housing and durable goods. Enumerators reported a few extreme cases of people with essentially zero expenditures who lived on what they could collect, forage, or receive from begging.

significant migration out of this region and the difference could be due to remittances. The BL survey, however, did not include direct questions on remittances. Remittances were listed as an option in response to a question about how households coped with shocks, but only 2% of households cited this as a strategy.

**Table 43. Disaggregated poverty measures by household type**

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Prevalence of Poverty: Percent of people living on less than \$1.90/day	89.9%	(0.80)	2,317	89.7%	(0.74)	2,278	89.8%	(0.54)	4,595
F&M	91.6%	(0.88)	1,584	91.8%	(0.83)	1,545	91.7%	(0.61)	3,129
FNM	83.9%	(1.96)	632	82.7%	(1.69)	657	83.3%	(1.29)	1,258
MNF	85.0%	(3.89)	101	86.0%	(3.80)	76	85.4%	(2.76)	177
Daily per capita expenditure (Ariary)	1,243.12	(23.77)	2,317	1,302.02	(21.83)	2,278	1,272.47	(16.15)	4,595
F&M	1,191.42	(26.81)	1,584	1,253.66	(24.81)	1,545	1,222.27	(18.30)	3,129
FNM	1,436.01	(53.97)	632	1,464.09	(50.15)	657	1,450.53	(36.70)	1,289
MNF	1,307.26	(135.53)	101	1,427.8	(120.11)	76	1,357	(93.70)	177
Daily per capita expenditure (Dollars)	0.97	(0.02)	2,317	1.01	(0.02)	2,278	0.99	(0.01)	4,595
F&M	0.93	(0.02)	1,584	0.98	(0.02)	1,545	0.95	(0.01)	3,129
FNM	1.12	(0.04)	632	1.14	(0.04)	657	1.13	(0.03)	1,289
MNF	1.02	(0.11)	101	1.11	(0.09)	76	1.06	(0.07)	177

\**Gendered household type: Female and Male Adults (F&M), Adult Female no Adult Male (FNM), Adult Male no Adult Female (MNF)*

The 2011 PPP used was 700.228 Ariary/dollar. The Consumer Price Index used for 2011 was 72.11 and 132.5 for 2020. This gives us the poverty line =  $1.9 * 700.228 * 132.5 / 72.18 = 2,243$ .

## 3.8 Gender Dynamics

Gender dynamics are captured through the eight indicators in this section. Because the survey targeted only men and women in a union, they are the only ones included in this section. These indicators explore male and female financial resources, access to credit, and female decision-making within the households.

### 3.8.1 Use of Financial Resources

This section presents findings on participation in cash earning activities across men and women in a union as well as women's participation in decisions around their own incomes and their husbands'

incomes. As illustrated in Table 44, approximately half of men and women in a union (52%) participated in a cash earning activity in the past year. It is far more common, however, for men in a union (71%) to participate in cash earning activities than for women in a union (33%) to do so (p-value = 0.00). Fewer young adult women (ages 15–19) are participating in cash earning activities relative to older women (20–49) (p-value = 0.16). A majority of men across all age brackets are participating in cash earning activities.

**Table 44. Percent of women and men in a union who earned cash in the past 12 months**

Outcome	Control		Treatment		All	
	Percent	N	Percent	N	Percent	N
Cash Earners in a union	51.8%	2,607	52.2%	2,543	52%	5,150
Women in a union (ages 15–49)	33.5%	1,299	32.3%	1,268	32.9%	2,567
Women in a union (ages 15–19)	19.3%	125	26.9%	132	23.4%	257
Women in a union (ages 20–29)	30.2%	508	30.5%	482	30.4%	990
Women in a union (ages 30–49)	39.3%	483	32.7%	468	35.9%	951
Men in a union (15+)	69.8%	1,308	72%	1,275	70.9%	2,583
Men in a union (ages 15–19)	66.4%	17	49.2%	13	58.1%	30
Men in a union (ages 20–29)	76.8%	307	72.2%	339	74.2%	646
Men in a union (ages 30+)	67.7%	984	72.4%	923	69.9%	1,907

As shown in Table 45, among women who are earning cash, a large majority (82%) reported that they participate in decisions about how to use the cash, whether solely or jointly with others. Women participate in decisions about the use of cash income at similar rates across ages.

**Table 45. Percent of women in a union and earning cash who report participation in decision about the use of self-earned cash**

Outcome	Control			Treatment			All		
	Percent	SE	N	Percent	SE	N	Percent	SE	N
Cash earning women in a union (ages 15–49)	81.1%	(0.038)	456	82.8%	(0.026)	416	82.0%	(0.019)	872
Women in a union (ages 15–19)	53.8%	(0.086)	32	75.7%	(0.091)	35	67.4%	(0.069)	67
Women in a union (ages 20–29)	84.2%	(0.036)	171	87%	(0.037)	151	85.7%	(0.021)	322
Women in a union (ages 30–49)	83.6%	(0.039)	197	82.3%	(0.029)	157	83.0%	(0.024)	354

Table 46 highlights the percent of cash earning men in a union who report that their spouse participates in decision-making about the use of self-earned cash. Approximately 75% of men perceive their wives to be involved in decision-making.<sup>19</sup>

**Table 46. Percent of men in union and earning cash who report spouse/partner participation in decisions about the use of self-earned cash**

Outcome	Control			Treatment			All		
	Percent	SE	N	Percent	SE	N	Percent	SE	N
Cash Earning Men in a union (ages 15+)	73.6%	(0.028)	913	75.3%	(0.024)	929	74.5%	(0.017)	1,842
Men in a union (ages 15–19)	n/a	n/a	12	n/a	n/a	9	n/a	n/a	21
Men in a union (ages 20–29)	70.6%	(0.044)	230	74.2%	(0.037)	262	72.6%	(0.028)	492
Men in a union (ages 30+)	75.0%	(0.029)	671	75.6%	(0.024)	658	75.3%	(0.018)	1,329

### 3.8.2 Credit

This section presents findings on the use of credit among men and women in a union. Table 47 shows that approximately one-third (36%) of men and women in a union borrowed in the previous 12 months. Women and Men in a union report borrowing at similar rates across any source. It is far less common for men and women in a union to borrow from microfinance or lending based groups (3%).

**Table 47. Percent of women/men in a union who used credit in the previous 12 months**

Outcome	Control			Treatment			All		
	Percent	SE	N	Percent	SE	N	Percent	SE	N
Men and women in a union (lending groups)	3.0%	(0.01)	1,213	3.0%	(0.01)	1,208	3.0%	(0.01)	2,421
Men and women in a union (any source)	36.8%	(0.03)	2,356	35.7%	(0.02)	2,328	36.2%	(0.02)	4,684
Men in a union (ages 15–49)	37.2%	(0.03)	1,143	36.5%	(0.03)	1,159	36.8%	(0.02)	2,302
Men in a union (ages 15–19)	n/a	n/a	14	n/a	n/a	13	n/a	n/a	27
Men in a union (ages 20–19)	33.6%	(0.04)	276	41.7%	(0.03)	315	38.2%	(0.03)	591
Men in a union (ages 30+)	38.1%	(0.03)	853	33.9%	(0.03)	831	36.1%	(0.02)	1,684
Women in a union (ages 15–49)	36.4%	(0.02)	1,213	34.9%	(0.02)	1,169	35.6%	(0.02)	2,382

<sup>19</sup> The sample for BL 34 indicator (Percent of women in a union and earning cash who report spouse/partner participation in decisions about the use of self-earned cash), was not going to be reflective of all cash earning women in a union due to a survey coding error, the research team decided to excluded the indicator from the report.

Outcome	Control			Treatment			All		
	Percent	SE	N	Percent	SE	N	Percent	SE	N
Women in a union (ages 15–19)	22.0%	(0.05)	116	25.5%	(0.04)	113	23.8%	(0.03)	229
Women in a union (ages 20–29)	36.2%	(0.03)	474	41.2%	(0.03)	447	38.7%	(0.02)	921
Women in a union (ages 30–49)	40.7%	(0.03)	452	34.0%	(0.04)	434	37.3%	(0.02)	886

Of the men and women in a union who report borrowing, almost two-thirds (66%) of them participate in decisions about credit. As illustrated in Table 48, men in a union participate in decisions about credit at a much higher rate than women in a union ( $p$ -value = 0.00), with 89% of men reportedly making credit decisions, which is consistent across age groups.

**Table 48. Percent of women/men in a union who make decisions about credit**

Outcome	Control			Treatment			All		
	Percent	SE	N	Percent	SE	N	Percent	SE	N
Men and women in a union	66.2%	(0.019)	887	65.4%	(0.015)	821	65.8%	(0.012)	1,708
Men in a union (ages 15+)	89.3%	(0.023)	441	88.8%	(0.018)	419	89.0%	(0.012)	860
Men in a union (ages 15–19)	n/a	n/a	9	n/a	n/a	5	n/a	n/a	14
Men in a union (ages 20–29)	92.5%	(0.029)	102	91.2%	(0.028)	128	91.7%	(0.021)	230
Men in a union (ages 30+)	88.7%	(0.024)	330	87.1%	(0.022)	286	88.0%	(0.013)	616
Women in a union (ages 15-49)	43.5%	(0.037)	446	41.4%	(0.036)	402	42.5%	(0.025)	848
Women in a union (ages 15–19)	30.9%	(0.087)	33	34.3%	(0.094)	34	32.8%	(0.058)	67
Women in a union (ages 20–29)	45.4%	(0.043)	174	39.0%	(0.044)	171	42.0%	(0.030)	345
Women in a union (ages 30–49)	40.8%	(0.048)	178	43.8%	(0.053)	154	42.2%	(0.037)	332

### 3.8.3 Additional Decision-Making Areas

This section presents findings on the input women have in their household, disaggregated by age and household type. The questions were broken down into the following categories: nutrition, health, agriculture, livestock/fisheries, savings and lending, women’s empowerment, and WASH. Women would rate on a scale of 1 to 4 the level of input they had in making decisions about those different categories. If women averaged between a 3 and 4, they were considered to have a medium to high level of input.

Table 49 shows that almost half of women have a medium or high input when making decisions in their home (50%). Table 50 shows which categories of decisions women have medium or high input into. The large majority of women (94%) have medium or high input into agency related decisions. It is far less common for women to have medium or high input into savings and lending decisions, where 21% of women have this level of input.

**Table 49. Women in a union who report medium or high amount of household input, age**

Outcome	Control			Treatment			All		
	Percent	SE	N	Percent	SE	N	Percent	SE	N
Women in a union (ages 15+)	47.7%	(0.031)	1,250	51.9%	(0.022)	1,181	49.8%	(0.019)	2,431
Women in a union (ages 15–19)	37.7%	(0.045)	115	46.8%	(0.060)	113	42.5%	(0.040)	228
Women in a union (ages 20–29)	45.1%	(0.042)	483	48.4%	(0.033)	453	46.7%	(0.024)	936
Women in a union (ages 30–49)	50.4%	(0.038)	469	56%	(0.034)	441	53.2%	(0.023)	910
Women in a union (ages 50+)	52.9%	(0.064)	183	53.9%	(0.045)	174	53.4%	(0.039)	357

**Table 50. Women in a union who report medium or high amount of household input, categories**

Outcome	Control			Treatment			All		
	Percent	SE	N	Percent	SE	N	Percent	SE	N
Nutrition	48.7%	(0.04)	913	50.7%	(0.03)	926	49.7%	(0.02)	1,839
Health	86.9%	(0.02)	1,176	89.7%	(0.01)	1,119	88.3%	(0.01)	2,295
Agriculture	41.1%	(0.02)	1,083	44.4%	(0.02)	1,053	42.8%	(0.01)	2,136
Livestock	50.0%	(0.03)	1,099	53.2%	(0.02)	1,067	51.6%	(0.02)	2,166
Saving and Lending	22.0%	(0.04)	327	19.5%	(0.03)	353	20.7%	(0.02)	680
Agency	94.4%	(0.01)	1,223	93.8%	(0.01)	1,153	94.1%	(0.01)	2,376
Water and Sanitation	65.5%	(0.02)	1,146	66.7%	(0.03)	1,094	66.1%	(0.01)	2,240

Table 51 highlights women in a union's input into household decisions, disaggregated by the gender of the head of household. Women in female-headed households reported having a similar level of input into household decisions (56%) relative to women in male-headed households (50%). However, there are only 71 cases in which the head of the household is a woman. These are most likely women whose husbands are not currently present.

**Table 51. Women in a union who report medium or high amount of household input, household head's sex**

Outcome	Control			Treatment			All		
	Percent	SE	N	Percent	SE	N	Percent	SE	N
Women in a union	47.7%	(0.031)	1,250	51.9%	(0.022)	1,181	49.8%	(0.019)	2,431
Female Head of Household	68.4%	(0.086)	40	39.9%	(0.099)	31	56.1%	(0.070)	71
Male Head of Household	47.0%	(0.031)	1,210	52.2%	(0.023)	1,150	49.6%	(0.019)	2,360

## 3.9 Resilience

### 3.9.1 Ability to Recover from Shocks and Stresses Index

The ability to recover from shocks and stresses index reflects the ability to recover from negative events that have impacted the household. On average, households score 2.2 on this index. This index is composed of indices that reflect how households perceived their recovery as well as the total number and severity of shocks the household experienced over the past year. Table 52 below illustrates that there was little to no observable difference across treatment and control household responses (see Annex A for statistical comparisons). There is also little variation in the perceived ability to recover across households with both male and female adults present.

**Table 52. Ability to recover from shocks and stresses**

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Household ability to recover from shocks & stresses index	2.178	(0.047)	2,012	2.237	(0.051)	1,989	2.208	(0.019)	4,001
F&M	2.183	(0.048)	1,376	2.232	(0.049)	1,338	2.208	(0.022)	2,714
FNM	2.181	(0.061)	548	2.229	(0.058)	583	2.207	(0.022)	1,131
MNF	2.070	(0.058)	88	2.394	(0.122)	68	2.209	(0.055)	156
Household ability to recover index (2–6)	2.179	(0.048)	2,013	2.242	(0.052)	1,991	2.211	(0.019)	4,004
F&M	2.184	(0.048)	1,377	2.238	(0.050)	1,339	2.211	(0.022)	2,716
FNM	2.182	(0.061)	548	2.235	(0.059)	584	2.210	(0.022)	1,132
MNF	2.082	(0.058)	88	2.392	(0.124)	68	2.214	(0.054)	156
Household total shocks experienced (0–15)	3.145	(0.071)	2,317	3.112	(0.067)	2,278	3.128	(0.035)	4,595
F&M	3.185	(0.072)	1,584	3.132	(0.075)	1,545	3.159	(0.037)	3,129
FNM	3.085	(0.088)	632	3.043	(0.071)	657	3.063	(0.046)	1,289
MNF	2.831	(0.154)	101	3.298	(0.191)	76	3.033	(0.122)	177
Household shock exposure index (0–120)	20.846	(0.493)	2,311	20.322	(0.424)	2,268	20.582	(0.231)	4,579
F&M	21.057	(0.493)	1,579	20.322	(0.476)	1,540	20.690	(0.252)	3,119
FNM	20.528	(0.616)	632	20.245	(0.530)	652	20.379	(0.325)	1,284

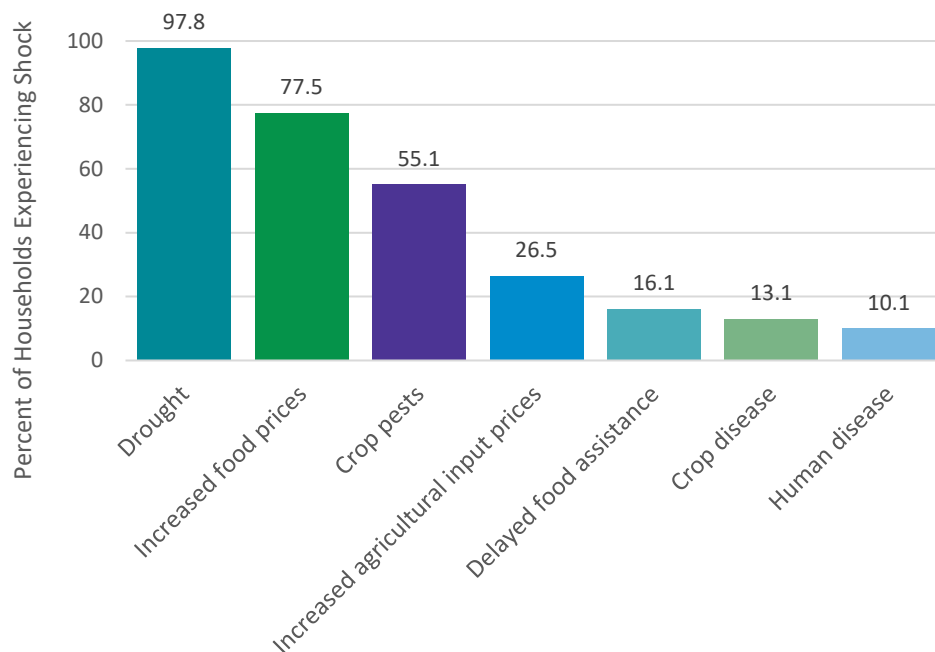
Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
MNF	19.249	(1.088)	100	21.046	(1.160)	76	20.029	(0.746)	176

\*Gendered household type: Female and Male Adults (F&M), Adult Female no Adult Male (FNM), Adult Male no Adult Female (MNF)

The perceived ability to recover index reflects a household's perspective on their ability to meet food needs now, relative to the previous year, as well as their ability to meet their future food needs. Households score an average of 2.2 (range of 2–6). In other words, households perceived their ability to meet their current needs as worse than the previous year and suspect that their future ability to meet these needs will deteriorate. Households experienced an average of 3.1 out of 15 possible shocks in the previous year. The most commonly reported shocks are illustrated below in Figure 5, which shows the shocks experienced by at least 10% of households. Nearly all households (98%) listed the drought as one of these shocks. Other common shocks listed included rising food prices and crop pests.

In terms of the number and intensity of shocks experienced, households score an average of 20.6 out of 120, which accounts for 15 shocks and four different levels of severity (regarding both the impact on the household economic situation and impact on household consumption).<sup>20</sup> This suggests that out of the average of 3.1 shocks experienced, households perceived those shocks to be severe. This perception is likely driven by the ongoing extreme drought which has pushed many households to the brink and likely explains households' perceived low ability to recover.

**Figure 5. Most common shocks reported by households**



<sup>20</sup> Note that the SEI was created out of 15 possible shocks instead of 16 given available data.

## 3.9.2 Social Capital Index

This index conveys the ability of households to draw on social networks to get support to reduce the impact of shocks and stresses on their households. It measures both the degree of bonding—social capital among households within their own communities—and the degree of bridging—social capital between households in the area and households outside their own community. On average, households score 40.4 out of 100,<sup>21</sup> indicating that their ability to draw on their networks for support is moderate (Table 53). There is little observable difference in this score across treatment and control households. Similarly, F&M, FNM and MNF households report similar scores.

**Table 53. Index of social capital at the household level**

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Household index of social capital at household level (0–100)	40.357	(1.348)	2,317	40.507	(1.370)	2,278	40.433	(0.532)	4,595
F&M	40.965	(1.419)	1,584	40.346	(1.434)	1,545	40.655	(0.605)	3,129
FNM	39.462	(1.371)	632	40.596	(1.518)	657	40.059	(0.684)	1,289
MNF	35.641	(3.460)	101	43.293	(3.203)	76	38.952	(2.275)	177
Household bonding sub-index (0–100)	43.708	(1.320)	2,317	43.742	(1.231)	2,278	43.725	(0.547)	4,595
F&M	44.158	(1.412)	1,584	43.522	(1.327)	1,545	43.84	(0.643)	3,129
FNM	43.125	(1.398)	632	44.004	(1.351)	657	43.588	(0.704)	1,289
MNF	39.702	(3.811)	101	46.248	(2.989)	76	42.534	(2.400)	177
Household bridging sub-index (0–100)	37.007	(1.542)	2,317	37.273	(1.615)	2,278	37.141	(0.611)	4,595
F&M	37.771	(1.602)	1,584	37.17	(1.674)	1,545	37.47	(0.671)	3,129
FNM	35.798	(1.618)	632	37.188	(1.841)	657	36.53	(0.835)	1,289
MNF	31.581	(3.412)	101	40.339	(3.655)	76	35.37	(2.356)	177

\* Gendered household type: Female and Male Adults (F&M), Adult Female no Adult Male (FNM), Adult Male no Adult Female (MNF)

Findings suggest that households are able to draw on households within their community slightly more (average score of 43.7) than they are able to draw on households outside of their community (average score of 37.0).

## 3.9.3 Absorptive Capacity Index

The absorptive capacity index reflects the ability of households to prepare for, deal with, and mitigate the impact of shocks and stressors on well-being outcomes through preventive measures and positive coping strategies. Overall, households score 33.6 out of 100 on this index, reflecting a low ability to absorb shocks, an ability that has likely been hampered by the ongoing drought. Below we discuss the results of the components of the absorptive capacity index. As discussed below, beyond humanitarian

<sup>21</sup> We followed precedent with TANGO and did not exclude factors that loaded negatively on the first component in the construction of this index. This is because we want the indices to be comparable across baseline and EL (where at EL the factors that load negatively may be different). However, the two scores are comparable on average.

assistance and some community organizations, there are few resources that households have access to that would enable them to better mitigate shocks.

A key aspect of the absorptive capacity index captures financial resources that households have access to in order to absorb shocks. Overall, very few households have access to financial resources for absorbing shocks, lowering their ability to mitigate the impact of shock on well-being outcomes. Specifically, only 3% of households have cash savings, 2% have reported receiving remittances and 1% have access to insurance. Households on average own 5.8 different types of household and productive assets (out of 16), although this does not necessarily mean that households have a large asset stock.

**Table 54. Absorptive capacity index**

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Household absorptive capacity index (0–100)	33.626	(0.737)	2,130	33.496	(0.711)	2,091	33.561	(0.364)	4,221
Household access to cash savings index (0–1)	0.034	(0.008)	2,313	0.029	(0.007)	2,277	0.031	(0.004)	4,590
Household asset ownership index - total type (0–31)	5.793	(0.108)	2,290	5.747	(0.111)	2,246	5.770	(0.063)	4,536
Household remittances index (0–1)	0.022	(0.004)	2,272	0.015	(0.003)	2,214	0.019	(0.003)	4,486
Household access to insurance index (0–1)	0.001	(0.001)	2,176	0.001	(0.001)	2,141	0.001	(0.001)	4,317
Household bonding social capital index (0–6)	1.751	(0.050)	2,317	1.752	(0.049)	2,278	1.752	(0.021)	4,595
Household access to informal safety nets index (0–6)	2.494	(0.168)	2,317	2.484	(0.163)	2,278	2.489	(0.042)	4,595
Household shock preparedness & responsiveness index (0–3)	0.792	(0.051)	2,317	0.794	(0.054)	2,278	0.793	(0.014)	4,595
Household access to humanitarian assistance index (0–1)	0.813	(0.029)	2,317	0.826	(0.025)	2,278	0.820	(0.015)	4,595

The absorptive capacity index also captures the level of social capital that households have access to in order to help them absorb shocks. Overall, findings suggest that most households have low social capital. The bonding social capital index reflects the number of types of individuals households could draw on the inside of their communities (out of six groups). On average, households feel able to draw on 1.8 of these types of individuals. Moreover, households reported that they have moderate access to, and have been active in, community organizations that typically serve as informal safety nets. On average, households have access to 2.5 of six types of safety nets.

Another element of absorptive capacity is how well a household is prepared to mitigate shocks<sup>22</sup> through the availability of disaster preparedness groups in the community, as well as other household shock mitigation strategies. On average, households score a 0.79 out of 3 on this index, suggesting a lower ability to mitigate shocks.

The last dimension of absorptive capacity is availability of humanitarian assistance in the community. A large majority of households (82%) reported that they have received emergency food or cash assistance from the government or a non-governmental organization (NGO).<sup>23</sup> The presence of humanitarian assistance might be heightened by the ongoing drought. Nevertheless, it is one of the few absorptive capacity resources that households currently have access to.

### 3.9.4 Adaptive Capacity Index

The adaptive capacity index measures the ability of households to manage resources and make proactive and informed choices in order to better prepare for and adapt to future shocks. The index is composed of several components that reflect different resources or adaptive abilities. On average, households score a 39.7 out of 100 on this index,<sup>24</sup> which suggests that households have a limited ability to manage resources and adapt to future shocks. Below we discuss the results of the components of the adaptive capacity index. Similar to the absorptive capacity index, the low score on the adaptive capacity index likely reflects the ongoing humanitarian emergency situation. Households across the treatment and control groups perform similarly on this score.

**Table 55. Adaptive capacity index**

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Household adaptive capacity index (0–100)	39.604	(0.790)	1,946	39.765	(0.738)	1,959	39.686	(0.420)	3,905
Household bridging social capital index (0–6)	1.488	(0.062)	2,317	1.498	(0.065)	2,278	1.493	(0.025)	4,595
Household linking social capital (0–4)	0.035	(0.008)	2,317	0.036	(0.007)	2,278	0.035	(0.005)	4,595
Household social network index (0–6)	1.758	(0.087)	2,317	1.810	(0.082)	2,278	1.784	(0.025)	4,595
Household education/training index (0–8)	0.750	(0.053)	2,308	0.726	(0.052)	2,271	0.738	(0.035)	4,579
Household asset ownership index - total type (0–31)	5.793	(0.108)	2,290	5.747	(0.111)	2,246	5.770	(0.063)	4,536

<sup>22</sup> This index does not include whether household reports participating in any of the following activities: soil conservation activities, flood diversion structures (i.e., protection of land/infrastructure from flooding), planting trees on communal land, or improving access to health services given available data.

<sup>23</sup> Note that this index does not capture whether NGO/government assistance is available in their community but they have not received it.

<sup>24</sup> We followed precedent with TANGO and did not exclude factors that loaded negatively on the first component in the construction of this index. This is because we want the indices to be comparable across BL and EL (where at EL the factors that load negatively may be different). However, the two scores are comparable on average.

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Household access to financial resources (0–2)	0.799	(0.069)	2,317	0.804	(0.062)	2,278	0.801	(0.019)	4,595
Household livelihood diversification index (0–20)	1.958	(0.049)	2,317	2.033	(0.057)	2,278	1.996	(0.028)	4,595
Household adoption of improved practices index (0–1)	0.110	(0.017)	2,176	0.123	(0.019)	2,141	0.117	(0.008)	4,317
Household exposure to information index (0–19)	2.436	(0.179)	2,317	2.485	(0.183)	2,278	2.460	(0.077)	4,595
Household aspirations/confidence to adapt index (0–16)	8.773	(0.132)	2,082	8.815	(0.113)	2,084	8.794	(0.070)	4,166

One aspect of the adaptive capacity index captures households' social capital and networks, given that households that are able to leverage these networks more effectively may better prepare for and adapt to future shocks. Across these indicators, households score poorly, suggesting that households are not able to effectively leverage social capital and networks in order to adapt to shocks. In particular, the bridging social capital index reflects the number of types of individuals that households could draw on outside of their communities (out of six groups). On average, households feel able to draw on 1.5 of these types of individuals. The linking social capital index reflects how well-connected households are to government or NGO leaders and whether they can draw on them for help. Households score very low (0.04 out of 4) on this suggesting that the majority of households neither know leaders nor are they able to ask leaders for help. Finally, the social network index captures household access to and participation in various support groups. Households score a 1.8 out of 6 suggesting that only a minority of households have access to and/or participate in these groups.

Another aspect of the adaptive capacity index captures the human resources, assets and financial resources available to households in order to mitigate shocks. Overall, households have low levels of human capital and asset resources, suggesting constraints on the overall resource pool they are able to draw on in the face of shocks. The education/training index reflects the level of human capital in the household, specifically adult literacy, whether any adult has surpassed primary school, and the number of trainings household adults have participated in. Households score very low (0.8 out of 8) on this indicator, reflecting that overall household human capital is low. The asset ownership index illustrates the number of different types of assets a household owns (out of 31 types). On average, a household owns 5.8 different types of assets. This could mean that overall household asset stock is low, although this does not reflect the value of each asset. Finally, the access to financial resources index reflects the financial resources available in the village through credit and savings institutions. Households have on average 0.8 out of two of these institutions available to them.

A third aspect of the adaptive capacity index reflects how diversified and improved household livelihood activities are. In summary, household activities are not well-diversified and few households have adopted improved practices. The livelihood diversification index reflects the number of different livelihood activities households were engaged in over the past year. Overall, households were engaged in an average of 2.0 out of 20 activities indicating that activities are not well-diversified. The adoption of

improved practices index<sup>25</sup> reflects whether households adopted improved crop or livestock practices, natural resource management practices, or improved storage practices. Overall, households score 0.11 out of 1 indicating that only a minority of households have adopted improved practices. The exposure to information index captures the number of topics that households have received information on in the past year, which relates directly to a household’s ability to make informed choices in order to better prepare for shocks. On average, households have received information on 2.5 out of 19 available topics, highlighting that households have had limited exposure to information to help inform shock mitigation strategies.

Finally, the aspirations/confidence to adapt index reflects a household adult’s aspirations, confidence to adapt, and a sense of control over her life. On average, adults score 8.8 out of 16 on this index reflecting a moderate sense of confidence to adapt.

### 3.9.5 Transformative Capacity Index

The transformative capacity index<sup>26</sup> captures system-level resources, governance, and institutions that comprise the enabling environment which promotes or limits a household’s capacity to respond to shocks and stressors. On average, households score 70.3 out of 100 on this index<sup>27</sup> indicating that there are moderately strong institutions available to enhance household capacity to respond to shocks. Households across the treatment and control groups perform similarly on this score. Below we discuss the results of the components of the transformative capacity index.

**Table 56: Transformative capacity index**

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Household transformative capacity index (0–112)	70.101	(3.431)	2,153	70.459	(3.600)	2,154	70.283	(0.711)	4,307
Household access to infrastructure index (0–3)	0.958	(0.060)	2,317	0.953	(0.056)	2,278	0.955	(0.011)	4,595
Household basic services index (0–4)	2.542	(0.081)	2,317	2.581	(0.081)	2,278	2.561	(0.021)	4,595
Household access to markets index (0–1)	0.91	(0.026)	2,317	0.899	(0.030)	2,278	0.904	(0.008)	4,595
Household access to communal natural resources index (0–4)	0.486	(0.077)	2,317	0.480	(0.074)	2,278	0.483	(0.023)	4,595

<sup>25</sup> This index was created differently given available data. We create a binary variable if respondents report three or more improved crop *or* livestock practices in total versus a binary if respondents report three or more crop practices *or* three or more livestock practices.

<sup>26</sup> Note that this index does not include the following sub-indices given data availability: access to livestock services and collective action.

<sup>27</sup> We followed precedent with TANGO and did not exclude factors that loaded negatively on the first component in the construction of this index. This is because we want the indices to be comparable across BL and EL (where at EL the factors that load negatively may be different). For the case of the transformative index, the index that adjusts for negative factors is 35.11 on average across the sample. The main driver between these scores is that the infrastructure factor gets more weight in the score we show here.

Outcome	Control			Treatment			All		
	Mean	SE	N	Mean	SE	N	Mean	SE	N
Household access to agricultural services index (0–1)	0.257	(0.055)	2,317	0.287	(0.056)	2,278	0.272	(0.018)	4,595
Household bridging social capital index (0–6)	1.488	(0.062)	2,317	1.498	(0.065)	2,278	1.493	(0.025)	4,595
Household linking social capital index (0–4)	0.035	(0.008)	2,317	0.036	(0.007)	2,278	0.035	(0.005)	4,595
Household social cohesion index (0–3)	0.109	(0.037)	2,317	0.120	(0.037)	2,278	0.114	(0.014)	4,595
Household local decision-making index (0–1)	0.228	(0.027)	2,153	0.259	(0.027)	2,154	0.244	(0.013)	4,307
Household gender index (0–3)	1.953	(0.021)	2,317	1.955	(0.021)	2,278	1.954	(0.008)	4,595
Household gender equitable decision-making index (0–2)	0.705	(0.036)	2,317	0.718	(0.030)	2,278	0.712	(0.010)	4,595
Household access to formal safety nets index (0–13)	3.047	(0.150)	2,317	3.178	(0.171)	2,278	3.113	(0.050)	4,595
Household local government responsiveness index (0–2)	0.064	(0.037)	2,317	0.068	(0.041)	2,278	0.066	(0.004)	4,595

One dimension of the transformative capacity index is the accessibility of infrastructure and services in the community. While few communities have key infrastructure, most have access to basic services. The access to infrastructure index<sup>28</sup> reflects how many types of key infrastructure (electricity grid, piped water, mobile phone service) are available in the community. On average, households have access to 0.96 out of three of these types of key infrastructure. The basic services index<sup>29</sup> illustrates the number of services (police force, primary schools, health and financial services) that are available in a community. Households have access to 2.6 out of four of these services on average.

The next dimension of the transformative capacity index is the availability of economic institutions to support livelihoods. Access to these economic institutions is varied. The majority (90%) of households have access to markets.<sup>30</sup> Only one-quarter (27%), however, report having access to agricultural extension services.<sup>31</sup> Few households have access to natural communal resources: on average households have access to only 0.48 out of four natural communal resources (communal grazing land, water source, firewood, and irrigation source).

<sup>28</sup> As access to roads is not available, this index was calculated using the other three service types instead.

<sup>29</sup> This index does not include a measure of quality for each of the service types. Instead, it only captures whether or not the service exists. Health services reflect whether NGOs are currently conducting health activities and not whether local health institutions are available.

<sup>30</sup> We assumed that any community in which a household reported selling to a local market had access to a market.

<sup>31</sup> This index was calculated based on percentage using agricultural extension services versus those with access given available data.

Another aspect of the transformative capacity index reflects the strength of households to support themselves through their networks. Overall, the ability for households to draw on their networks is low. In particular, the bridging social capital index reflects the number of types of individuals that households could draw on outside of their communities (out of six groups). On average, households feel able to draw on 1.5 of these types of individuals. The linking social capital index reflects how well-connected households are to government or NGO leaders and whether they can draw on them for help. Households score very low (0.04 out of 4) on this suggesting that the majority of households either do not know leaders or are not able to ask leaders for help. The social cohesion index<sup>32</sup> illustrates how active households have been in various support groups in the village. On average, households report engaging in 0.11 out of three support groups reflecting that participation in support groups is not common. Finally, the local decision-making index reflects how actively households participate in groups in their communities. About one-quarter of households (24%) report active participation.

Another dimension captured by the transformative capacity index is the extent to which there are gender-related barriers in the community. Overall, there seem to be a moderate number of gender-related barriers in the community. The gender index reflects constraints to gender-neutral behavior at the community level. On average, communities report 2.0 out of three gender-neutral behaviors are norms. The gender equitable decision-making index<sup>33</sup> reflects how equitable decision-making is across male and female adults within the same household. On average, households score 0.71 out of 2 on this index reflecting that out of two key household decisions, on average 0.71 involve both male and female household members.

A final dimension of the transformative capacity index is how available and reliable external sources of support are. Overall, households have access to a low number of these external resources. The formal safety nets index reflects the number of external safety nets (e.g., emergency food or cash assistance, agricultural inputs) available in the community. Overall, households have access to 3.1 out of 13 formal safety nets. The government responsiveness index reflects whether households have access to a reliable police force and a peace committee.<sup>34</sup> On average, households have access to 0.07 of two of these resources, indicating that very few households have access at all.

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<sup>32</sup> This index ranges from 0–3 instead of 0–4 as we do not have data on whether community members came together for social events.

<sup>33</sup> This index does not include measures of equitable decision-making around nutrition and child health as well as around savings. Thus, the index ranges from 0–2 instead of 0–4.

<sup>34</sup> This indicator also corresponds to BL 24% of households that believe local government will respond effectively to future shocks and stresses.

## 4. COMPARISON OF TREATMENT AND CONTROL GROUPS

Based on the data collected in the BL round, the research can evaluate the overall comparability of the treatment and control groups. This is done by comparing the mean values of a range of demographic and household level characteristics and identifying any trends of statistically significant differences between the two. The table below illustrates the results of this exercise and confirm that the treatment and control group are, overall, balanced. There are no statistically significant differences in means between the two household groups at BL. Furthermore, a joint test of orthogonality demonstrates that the BL characteristics do not predict treatment status (p value = 0.365). Additional balance tables between treatment and control groups are in Annex A of this report.

**Table 57. Household roster balance table**

Outcome	Control		Treatment		Difference	P-value
	Mean	N	Mean	N		
Average age of people in the household roster	17.455	12,664	17.515	12,248	0.06	0.861
Percent of females in the household roster	52.409	12,665	52.488	12,248	0.079	0.916
Percent of farmers in the household roster	44.956	5,134	46.163	4,992	1.207	0.569
Percent of people with at least some schooling in the household roster	52.128	9,550	52.308	9,207	0.18	0.96
Percent of people who worked for cash in the roster	41.334	6,245	41.586	6,112	0.252	0.909
Percent of households with adult male and female present in the roster	70.059	2,317	68.712	2,278	-1.347	0.489
Percent of households with adult female only present in the roster	25.828	2,317	28.209	2,278	2.381	0.212
Percent of households with adult male only present in the roster	4.113	2,317	3.078	2,278	-1.035	0.122
<b>Household Head</b>						
Average age of heads of households in the roster	42.417	2,317	42.337	2,274	-0.081	0.923
Percent of female head of households in the roster	36.817	2,319	38.702	2,275	1.885	0.344
Percent that did not attend school in the roster	68.922	2,319	67.894	2,275	-1.029	0.754
Percent of people in the roster with some schooling, less than primary	15.002	2,319	16.878	2,275	1.876	0.262
Percent of people in the roster that completed Primary or more	15.923	2,315	15.105	2,272	-0.818	0.755

\*Denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. The p-value for a joint test of orthogonality is 0.365

## 5. CONCLUSION

The indicators presented in this report from the BL survey for the Maharo RFSa reflect the severe food security crisis in southern Madagascar. Nearly 90% of the population is living on less than \$1.90 per day. Nearly all households cite the ongoing drought as one of the major shocks the household has faced. When asked how their ability to meet food needs has changed in the last 12 months, 95% said their situation is worse today and 78% said they foresee things getting even worse in the coming year. FCSs and dietary diversity for women and children are all extremely low. Dietary diversity scores of zero, zero reported consumption, and zero agricultural production are outcomes that would be considered reporting errors in most surveys but were verified by supervisors in the field.<sup>35</sup> Adaptive and absorptive resilience capacities to mitigate these shocks are indicated to be low.

The results underscore the need for the types of livelihood support being provided by Maharo's activities. The survey design and results from the EL survey will provide the opportunity to assess the impact of additional activities beyond emergency aid. However, there are significant challenges ahead for the evaluation.

First, a significant number of households have migrated out of the area or have migrated internally and may continue to do so. This suggests that there will be significant attrition at EL. Furthermore, this type of attrition is particularly problematic because it is driven by the same factors the IE is tasked with evaluating.

Second, the treatment areas appear to be somewhat better off than control areas at BL. For example, expenditure is slightly higher, while depth of poverty and prevalence of underweight and severely underweight children are lower, and more children have a MAD in the treatment areas. However, as shown in the balance tables in the annex, most of these differences are not statistically significant when controlling for the clusters and matched pairs. Furthermore, the advantage of the RCT design with BL data is that we are able to control for these differences and they should not pose a problem for the evaluation.

Third, because of the ongoing crisis in the region, there are other organizations working in these areas providing emergency aid and other assistance. These other interventions may make it difficult to isolate the effect of the additional CRS programming in treatment areas.

Finally, the effect of agricultural interventions will be limited if the drought persists. Roughly 70% of farmers reported having no production and investments in the sector are unlikely to show positive results at EL unless conditions improve.

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<sup>35</sup> A 24 hour period without reported food consumption is not surprising given the extreme drought conditions. This was further validated by the coping strategies people reported which includes begging and relying on charity.

## ANNEX A: BALANCE TABLES

**Table 58. Food security**

Outcome	Control		Treatment		Difference	P-value
	Mean	N	Mean	N		
Household FCS (0–112)	24.869	2,241	25.842	2,223	0.973	0.351
Household poor consumption score (<22)	47.175	2,241	43.076	2,223	-4.099	0.286
Household borderline consumption score (22–35)	35.781	2,241	36.645	2,223	0.864	0.793
Household acceptable consumption score (>35)	17.044	2,241	20.279	2,223	3.235	0.379
Households worried about not having enough food to eat because of a lack of money or other resources	99.637	2,241	99.07	2,223	-0.567	0.174
Households unable to eat healthy and nutritious food because of a lack of money or other resources	99.142	2,241	99.132	2,223	-0.009	0.99
Households that ate only a few kinds of foods because of a lack of money or other resources	99.309	2,241	99.106	2,223	-0.203	0.692
Households that skipped a meal because there was not enough money or other resources	94.012	2,241	92.735	2,223	-1.276	0.421
Households that ate less than you thought you should because of a lack of money or other resource	98.771	2,241	97.136	2,223	-1.635	0.06
Household that did not have food because of a lack of money or other resources	82.579	2,241	80.194	2,223	-2.385	0.423
Households that are hungry but did not eat because there was not enough money or other resource	83.54	2,241	80.423	2,223	-3.117	0.331
Households that went without eating for a whole day because of a lack of money or other resource	79.202	2,241	75.13	2,223	-4.072	0.269

\*Denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. The p-value for a joint test of orthogonality is 0.567

**Table 59. Child nutrition and health**

Outcome	Control		Treatment		Difference	P-value
	Mean	N	Mean	N		
MDD children ages 6–23 months	0.024	814	0.038	823	0.015	0.404
MAD children ages 6–23 months	0.018	814	0.028	823	0.011	0.44
Exclusively breastfed under 6 months of age	0.389	222	0.384	200	-0.005	0.948
Children under 5 children who had diarrhea	0.347	2,682	0.341	2,468	-0.006	0.831
Children under 5 who had diarrhea and were given ORS	0.145	875	0.133	817	-0.012	0.734

**Table 60. Anthropometry**

Outcome	Control		Treatment		Difference	P-value
	Mean	N	Mean	N		
Weight-for-age Z-score	-1.642	2,900	-1.589	2,848	0.053	0.225
Children underweight (ages 0–59 months)	37.686	2,900	34.932	2,848	-2.754	0.078
Children severely underweight (ages 0–59 months)	15.552	2,900	14.152	2,848	-1.4	0.221

**Table 61. Women's health, maternal nutrition, and reproductive health**

Outcome	Control		Treatment		Difference	P-value
	Mean	N	Mean	N		
Women of reproductive age (15–49) with MDD	0.015	2,084	0.019	2,024	0.004	0.677
Women in a union using birth control	0.116	913	0.138	871	0.021	0.484
Women of reproductive age who had a live birth during the last five years that received ANC during last pregnancy	0.66	1,057	0.637	1,072	-0.024	0.572
Women of reproductive age in a union who have knowledge of modern family planning methods	0.884	2,274	0.89	2,213	0.006	0.77
Women of reproductive age in a union who use a modern family planning method in the last 12 months who made decisions about modern family planning methods in the past 12 months	0.896	124	0.895	134	-0.001	0.978

**Table 62. WASH**

Outcome	Control		Treatment		Difference	P-value
	Mean	N	Mean	N		
Households with access to basic drinking water services	9.612	2,312	15.71	2,272	6.098	0.174
Percent of households with improved water source	42.141	2,313	42.905	2,274	0.765	0.923
Water source within 30 minutes per household	28.971	2,315	35.886	2,272	6.916	0.266
Water available year-round per household	84.314	2,316	80.36	2,274	-3.954	0.124
Handwashing available per household	4.875	2,039	3.638	2,038	-1.236	0.374
Households that treat their water	43.119	2,316	39.889	2,274	-3.23	0.571
Households that treat water by adding bleach or chlorine before drinking	5.116	2,316	4.687	2,274	-0.428	0.737
Households that treat water by flocculation before drinking	27.215	2,316	24.574	2,274	-2.641	0.497
Households that treat water by filtration before drinking	3.455	2,316	3.256	2,274	-0.199	0.832
Households that treat water by solar disinfection	13.522	2,316	13.484	2,274	-0.038	0.988
Households that treat water by boiling before drinking	0.313	2,316	0.42	2,274	0.106	0.628
Households practicing open defecation	55.84	2,316	57.956	2,274	2.117	0.661

Outcome	Control		Treatment		Difference	P-value
	Mean	N	Mean	N		
Households using improved sanitation facilities	14.14	2,316	16.266	2,274	2.127	0.461
Household water use per capita (liters)	7.471	1,086	8.276	1,016	0.805	0.182

\*Denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. The p-value for a joint test of orthogonality is 0.940

**Table 63. Agriculture—cassava, sorghum, and cowpea**

Outcome	Control		Treatment		Difference	P-value
	Mean	N	Mean	N		
Farmers using at least one practice for cassava	60.538	1,536	57.536	1,509	-3.002	0.518
Farmers sowing after significant rain for cassava	27.739	1,564	27.291	1,524	-0.449	0.915
Farmers interplanting for cassava	36.569	1,564	34.844	1,524	-1.725	0.72
Farmers wind break for cassava	16.067	1,564	13.352	1,524	-2.715	0.439
Farmers not using improved practices for cassava	40.149	1,564	42.555	1,524	2.406	0.598
Farmers using at least one practice for sorghum	85.262	192	72.338	198	-12.924	0.056
Farmers sowing after significant rain for sorghum	49.809	193	44.076	200	-5.733	0.594
Farmers interplanting for sorghum	70.847	193	59.609	200	-11.239	0.177
Farmers using crop rotation for sorghum	30.178	193	22.021	200	-8.157	0.471
Farmers using wind break for sorghum	23.813	193	20.556	200	-3.257	0.685
Farmers not using improved practices for sorghum	14.618	193	28.084	200	13.465	0.046
Farmers using at least one practice for cowpea	64.701	1,525	64.347	1,602	-0.354	0.931
Farmers sowing after significant rain for cowpea	34.454	1,532	34.169	1,613	-0.285	0.941
Farmers interplanting for cowpea	46.403	1,532	43.453	1,613	-2.95	0.556
Farmers using crop rotation for cowpea	6.95	1,532	5.365	1,613	-1.585	0.553
Farmers using wind break for cowpea	16.342	1,532	15.7	1,613	-0.642	0.863
Farmers not using improved practices for cowpea	35.85	1,532	35.91	1,613	0.06	0.988
Farmers using agricultural credit	4.825	2,167	4.575	2,187	-0.25	0.842
Farmers who saved	3.573	2,196	2.517	2,208	-1.057	0.243
Farmers using insurance	0.067	2,196	0.095	2,208	0.029	0.806
Farmers reporting at least one value chain activity	25.674	1,460	24.113	1,448	-1.561	0.72

\*Denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. The p-value for a joint test of orthogonality is 0.000

**Table 64. Agriculture–yield**

Outcome	Control		Treatment		Difference	P-value
	Mean	N	Mean	N		
Farmers reporting zero cassava production	66.744	1,548	67.515	1,522	0.771	0.71
Farmers reporting cassava yield	1,401.987	458	1,269.36	409	-132.627	0.327
Farmers reporting zero cowpea production	73.841	1,529	75.727	1,611	1.886	0.319
Farmers reporting cowpea yield	386.71	304	336.364	320	-50.346	0.284
Farmers reporting zero sorghum production	69.395	193	73.051	211	3.656	0.474
Farmers reporting sorghum yield	364.615	37	334.596	28	-30.018	0.807

\*Denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. The p-value for a joint test of orthogonality is 0.068

**Table 65. Poverty measurements**

Outcome	Control		Treatment		Difference	P-value
	Mean	N	Mean	N		
Poor per household	89.896	2,317	89.739	2,278	-0.157	0.918
Daily per capita expenditure (Ariary) per household	1,243.118	2,317	1,302.017	2,278	58.899	0.356
Daily per capita expenditure (Dollars) per household	0.967	2,317	1.013	2,278	0.046	0.356

\*Denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. The p-value for a joint test of orthogonality is 0.325

**Table 66. Use of financial resources**

Outcome	Control		Treatment		Difference	P-value
	Mean	N	Mean	N		
Women and men in a union who earned cash in the past 12 months	0.518	2,607	0.522	2,543	0.004	0.924
Women in a union earning cash who report participation in decision about the use of self-earned cash	0.811	456	0.828	416	0.017	0.753
Men in a union earning cash who report spouse/partner participation in decisions about the use of self-earned cash	0.736	913	0.753	929	0.017	0.665

**Table 67. Credit**

Outcome	Control		Treatment		Difference	P-value
	Mean	N	Mean	N		
Men and women in a union who have access to credit	0.368	2,356	0.357	2,328	-0.01	0.791
Men and Women in a union who report making the borrowing decision	0.662	887	0.654	821	-0.008	0.731

**Table 68. Female household input**

Outcome	Control		Treatment		Difference	P-value
	Mean	N	Mean	N		
All women in a union	0.477	1,250	0.519	1,181	0.042	0.299

\*Denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. The p-value for a joint test of orthogonality is 0.299

**Table 69. Resilience**

Outcome	Control		Treatment		Difference	P-value
	Mean	N	Mean	N		
Household adaptive capacity index (0–100)	39.604	1,946	39.765	1,959	0.161	0.899
Household bridging Social Capital index (0–6)	1.488	2,317	1.498	2,278	0.011	0.926
Household linking social capital (0–4)	0.035	2,317	0.036	2,278	0.001	0.937
Household social network index (0–6)	1.758	2,317	1.81	2,278	0.052	0.747
Household education/training index (0–7)	0.75	2,308	0.726	2,271	-0.025	0.753
Household asset ownership index—total type (0–31)	5.793	2,290	5.747	2,246	-0.046	0.8
Household access to financial resources (0–2)	0.799	2,317	0.804	2,278	0.005	0.968
Household livelihood diversification index (0–20)	1.958	2,317	2.033	2,278	0.075	0.407
Household adoption of improved practices index (0–1)	0.11	2,176	0.123	2,141	0.013	0.673
Household exposure to information index (0–19)	2.436	2,317	2.485	2,278	0.049	0.88
Household aspirations/confidence to adapt index (0–16)	8.773	2,082	8.815	2,084	0.041	0.84
Household absorptive capacity index (0–100)	33.626	2,130	33.496	2,091	-0.13	0.917
Household access to cash savings index (0–1)	0.034	2,313	0.029	2,277	-0.005	0.723
Household asset ownership index—total type (0–31)	5.793	2,290	5.747	2,246	-0.046	0.8
Household remittances index (0–1)	0.022	2,272	0.015	2,214	-0.007	0.165
Household access to insurance index (0–1)	0.001	2,176	0.001	2,141	0	0.804
Household bonding Social Capital index (0–6)	1.751	2,317	1.752	2,278	0.001	0.991
Household access to informal safety nets index (0–6)	2.494	2,317	2.484	2,278	-0.01	0.976
Household shock preparedness & responsiveness index (0–3)	0.792	2,317	0.794	2,278	0.002	0.985
Household access to humanitarian assistance index (0–1)	0.813	2,317	0.826	2,278	0.014	0.76
Household transformative capacity index (0–100)	66.712	2,153	67.294	2,154	0.582	0.93
Household access to formal safety nets index (0–13)	3.047	2,317	3.178	2,278	0.131	0.668
Household access to markets index (0–1)	0.91	2,317	0.899	2,278	-0.012	0.833
Household access to communal natural resources index (0–4)	0.486	2,317	0.48	2,278	-0.006	0.969
Household basic services index (0–4)	2.542	2,317	2.581	2,278	0.039	0.803
Household access to infrastructure index (0–3)	0.958	2,317	0.953	2,278	-0.006	0.961
Household access to agricultural services index (0–1)	0.257	2,317	0.287	2,278	0.03	0.777

Outcome	Control		Treatment		Difference	P-value
	Mean	N	Mean	N		
Household bridging Social Capital index (0–6)	1.488	2,317	1.498	2,278	0.011	0.926
Household linking social capital (0–4)	0.035	2,317	0.036	2,278	0.001	0.937
Household social cohesion index (0–3)	0.109	2,317	0.12	2,278	0.011	0.868
Household gender equitable decision-making index (0–2)	0.705	2,317	0.718	2,278	0.013	0.832
Household local decision-making index (0–1)	0.228	2,153	0.259	2,154	0.031	0.512
Household local government responsiveness index (0–2)	0.064	2,317	0.068	2,278	0.005	0.951
Household gender index (0–3)	28.922	2,317	28.673	2,278	-0.249	0.788
Household ability to recover from shocks & stresses index	2.178	2,012	2.237	1,989	0.059	0.521
Household index of social capital at household level (0-100)	40.357	2,317	40.507	2,278	0.15	0.952

*\*Denotes significance at 10 pct., \*\* at 5 pct., and \*\*\* at 1 pct. The p-value for a joint test of orthogonality is 0.703*

## ANNEX B: RISK MITIGATION PLAN

### Project Title

Maharo Impact Evaluation

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### Version Date

This protocol was developed on December 30, 2020 and updated on June 22, 2021

### Context

Per the goals and objectives of improving food security and promoting well-being and welfare among beneficiary communities, the Maharo RFSA activities aim to provide a range of support services to a large population of households in Southern Madagascar. The Maharo RFSA activities will include but are not limited to the provision of food assistance as well as maternal health support for mothers and their children, particularly in the early stages of childhood development. In addition to these services, the RFSA will also include a range of tailored livelihood support activities. While general RFSA support will be delivered unconditionally in the region of focus, livelihood activities will be designed to be targeted to specific communities. The delineation between communities that receive a RFSA package activities with and without the additional livelihood support will allow for the ability to design an experimental impact evaluation to estimate the marginal benefit of these livelihood activities. Experimental impact evaluation to estimate the marginal effect of the "full" RFSA package in this context.

### Evaluation Design

The evaluation team will conduct a clustered RCT to estimate the marginal impact of the Maharo RFSA intervention on food security and other well-being indicators in selected communities. The approach will use statistical analysis to estimate the direct impact of livelihood support activities on communities receiving RFSA support using standard BHA food security and health indicators<sup>36</sup>. The design will maximize the ability for the research to measure direct and attributional impacts and will employ

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<sup>36</sup> <https://www.usaid.gov/food-assistance/partner-with-us/implementation-and-reporting>

statistical tools and methodologies, specifically randomization, ex-ante matching, and regression analysis.

### Identification Strategy

**Implementer-defined clusters:** Following an in-country field visit and evaluability assessment in January 2020, village or fokontany-level randomization was deemed infeasible because (1) villages or fokontany within the target area are too small to practically implement within, and (2) the definitions of fokontany in this area are dynamic and highly subject to change. The commune is the next highest level of administration. However, there are only 20 communes in the Maharo intervention areas—fewer than would be required for statistical power—ruling this out as an enumeration area for the purposes of randomization. CRS proposed defining “implementation clusters” composed of groups of fokontany that could be served by a CRS team. CRS identified 218 of these clusters in the target area, each with an average of 3 fokontany per cluster, to be used as the sampling frame. The “implementation clusters” approach should ensure that a statistically adequate number of treatment and control clusters can be assigned.

### Randomization Strategy

CD will use a two-stage randomization strategy to select final treatment and control communities and households. On the cluster level, CD will use a matched pair randomization approach (rather than stratified random sampling) to ensure better balance prior to BL data collection. In the matched pair randomization, units will first be matched based on variables related to outcomes. In other words, clusters that look “similar” based on available data will be paired together. One unit from each pair will then be randomly assigned to treatment and the other to control. This process will then be used to generate matched pairs that will be utilized in the randomization exercise. CRS has provided information on the estimated number of households, number of potential beneficiaries, access to a river, access to a market, proximity to the coast, and presence of a clinic for each of the 217 clusters. Based on these data we formed 98 pairs of clusters for the matched-pair randomization. This has resulted results in 98 treatment areas and 98 control areas with 21 unassigned areas where CRS is free to implement as it sees fit. Prior to assignment, the CRS team verified that the matches were reasonable based on knowledge of the areas.

The second stage of randomization will involve selecting fokontany within clusters and household within each fokontany. CRS conducted a household census in its intervention area in August 2020. Using this data, we will randomly sample 1-4 fokontany per cluster, based on the total population of each intervention cluster. We will then sample 12 households per fokontany.

### Inclusion and Exclusion Criteria

Inclusion criteria will be solely based on residence in Maharo RFSA program’s intervention communities that have been designated as treatment or control areas. The primary desired respondent for the quantitative surveys will be adult (ages 18 and older) financial decision makers of the home, particularly individuals most responsible for purchasing or approving the purchase of home or livelihood assets. Where household heads are not available to participate in the survey, enumerators will be instructed to consult the spouse or secondary member most responsible for purchasing assets for the home or primary livelihood.

The project will not include the following special populations:

- Adults unable to consent.
- Individuals who are not yet adults (minors): infants, children, teenagers
- Prisoners or other detained individuals.

As the study and data collection activity pose little physical risk to adult participants, the research reserves the right to interview consenting pregnant women should they fit the inclusion criteria described above.

Apart from the vulnerable populations highlighted above, the project will not impose specific exclusion criteria. All beneficiaries identified as eligible for compensation; a bar of soap will be offered.

### **Community and Government Coordination**

The unique competent authority to issue a license to conduct surveys and research to subjects in Madagascar is the Committee of Ethics of Biomedical Research at the Ministry of Public Health (CERBM). After presenting the study to this Committee by submitting all the necessary documents (including questionnaires) and after analyzing all the documents submitted, the committee concluded that it is not biomedical research and does not require a special authorization to conduct it.

### **Data Protection Processes**

Protection of privacy and household information are key concerns for the both the implementation team and the associated researcher. Currently all data collection done in the service of monitoring and implementing the existing program is subject to USAID security protocols. To minimize any vulnerability and risks of data breach, the research team will work to ensure that shared datasets are fully anonymized and cannot be linked directly to participating households.

### **Confidentiality and Data Management**

The research team will rely on existing protocols governing data privacy and confidentiality. All monitoring and survey data will continue to be housed on password protected and encrypted servers using the Survey CTO platform.

### **Provisions to Protect and Privacy Interest of Participants**

When transferring data from field surveys to the Principal Investigators for ensuing analysis, no names or means for direct identification will be included. Instead, randomized household ID numbers will be assigned to participants and. As a result, no researcher outside the original research staff will have the ability to directly link data and information to households in the study.

While the questionnaire and data collection activities do not pose any substantial physical risk or collect overly sensitive data, numerous steps will be taken to ensure to participants are protected and not exposed to any undue risk from data collection activities or enumerators. Data collection enumerators will be required to participate in training exercises to ensure compliance with research protocols and observance of risk mitigation processes. Additionally, supervisors will be dispatched with each team of enumerators to ensure adherence to data collection protocols. Spot checks will also be conducted on anonymized datasets by the research team at the outset of each of the data collection periods to help ensure data validity.

Quantitative interviews are estimated to take about one hour to complete, while interviews are scheduled to last between 45 minutes to 1.5 hours. Data will be analyzed through the scheduled end of the project.

Quantitative data collection will be conducted using electronic tablets using questionnaires designed through ODK (Open Data Kit) and collected using the Survey CTO platform.

### **Process to Document Consent (Waiver Requested)**

The research conducted will obtain verbal consent from clients before undertaking research activities and including the respondent's answer in the study. The research team requests a waiver to collecting signatures from agreeing participants for the following reasons.

A waiver of informed consent is being requested due to the nature of the research. The research team will be analyzing data with no confidential or identifying information. Furthermore, the research activity involves little to no risk to beneficiaries as it does little to change the way that normal program. 15 implementations would be done, apart from introducing different schedules for receive cash benefits. Finally, documentation of informed consent, if required, would be the only information linking the participant to the research and would introduce the only means for potentially compromising beneficiary privacy. Further explanation and rationale is given in an attached document requested by Solutions IRB. By collecting verbal consent, beneficiaries are shielded from all vulnerability of exposure posed by the research linking specific households to the study. Security and data management protocols are already in place and mandated by donor agencies for regular monitoring purposes and data is stored in password protected and encrypted servers using the Survey CTO platform. By anonymizing data before it is given to the research team, privacy concerns and risks are minimized further.

The secondary reason is that a substantial number of beneficiaries are potentially illiterate. While the project would stress that receipt of financial support would be in no way linked to participation in the study, administering a written form for beneficiaries to sign would create undue suspicion surrounding their receipt of funds.

The actions of the research team amount to researchers effectively working with an existing administrative dataset. While identifying data will be collected for basic monitoring purposes, that information would be collected regardless of the research and is governed by standing protocols and agreements with the United States Agency for International Development (USAID). Data shared with the research team will be fully anonymized meaning that there would effectively be little to no risk to beneficiary confidentiality as a result of participation in the study.

The following language will be conveyed to all research participants at all rounds of data collection:

**Title of Research: IMPEL Maharo Impact Evaluation**

**Investigators: Christine Moser, Reimar Macaranas**

#### Purpose of the Research

Hello, my name is [ENUMERATOR]. I am working with Consultant Associates in Madagascar on behalf of Causal Design, a US company that does research on programs that support communities in Madagascar. We are speaking with households in your area to learn more about

how families and communities support themselves and respond to challenges. Your household was selected to be interviewed to learn how you have been affected by different challenges and how your family responded to them. Households like yours were selected because they live in an area where Catholic Relief Services, CRS, is delivering the Maharo program and its activities.

#### Explanation of Procedures

The interview may take up between 1 hour and 2 hours to finish. We will ask to interview different members of your household. We will ask many things about your daily life in the survey and hope that none of the questions make you or your family members uncomfortable. If I ask you any questions you or your family members don't want to answer, let me know and I will go on to the next question. You can also stop the interview at any time. If you decide not to participate in this survey or if you withdraw from participating at any time, you will not be punished in any way. Your privacy is important to us. We hope you will agree to answer the questions since your views and experiences are important. Choosing to participate will not do anything to change the services and support you receive from the Maharo program.

#### Risks

There is little risk to you and your household for sharing your experiences. We have taken care to protect you and your household against the COVID-19 virus. We will wear masks during the interview and maintain a 2-meter distance from you and the people in your household. We will be weighing children during this survey and to make sure that we keep you and your household safe we have cleaned the scales, washed our hands with disinfectant, and we will still have our masks on. Your responses will help organizations like CRS better understand how to improve programs and provide support in the future.

#### Benefits

There is no direct benefit to your household for sharing your experiences. Your responses will help organizations like CRS better understand how to improve programs and provide support in the future. At the end of the interview, we will provide a small gift, a small packet of soap, for your participation.

#### Confidentiality

If you agree to participate, the information will be entered into a database that will be used to understand how people in your community live their lives and do daily activities. Some of the information you provide will be available on a public website that researchers and others will be able to access, but all personal information will be kept confidential and not made public. There will be no audio or video recording of this interview. We will ask you for personal information now to make sure that we can visit you at the end of the project about 5 years from now to ask you the same types of questions but will remove all personal identifying information after we have finished collecting your responses at the end of the research. Any data attached to your personal information will be stored in a password protected electronic format.

### Questions

Do you have any questions about the survey or what I have said? If in the future you have any questions regarding the survey or the interview, or concerns or complaints, we welcome you to contact Consultant Associates or Causal Design. You can reach us at [info@causaldesign.com](mailto:info@causaldesign.com) or (720) 260-4837.

If you have questions about your rights as a research participant or concerns or complaints about the research, you may contact the Solutions IRB at (855) 226-4472. This organization is based in the United States. Regular hours for Solutions IRB are 8:00 a.m. to 5:00 p.m. CT, Monday through Friday. You can also email them at [participants@solutionsirb.com](mailto:participants@solutionsirb.com)

We will leave a copy of this statement and our organization's complete contact information with you so that you may contact us at any time. Do you agree to participate in the survey?

### **Incomplete Disclosure or Deception**

The study will not attempt to use any means of incomplete disclosure or deception in its data collection efforts.

### **Recruitment**

Participants will be recruited based on availability and satisfaction of eligibility criteria.

### **Risk to Participants**

The study team foresees that the overall risks to participants of the research study is low. There is little to no danger of physical strain given that data collection is primarily through self-reported answers. The bulk of questions deal with common behaviors around household decision making, interactions with other community members, and information around livelihood decisions. Participation is not required and households that refuse to take part in the research will still be allowed to receive humanitarian and livelihood services. There is the potential risk that for some, discussions around group dynamics may be uncomfortable. The participant will be reminded that no answer is required and that he/she is free to not give a response to any specific question.

Should a participant desire to withdraw from the interview, enumerators will be instructed to end the discussion, thank the participant for their time and exit the household. Data collected from withdrawn interviews will be excluded from analysis in the study.

Additionally, any critical findings relevant to individual well-being and/or health will immediately be shared with local authorities and with households.

### **COVID-19 Considerations**

Any unexpected vulnerability or dangers that the research may have exposed participants to at any point during the study, including incidental exposure to the coronavirus will be communicated through local channels. A detailed COVID-19 safety protocol has also been developed and subsequently reviewed and approved by USAID staff to minimize the risk to households.

### **Potential Benefits to Participants**

The research provides no foreseeable channels for providing additional benefits to respondents or their families outside of original intervention.

### **Financial Compensation**

Survey respondents will not receive financial compensation in exchange for providing survey responses. The data collection team is authorized, however, to provide a nominal gift (approx. value 1-2 USD) to recognize the time given by the household to the research.

### **Qualifications to Conduct Research and Resources Available**

Causal Design is experienced in research methods and protocols and has completed learning modules on ethics and proper principles around human subject testing, research, and confidentiality. Additionally, all Principal Investigators associated with the project have similar certification. These are in line with current HIPAA standards and was administered by the Collaborative Institutional Training Initiative (CITI). Human Research Completion Reports for all Principal Investigators will be provided to the IRB for verification and can be provided upon request.