Agriculture to Nutrition (ATONU): Evaluation of Integrated Agriculture and Nutrition-Sensitive Interventions for the African Chicken Genetic Gains (ACGG) Program in Ethiopia - Baseline Data

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ATONU agriculture to nutrition

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Executive Summary

The Agriculture to Nutrition (ATONU): Improving Nutrition Outcomes Through Optimized Agricultural Investments Project, led by the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN), aims to develop, implement, and evaluate nutrition-sensitive interventions within the context of existing smallholder farming households with the goal of improving the nutritional status of women of reproductive age and young children, particularly in the first 1,000 days of life. ATONU is implementing a package of nutrition-sensitive interventions in Ethiopia in collaboration with the African Chicken Genetic Gains (ACGG) Program, led by the International Livestock Research Institute (ILRI). ACGG and ATONU are implementing two interventions: (1) distribution of high-producing and adapted chicken genotypes to poultry producing households ("ACGG"); and (2) a behavior change communication (BCC) intervention on poultry-specific aspects of nutrition, water, sanitation, and hygiene (WASH), women's empowerment, and use of household income combined with home gardening ("ATONU").

A cluster-randomized study design is evaluating the effect of the ATONU and ACGG interventions on the primary outcome of dietary diversity among women of reproductive age living in small poultry producer households. Secondarily, the study will also examine the effect of the interventions on women's and young children's nutritional and anemia status. The clusters used are kebeles, the smallest administrative unit in Ethiopia. Kebeles participating in the ACGG intervention were randomly assigned to one of two treatment arms: (1) ACGG alone, or (2) ACGG + ATONU. Using the same sampling frame of kebeles used by the ACGG Program, non-ACGG kebeles were selected for the third arm: (3) control (no intervention). Data are being collected at three time points over an 18-month period using questionnaires administered by trained interviewers using electronic tablets. Questionnaires administered to household heads and women of reproductive age are collecting data on nutrition knowledge, decision-making on household budgets and expenditures, agricultural activities, diet, child feeding and health, and related domains. Anthropometric and anemia assessments are also conducted on women of reproductive age and children under the age of three years at study inception. In addition, one survey administered at the kebele level is collecting information on food availability and prices at local markets over a twelve-month period.

Baseline data collection was conducted from November to December 2016. A total of 2,117 households met the eligibility criteria and enrolled in the study. Among these, 710 households belonged to the ACGG arm, 709 households belonged to the ACGG + ATONU arm, and 698 households were in the control arm. The kebele level questionnaire was administered in each kebele. Two such interviews were done in most kebeles for a total of approximately 110 interviews. The findings from the baseline study include:

Among women of reproductive age:

- Approximately 95% of women did not meet the recommendation for adequate dietary diversity (consuming at least 5 out of 10 food groups) based on their consumption over the preceding 24 hours

- Women consumed an average of 2.7 food groups out of 10 (standard deviation 1.1) in the preceding 24 hours; or 3.8 food groups out of 10 (standard deviation 1.6) over the preceding 7 days
- Maternal nutrition status was poor with 23.7% of women with BMI less than 18.5 kg/m^2, and 5.8% of women overweight or obese
- Maternal wasting as measured by MUAC under 21cm was generally low
- 20% of women were anemic

Among young children:

- Child dietary diversity was low with children consuming on average 2.7 food groups out of 8 (standard deviation 1.4) over the preceding 24 hours; or 3.2 food groups (standard deviation 1.6) over the preceding 7 days
- Malnutrition among children was relatively high with a stunting prevalence of 36.6% (severe stunting at 14.6%), underweight at 16.1% and wasting at 5.7%
- 51% of children were anemic

Overall, the study population for this evaluation—rural, chicken-producing smallholders in Ethiopia's four main regions—are vulnerable households with high food insecurity and high prevalence of poor nutritional outcomes among women of reproductive age and young children. These outcomes are the target of the ACGG and ATONU interventions, and the findings presented in this report will serve as the baseline to evaluate these interventions.

Acronyms and Definitions

ACGG – One of the treatment arms of the study, which includes the introduction of improved and adapted chickens to farmers under the African Chicken Genetic Gains Project.

ATONU – One of the treatment arms of the study, which includes the introduction of ACGG chickens and a package of nutrition-related behavior change and home gardening interventions in the study.

BCC – Behavior change communication.

Control – control arm of the study and it does not include the introduction of chickens or the nutrition-related behavior change interventions.

DD – Refers to the dietary diversity index. There are two dietary diversity indices, one each to assess the quality of the diet for women of childbearing age, which consists of ten food groups consumed in the previous 24 hours, and children under five years of age, which consists of eight food groups consumed in the previous 24 hours. Women consuming five or more food groups are categorized as those who have met the minimum dietary diversity. Children 6-23 months of age who have met four out of seven food groups (excludes the fat and oil food group) are considered to have met the minimum dietary diversity.

DHS – Demographic and Health Survey. In this report, baseline findings are compared with the 2011 Ethiopia DHS and the Key Indicators report from 2016 Ethiopian DHS (Central Statistical Agency (CSA) [Ethiopia] and ICF International, 2012).

ETB – Ethiopian Birr. Local currency with conversion rate of 23.1 per 1 USD (June 2017 rates).

HFIAS – Household Food Insecurity Access Scale, is a validated tool that measures household access to food and is based on nine (9) item questionnaires that ask about the food insecurity experience in the previous four weeks at the time of the interview.

HH – Head of Household.

ILRI – International Livestock Research Institute.

IQR – Interquartile range.

Kebele – Ethiopian term for the smallest administrative unit, also typically known as a village. There are 60 kebeles included in the trial.

MUAC – Mid upper arm circumference.

Timad – Ethiopian unit to estimate land ownership. Four timads are equivalent to a hectare.

SNNPR – Southern Nations, Nationalities, and Peoples' Region.

WASH – Water, sanitation, and hygiene.

Woreda – Ethiopian term for second smallest administrative unit, also typically translated to district. There are 20 woredas included in the trial.

1. Introduction

Nutrition-sensitive interventions in key sectors such as agriculture can advance progress in nutrition by addressing the underlying determinants of malnutrition and enhancing the coverage of nutrition-specific interventions (Ruel & Alderman 2013). Agriculture can impact nutrition through multiple pathways, including increased availability of food through household production; increased household incomes through agriculture-related activities; changes in women's time use, empowerment, or status within the household; and environmental exposures as a consequence of agricultural activities (Gillespie et al. 2012; Webb 2013).

The Agriculture to Nutrition (ATONU): Improving Nutrition Outcomes Through Optimized Agricultural Investments Project, led by the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN), aims to develop, implement, and evaluate nutrition-sensitive interventions within the context of existing agricultural programs with the goal of improving the nutritional status of women of reproductive age and young children, particularly in the first 1,000 days of life. Specifically, ATONU is implementing a nutrition-sensitive intervention in collaboration with the African Chicken Genetic Gains (ACGG) Program, led by the International Livestock Research Institute (ILRI). ACGG is evaluating the productivity of high-producing and tropically-adapted chicken genotypes in Ethiopia and is providing 20-30 chickens to each participating smallholder farming and chicken-producing household. ATONU will implement an additional package of nutrition-sensitive interventions among ACGG households that will use behavior change communication (BCC) to encourage consumption of chicken products (meat and eggs); good water, sanitation, and hygiene (WASH) practices in poultry production; use of income from sale of chicken products to improve nutrition and health; empowerment of women in decision-making around chicken production and sale; and home gardening to produce nutrient-dense vegetables to improve dietary diversity within the household.

ACGG's intervention to increase chicken production may improve the nutritional status of women and children by increasing access to chicken meat and eggs for household consumption and empowering women through access to income, which could be used for purchase of other nutrient-dense foods. However, increasing production and income alone may not necessarily translate into improved diets or positive nutritional outcomes. ATONU's intervention specifically encourages the use of chicken products and income to provide nutritious diets for women of reproductive age and young children. Recognizing that lack of availability of other nutrient-dense foods in local markets may be a further barrier to a diverse and nutritious diet, the home gardening component of ATONU's intervention seeks to increase the availability of nutrient-dense vegetables at household level.

The ACGG program is operating in diverse agroecologies in Ethiopia. ATONU is implementing its intervention in a subset of villages in chicken producing areas that were randomly selected to participate in ACGG. Therefore, this evaluation includes two treatment arms in ACGG villages: those receiving only the poultry production intervention, and those receiving the poultry production intervention coupled with ATONU's nutrition-sensitive intervention package. Allocation of ACGG villages to one of these two groups was done randomly. The third arm of this evaluation is a control group among non-ACGG villages.

Working with ATONU and ACGG, the Harvard T.H. Chan School of Public Health is evaluating the nutritional impact of these two interventions among smallholder chicken-producing households in Ethiopia. A cluster-randomized controlled trial is being conducted with the following specific aims:

1. To estimate the effect of the ACGG intervention (increased number of improved chicken and technical support on production) on dietary diversity among women of reproductive age (18 to 49 years)
2. To estimate the additional effect of the ATONU nutrition-sensitive intervention (BCC and home gardening) in the context of ACGG on dietary diversity among women of reproductive age (18 to 49 years)
3. To estimate the combined effect of the ACGG and ATONU interventions on dietary diversity among women of reproductive age (18 to 49 years).

Objective 1 will be achieved by comparing the arm receiving only the ACGG intervention with the arm receiving no interventions. Objective 2 will be achieved by comparing the arm receiving both the ACGG and ATONU interventions with the arm receiving ACGG only. Objective 3 will be achieved by comparing the arm receiving both the ACGG and ATONU interventions with the control arm receiving no interventions.

Secondarily, this evaluation aims at estimating the effects of each intervention on weight and anemia status among women of reproductive age (18-49 years), as well as dietary diversity, growth, and anemia status in young children (aged under 3 years at enrollment). This will be achieved through the same comparisons among treatment arms as used for the primary aims.

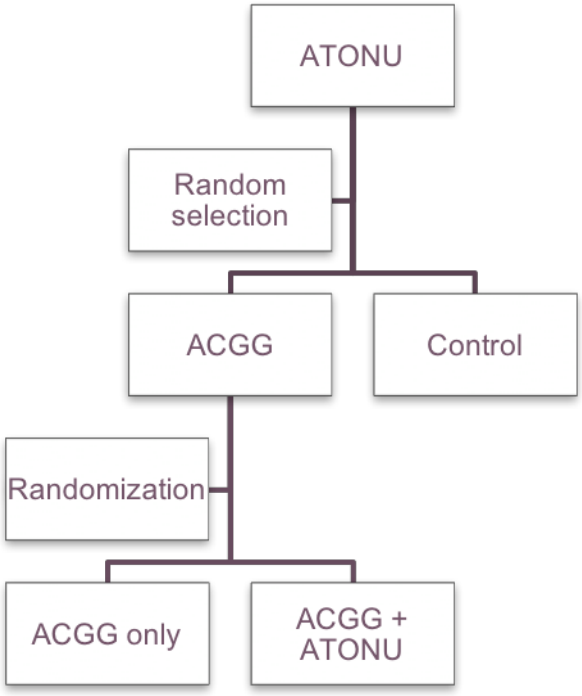
Data collection is being conducted at three time points: baseline, midline, and endline. Baseline data collection was carried out successfully in November-December 2016.

2. Methodology

This study is using a cluster randomized design to evaluate the two main interventions implemented by ACGG and ATONU (Figure 1): (1) distribution of high-producing chickens to households ("ACGG"); and (2) a BCC intervention on poultry-specific aspects of nutrition, WASH, women's empowerment, and use of income combined with home gardening ("ATONU"). Villages already participating in ACGG were randomized to one of the two following arms:

1. ACGG alone
2. ACGG + ATONU

Figure 1: Design of the ATONU cluster randomized control trial, Ethiopia



2.1 Selection of Study Area and Sampling

The ACGG program is working in all regions of Ethiopia. ACGG conducted its village selection process and began distributing chickens to households in the fall of 2016. ATONU similarly began implementation of its intervention shortly after distribution of chickens to households. For our evaluation, non-ACGG villages were randomly selected to form a third arm to serve as a control group receiving no interventions. In the selection of their program villages, ACGG created a sampling frame of villages in their program areas that met their criteria of geographic diversity, poultry producing capacity, and number of smallholder households producing chicken. The non-ACGG villages participating in our evaluation were randomly drawn from the same sampling frame.

Sampling

In the selection of their program kebeles, ACGG created a sampling frame of kebeles in their program areas that met their criteria of geographic diversity, poultry producing capacity, and number of smallholder households producing chicken. ACGG + ATONU kebeles were randomly selected from the frame of ACGG kebeles. The non-ACGG villages forming the control group in our evaluation were randomly drawn from the same sampling frame used by ACGG according to the same criteria as ACGG kebeles.

A two-step process was used for the assignment of kebeles to treatment arms. The ACGG program is active in the capital, Addis Ababa, and the four major regions of Ethiopia: Amhara, Oromia, Tigray, and the Southern Nations, Nationalities, and Peoples' Region (SNNPR). This

study excluded Addis Ababa to focus on the more rural four major regions. Within ACGG's target regions, zones and districts (known as "woredas" in Ethiopia) were selected based on certain criteria, such as high levels of poultry production, determined by the program. In each program district, all kebeles were listed and stratified by agroecology (highland, mid-altitude, or lowland). Some agroecologies in given districts were excluded if the kebeles in that agroecology were deemed sufficiently inaccessible that they would create difficulties in program implementation. Among the remaining agroecologies and kebeles in a given district, three kebeles were randomly selected to participate in ACGG. If the available kebeles in a district fell into one agroecology or predominantly one agroecology, all three ACGG kebeles in that district were randomly selected from that agroecology. If there were two dominant agroecologies in a district, two kebeles were randomly selected from the agroecology represented by a greater number of kebeles, and one kebele was randomly selected from the less dominant agroecology. In rare cases, all three agroecologies were represented in a given district, and one ACGG kebele was randomly selected in each agroecology. In three districts in Tigray, the program made a decision to sample two kebeles per district rather than three.

This evaluation is therefore being conducted in all 20 ACGG districts in Ethiopia. In each district, the study is being conducted in the agroecology where ACGG is predominantly working. In most districts, this agroecology has two or three ACGG kebeles. We selected two of these kebeles (randomly when three were available), and randomly assigned one to receive ACGG + ATONU, while the other kebele is assigned to ACGG alone. Then, we randomly selected one of the remaining non-ACGG villages in that agroecology to be assigned to the control arm.
The ACGG Program had already selected participating households in each ACGG kebele at the outset of this study. In each ACGG kebele, the program obtained a list of all households from the kebele administrative office. Households that raised chickens but had fewer than 50 birds were identified with the assistance of local officials, including "development agents" (kebele-level governmental staff who provide agricultural extension services). Potential participating households were randomly selected from the eligible households on the list. These households were visited and those confirmed as meeting all ACGG eligibility criteria, including documentation of informed consent, were enrolled in ACGG. The same process was therefore used in control kebeles to identify households to participate in this evaluation.

We screened 40 households per kebele in each of the 40 ACGG villages, and enrolled approximately 35 households per kebele meeting the inclusion and exclusion criteria. From the 20 selected control kebeles we screened approximately 50 households per kebele and enrolled approximately 35 households per kebele meeting the inclusion and exclusion criteria. In total, we screened 2,658 households and enrolled 2,117 households.

2.2 Study Timeline

Participating households will be visited three times during the 18-month evaluation period, i.e., during a baseline visit, a follow-up visit nine months after baseline, and a follow-up visit 18 months after baseline (Figure 2). Baseline data collection was conducted concurrent with ACGG's distribution of chickens and prior to the beginning of implementation of the package of interventions by ATONU. At each visit, questionnaires will be administered to the household

head and woman of reproductive age on nutrition knowledge, decision-making on household budgets and expenditures, agricultural activities, and related domains. At recruitment, if there is a child in the household under the age of 36 months, this child is being identified as an index child. A child born in a participating household during the evaluation study will also be identified as an index child. At each study visit, women will additionally be asked questions on their diet and, if an index child is present, on the feeding and health of the index child. Anthropometric and anemia assessments will also be conducted on women of reproductive age and all children in the household under the age of five years.

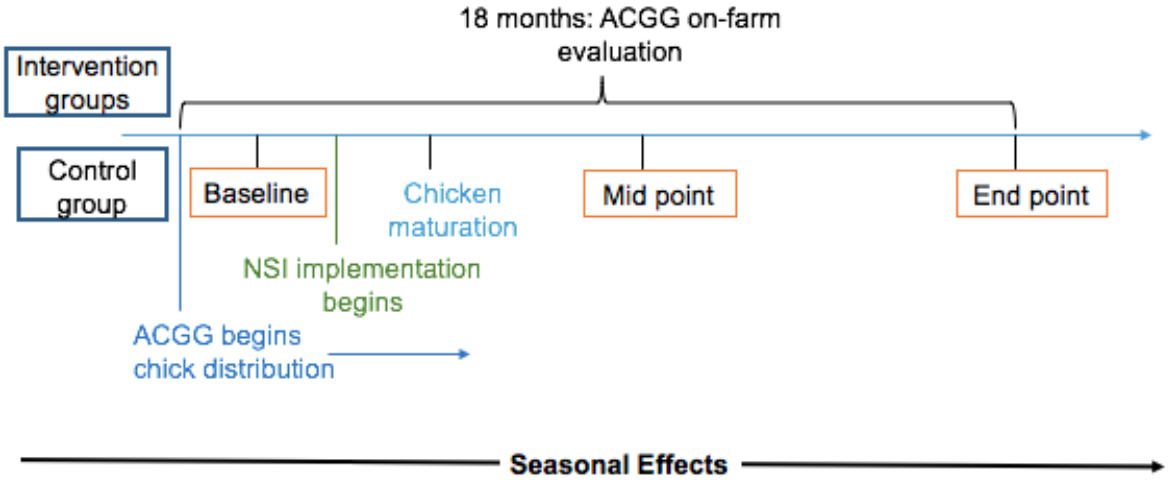


Figure 2: Data collection and sampling framework in the ATONU trial, Ethiopia

2.3 Inclusion Criteria

Households in one of the two ACGG treatment arms were eligible for inclusion if they met all of the following criteria:

1. Are participating in the ACGG program
2. Have at least one woman of reproductive age (18-49 years at enrollment)
3. Provide informed consent

Households in the control arm were eligible for inclusion if they met all the following criteria:

1. Meet the criteria for participating in the ACGG program, namely, they have produced chickens for at least two years and are currently keeping no more than 50 chickens with interest to expand production in the future
2. Have at least one woman of reproductive age (18-49 years at enrollment)
3. Provide informed consent

2.4 Data Collection

Baseline data collection was conducted during November - December 2016. Data were collected from 2,117 households (above the target of 2100); including HemoCue measurements on 1086 women and 440 children (on target) and dried blood samples (DBS) from more than 855 women and 270 children. The field work took slightly longer than expected. It was estimated that data collection would take three weeks with 20 teams, but this was extended by 1-2 more weeks depending on the region, due to security issues, distance between households, and time needed to reach, screen, and enroll the target number of control households. The baseline data collection was carried out by more than 90 field workers across the four regions, to ensure timely completion of the survey and high data quality. The survey tools were lengthy, and extra time was required for training to ensure all updates were included in training for field workers, to ensure quality of data collection.

2.5 Interviews

There were three primary surveys that were conducted during the baseline. One survey each was conducted with heads of households and women of reproductive age for each household, and one survey was conducted at the village level to record information on food availability and prices at the market over the last twelve months. The surveys are included in the appendices. The interviews took approximately 2.5-3.0 hours to complete for the women's questionnaire and about 1 hour for the household head questionnaire. The kebele level questionnaire was conducted in each kebele. Two interviews were done in most kebeles for a total of approximately 110 interviews.

2.6 Data Management

Data entry in tablets using ODK was successful. Data uploads were possible when field workers were able to connect to the internet. Some uploads were done manually where no connectivity was available. To ensure data quality in real time, supervisors were responsible for assigning a list of households to each field worker, which were tracked on paper forms and cross referenced with ODK data. Supervisors monitored the number of interviews completed by each field worker in each kebele and observed interviews as well as blood sample collection. Hard copies of consent forms were collected and filed by region, woreda, and kebele in a secure location.

2.7 Data Analysis

Data analysis included exploratory analysis, in particular cross tabulation by treatment group and regions when appropriate. Distribution of each variable was examined to identify outliers. Data analysis was conducted on STATA 15.0, SAS, and Excel.

3. Results

3.1 Household Demographics

Overall, 2117 participants met all eligibility criteria and were enrolled in the study. Among these, 710 households belonged to the ACGG arm, 709 households belonged to the ACGG + ATONU arm, and 698 households belonged to the control arm. Table 1 summarizes the head of household status and household characteristics. Participating household heads (HH) were largely male (82%) and married (88%), with a median age of 40 years. Households in each arm had a median of six members, although, overall, households in the treatment arms had a slightly higher number of members. Half of households were Orthodox Christian (51%), 28% were Muslim, and 21% were Protestant. The majority of participants listed farming (89.8%) as their primary occupation, and less than 7% indicated petty trade and domestic work as their primary occupation.

Participating women of reproductive age were generally younger than household heads, with a median age of 35 years, with higher ages reported in the intervention arms than in the control arms. The majority (79.6%) were the spouse of the household head, while 13.6% women indicated they were the household head.

Table 1: Head of household characteristics by treatment arm

	ACGG, n=710	ACGG + ATONU, n=709	Control, n=698
Median Head of Household age (IQR)	41 (35,48)	42 (35,50)	40 (35,48)
Median woman's age (IQR)[a]	35 (30,40)	35 (29, 40)	32 (27,28)
Male (%)	79.7	80.8	86.5
Marital status (%)			
Married, monogamous	84.7	88.1	87.3
Married, polygamous	1.1	2.4	1.6
Widowed	9.1	5.9	5.0
Divorced /separated	4.4	3.0	5.6
Other (single or cohabiting)	0.7	0.6	0.5
Religion (%)			
Orthodox	51.6	48.9	50.3
Muslim	25.3	27.1	30.8
Protestant	22.1	23.0	17.6
Other (Catholic, Monotheistic)	1.0	1.0	1.3
Median household size (IQR)	6 (5,8)	6 (5,8)	6 (4,7)
Woman's relationship to the HH (%)[a]			
Spouse	79.7	78.7	80.6
Woman is the HH	13.9	14.1	12.7
Other	6.4	7.2	6.7

[a] From the women's survey

3.2 Household Assets

Household assets by treatment arms are summarized in Table 2, and, in general, ownership of assets were consistent across arms. An average household owned five pieces of farm equipment and these included a sickle, hoe, spade, axe, and ox-plough. Very few of the households owned transportation related assets such as a bicycle or horse cart. Most commonly owned household assets included a chair, water carrier, and bed. Over 75% of the households indicated that they owned at least one mobile phone and 25% owned a radio. Mobile phone ownership is significantly high when compared to the Ethiopian Demographic Health Survey (DHS) conducted in 2011, where only 12.8% owned mobiles phone in rural areas (65.7% owned in urban areas) (Central Statistical Agency Ethiopia ICF International 2012) . Following the methods of the "Steps to construct new DHS Wealth Index", wealth index and quintiles were created for each household (Rutstein 2015). The first component from the principal component analysis utilized for the creation of the index explained less than 10% of the variance in the collected data (results not shown), and wealth indices based on household expenditures are therefore being considered.

Table 2: Number of household assets owned by treatment arm [median (IQR)]

	ACGG	ACGG + ATONU	Control
Farm Equipment			
Sickle	2 (1,3)	2 (1,3)	2 (1,3)
Hoe	2 (1,3)	1 (1,4)	1 (1,2)
Spade or shovel	1 (1,1)	1 (1,1)	1 (0,1)
Axe	1 (0,2)	1 (0,2)	1 (0,1)
Knapsack sprayer	0 (0,0)	0 (0,0)	0 (0,0)
Ox-plough	1 (1,2)	1 (1,1)	1 (0,1)
Transportation assets			
Horse/mule cart	0 (0,0)	0 (0,0)	0 (0,0)
Donley/oxen Car	0 (0,0)	0 (0,0)	0 (0,0)
Horse/mule saddle	0 (0,0)	0 (0,0)	0 (0,0)
Bicycle	0 (0,0)	0 (0,0)	0 (0,0)
Motorbike (scooter or bajaj)	0 (0,0)	0 (0,0)	0 (0,0)
Car/truck	0 (0,0)	0 (0,0)	0 (0,0)
Household assets			
Stone grain mill	1 (0,1)	0 (0,1)	0 (0,1)
Motorized grain mill	0 (0,0)	0 (0,0)	0 (0,0)
Improved charcoal/woodstove	0 (0,1)	0 (0,0)	0 (0,0)
Kerosene stove	0 (0,0)	0 (0,0)	0 (0,0)
Water carrier	2 (0,4)	2 (0,4)	2 (0,4)
Refrigerators	0 (0,0)	0 (0,0)	0 (0,0)
Watch/clock	0 (0,0)	0 (0,0)	0 (0,0)
Table	0 (0,2)	1 (0,1)	0 (0,1)
Chair	2 (0,4)	2 (0,4)	1 (0,3)
Bed (with cotton/mattress/sponge)	1 (0,1)	1 (0,1)	0 (0,1)
Electric mitad	0 (0,0)	0 (0,0)	0 (0,0)
Communication			
Radio	0 (0,1)	0 (0,1)	0 (0,1)

	ACGG	ACGG + ATONU	Control
Tape player	0 (0,0)	0 (0,0)	0 (0,0)
Mobile Phone	1 (1,2)	1 (1,2)	1 (0,1)
Non mobile phone (landline)	0 (0,0)	0 (0,0)	0 (0,0)
Television	0 (0,0)	0 (0,0)	0 (0,0)

3.3 Physical Characteristics of the Household

Physical characteristics of the households are summarized in Table 3. Over 95% of the households owned land, where the median amount of land owned is 3 timads (4 timads are equivalent to a hectare). This is consistent with the Ethiopian DHS conducted in 2011, where 87.8% of the rural households owned land. There were no marked differences observed among the study arms, except for a smaller amount of land owned by control households compared with intervention households.

Table 3: Physical characteristics of the house by treatment arm

Physical characteristics	ACGG	ACGG + ATONU	Control
Land owned (timad - median, IQR)	3 (2,6)	3.2 (2,6)	2.5 (1.5, 7.5)
% Running water	15.2	15.9	7.6
% Electricity	23.4	22.4	24.6
% Wood as cooking fuel	91.7	90.5	88.1
% Type of floor			
Natural (earth/sand)	93.1	89.8	93.1
Wood/Bamboo	1.1	0.7	0.4
Concrete	5.1	8.0	6.0
Finished (tile/mosaic/ceramic)	0.6	1.2	0.5
Other	0.1	0.3	0.0
Type of roof (%)			
Rudimentary (grass, palm leaves, straw)	18.3	20.7	26.2
Plastic sheeting /cardboard	0.0	0.3	0.1
Finished roof (metal, wood, corrugated tin, Other metal, tile, cement)	78.4	77.4	71.8
Other	3.2	1.6	1.9
Type of wall (%)			
Finished Wall	2.7	6.4	5.2
Other	0.8	0.7	1.1
Palm/bamboo/straw	0.7	1.4	1.3
Rudimentary wall	85.1	83.9	84.1
Traditional wall	10.7	7.6	8.3

Only 13% of households had access to running water, and 23% had access to electricity. In the Ethiopian DHS conducted in 2011, less than 5% of the rural areas had electricity. The sampled homes had earthen floors (92%) and metal roofs (76%) and relied on firewood as the main source of cooking fuel (90%).

Access to improved sanitation and water sources is summarized by treatment arm in Table 4, while Table 5 provides the summary by region. Access to improved water includes piped water

into dwelling, piped water to yard/plot, public tap/standpipe, tubewell or borehole, protected dug well, protected spring and rainwater. Overall, the sampled population had high access to improved water sources (83%). The access to improved water was lower in the Amhara region, while Tigray had the highest access at 89%. The most common sources of improved water source was piped water, public taps or standpipe, protected spring and borehole. In the most recent Ethiopian DHS report conducted in 2016, access to an improved water source was 97% in the urban areas and 57% in the rural areas (Central Statistical Agency 2016). Improved access to sanitation was 30% across the treatment arms, and varied across regions from 9.1% in Tigray to 48% in SNNPR. In the 2016 Ethiopian DHS, only 15% had access to improved sanitation, and this varied largely by degree of urbanization. The most common improved sanitation facilities in the baseline sample were pit latrines and pit latrines with slabs.

Table 4: Access to improved sanitation and water source by treatment arm

	ACGG	ACGG+ATONU	Control	Total
Improved sanitation	30.1	34.1	27.0	30.4
Improved water	84.6	87.1	79.0	83.6

Table 5: Access to improved sanitation and water source by region

	Amhara	Oromia	SNNPR	Tigray	Total
Improved sanitation	40.2	21.6	48.0	9.1	30.4
Improved water	78.2	82.7	84.9	89.9	83.6

3.4 Household Expenditures and Savings

The most common recurring expenses were food and other household needs (e.g. soap, transportation, Figure 3). Food was the largest cash expenditure, with 84% of households spending a median of 400 ETB in the month preceding the baseline survey. Other key expenditures included communications (72% of households spending a median of 50 ETB in the same period), personal care (67% of households spending a median of 30 ETB), and transportation (63% of households spending a median of 98 ETB). Over a quarter of the households (28%) had saved money in the preceding month, with a median of 100 ETB saved.

Common but less frequent expenditures included clothing, taxes, social events, school fees, and health care (Figure 4). Clothing and shoes were the largest expense, with most households (90%) spending a median of 1500 ETB in the year preceding the baseline survey. Households with health expenditures (60%) during the same period spent a median of 460 ETB.

Approximately 41.4% of households had some amount of savings (as reported by the woman of reproductive age) at the time of the baseline survey (Figure 5).

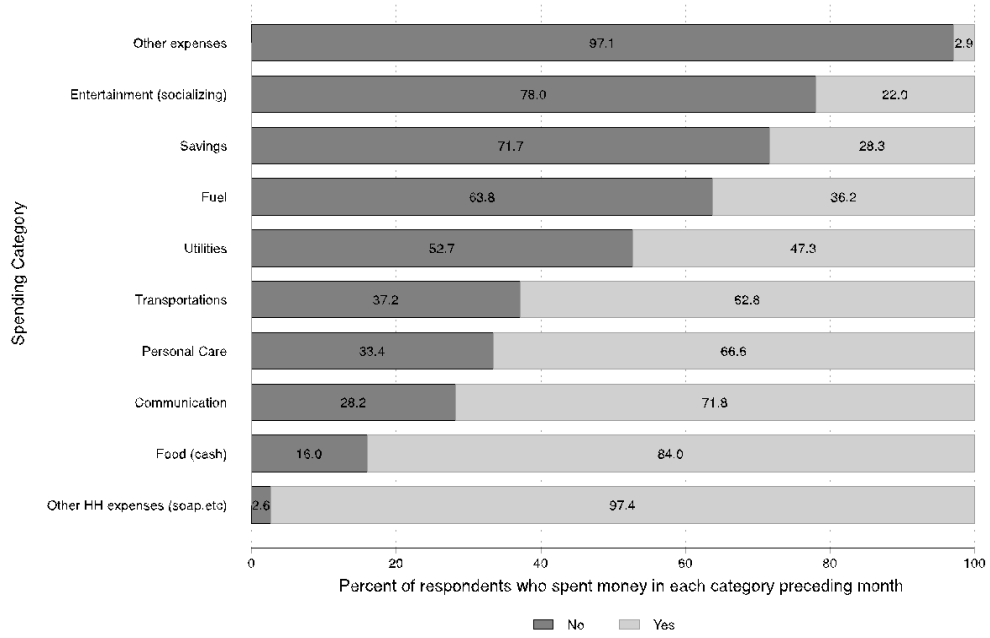


Figure 3: Most frequent spending (monthly expenses)

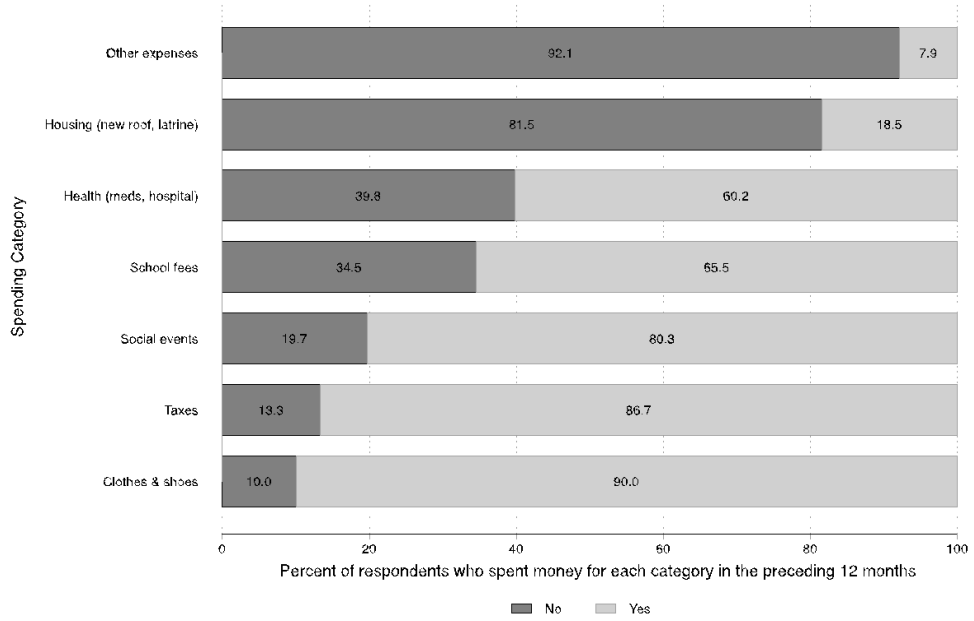


Figure 4: Less frequent expenses (last 12 months)

Half of the households in the study area kept their savings in formal banks, while a third of households saved through community groups (Figure 6). Approximately 10% of households kept their savings at home. The majority of women reported that their spouses made decisions

about household savings most of the time. About one-third of the women reported making decisions on savings.

The majority of the households reported participation in at least one community group that was either social or religious. Over 85% of households reported that there was a religious or funeral association, and a high proportion of these households were actively involved in the group. Over 70% reported presence of a local savings groups but only half participated. Two thirds of the respondents mentioned that there is a women's group in the community.

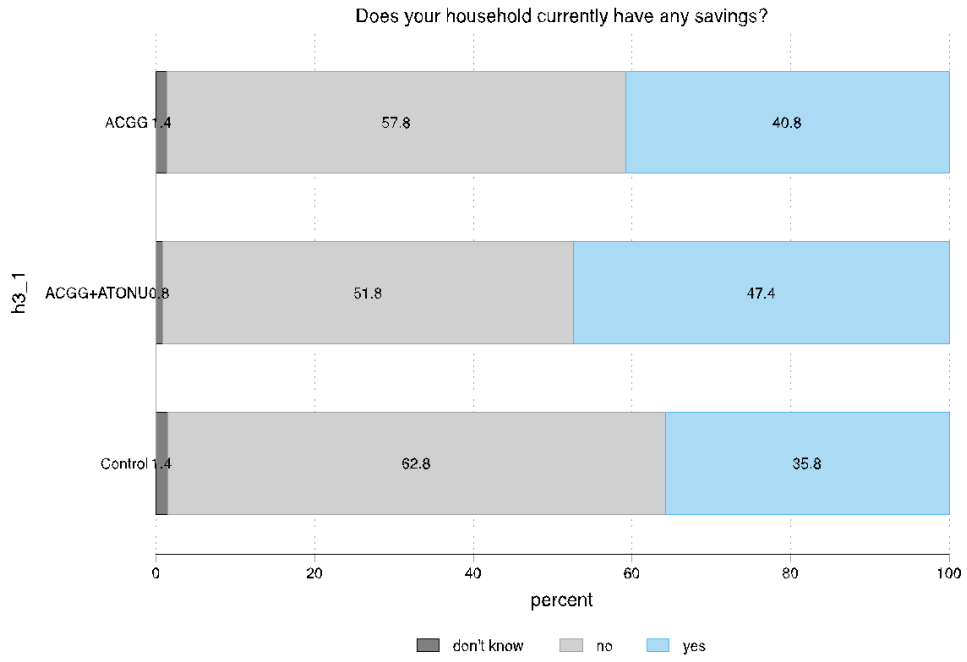


Figure 5: Amount of savings among households by treatment arm

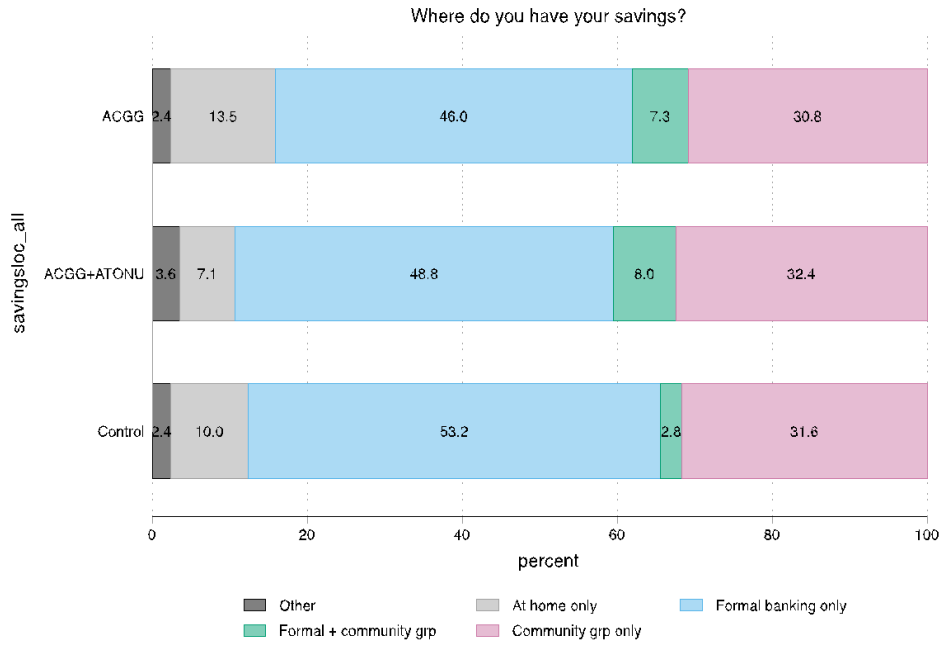


Figure 6: Location of savings by treatment arm

Table 6: Group activity and participation by household heads

Group type	Availability of group in the community	Proportion of households that are active in community groups
Savings and credit association	74.1	54.3
Input supply group, farmer cooperative or union	58.9	67.1
Crop marketing group	24.1	51.4
Women's association	67.8	74.7*
Youth association	53.4	31.0
Church/mosque association	89.2	88.1
Funeral association	88.7	94.5

*among women heads of households only

3.5 Crop Production and Inputs

Almost all households (95%) engaged in crop production during the main agricultural season, known as Meher, growing an average of 4.0 crops on farm. One in three (33%) households also grew crops during the minor season, known as Belg, with these households growing an average of 3.6 crops. The major crops during the Meher season were staple grains: maize (grown by 52% of farmers), teff (45%), sorghum (24%), and wheat (24%), reflecting national crop production patterns (Figure 7). Other key crops were also staples, such as the perennial enset (*Ensete ventricosum*, 15%), barley (14%), Irish potato (12%), and millet (11%). The most common cash crops in the study area were chat (*Catha edulis*, 12%) and coffee (9%). Few

households were engaged producing vegetables, fruits, or legumes (<10% of households for any such crop). In the shorter Belg season, the key crops were again enset (12%), Irish potato (8%), and maize (6%), along with the cash crops, chat (8%) and coffee (5%, Figure 8).

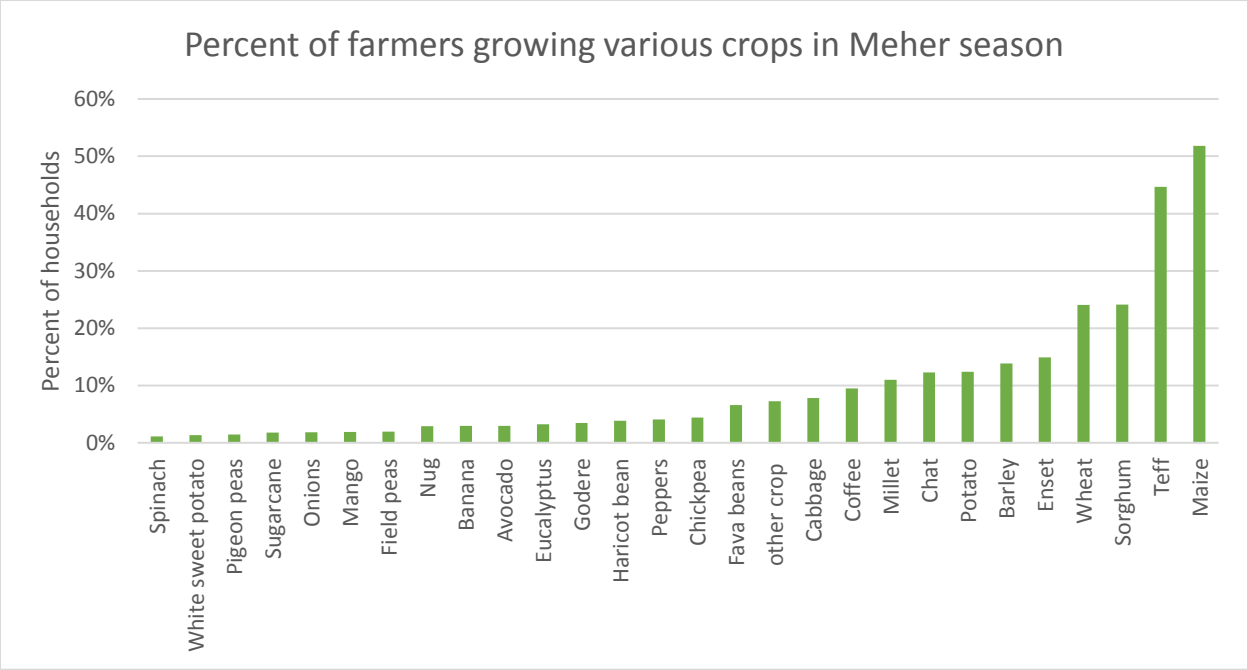


Figure 7: Percent of farmers growing various crops in the Meher season (crops grown by >1% of households presented)

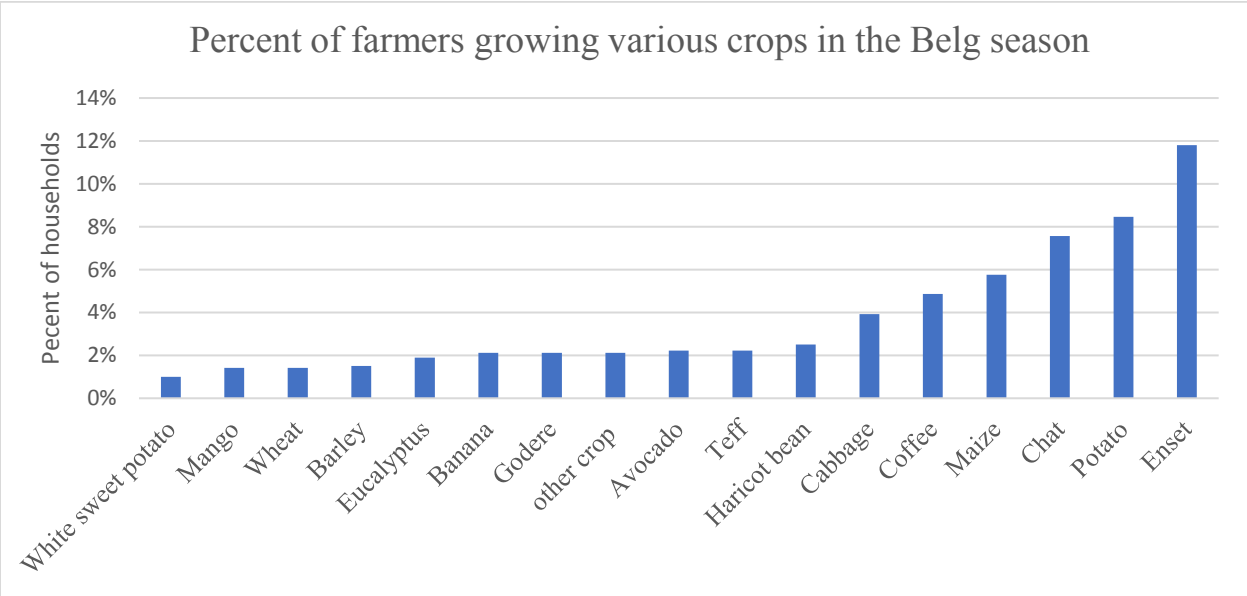


Figure 8: Percent of farmers growing various crops in the Belg season (crops grown by >1% of households presented)

In the Meher season, the majority of farmers' harvest of key crops is used for household consumption, except for the cash crop chat, which is largely sold (Figure 9). Among the key annual crops (cultivated by >10% of farmers), up to 11% of the harvest may be saved as seed. Post-harvest losses are limited (<4%). About one-third of the harvest of the more common legumes such as fava bean (33%), chickpea (30%), and haricot bean (34%) are sold. Certain vegetables, such as pepper (59%), onion (79%), and spinach (90%), and fruits, such as avocado (45%), banana (50%), and mango (50%), are also largely sold. In the Belg season, the main food crops are also largely for household consumption (Figure 10).

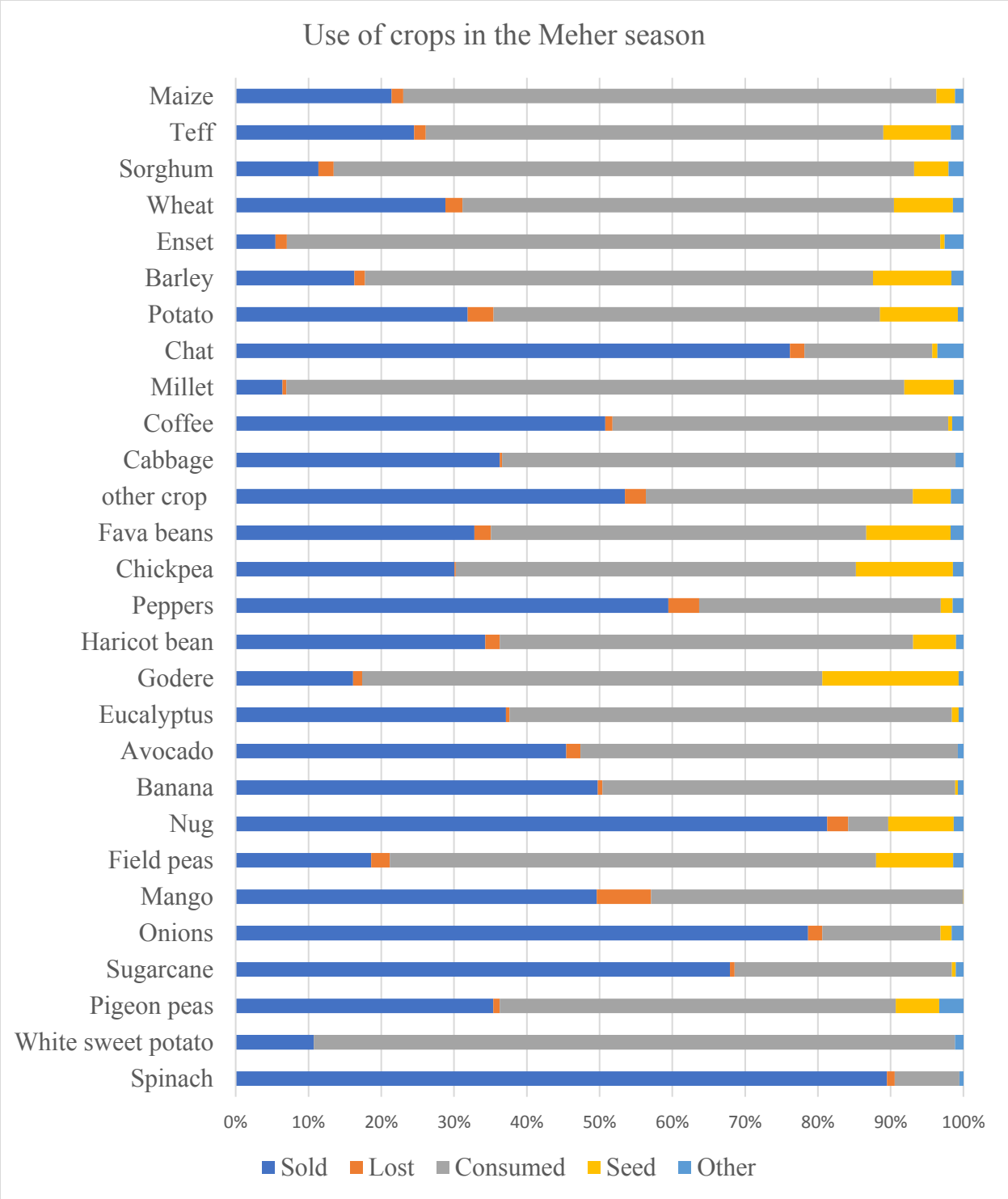


Figure 9: Use of crops in the Meher season (crops grown by >1% of households are listed by decreasing frequency of cultivation)

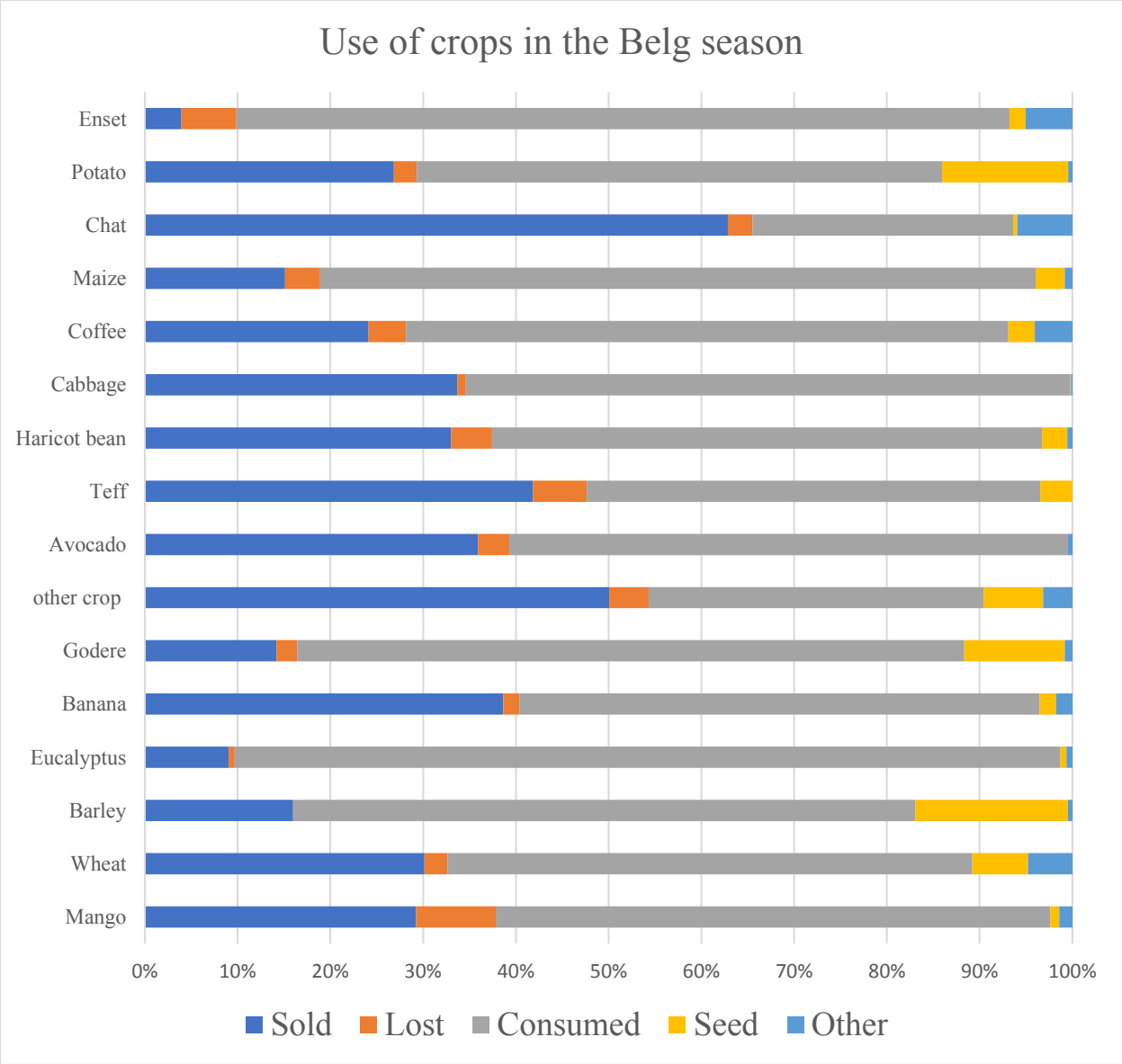


Figure 10: Use of crops in the Belg season (crops grown by >1% of households are listed by decreasing frequency of cultivation)

Following national trends, fertilizer use was relatively high among participating farmers (Figure 11). Half of farmers (53%) used DAP on at least one crop, with some farmers (6%) now using NPS. Forty-one percent additionally applied urea to at least one crop, while only 31% used animal manure. Despite widespread production of cereal crops, only a quarter of the study sample (26%) used improved seed. Herbicide (21%) and pesticide (13%) use was less frequent.

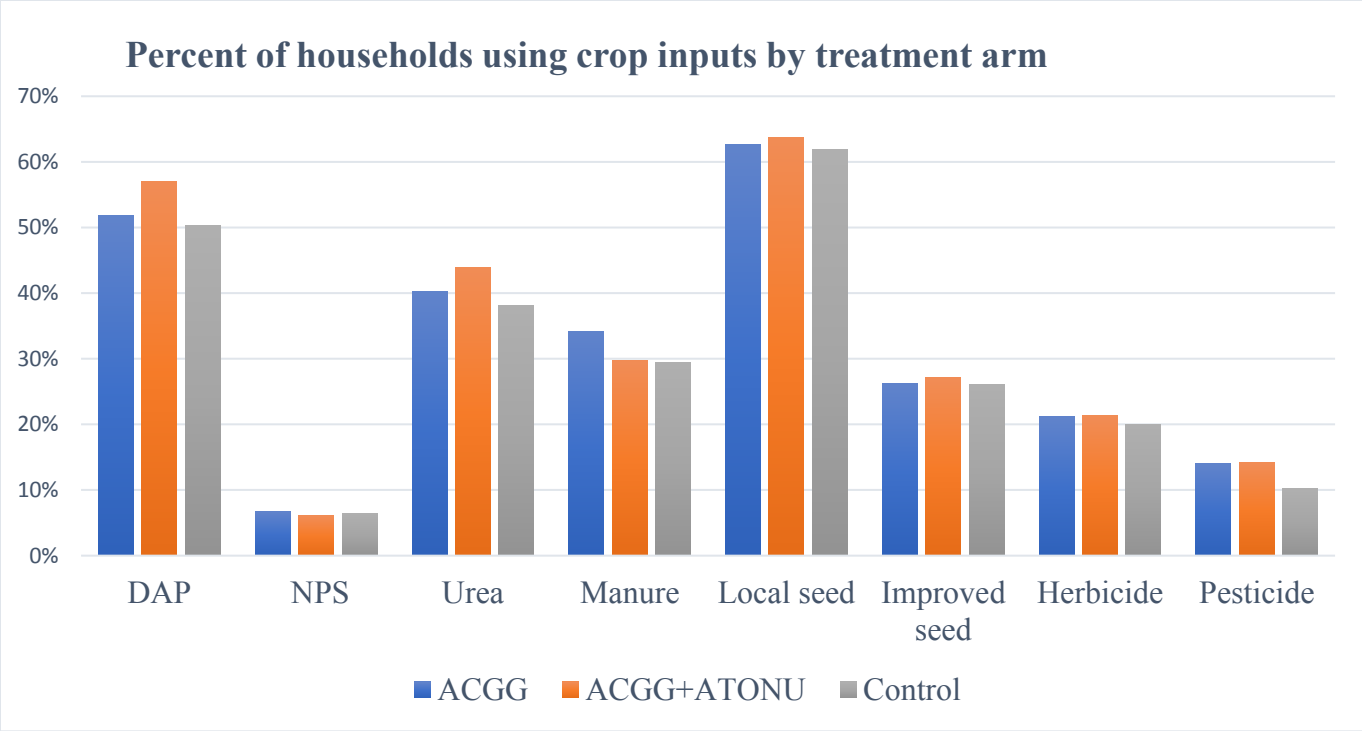


Figure 11: Crop input use by treatment arm

For households using agricultural inputs, these inputs were a significant source of expenditure (Table 7). Expenditure for DAP exceeded 1200 ETB on average, expenditure for NPS exceeded 1600 ETB, and expenditure for urea exceeded 1000 ETB in a calendar year. Seed, if purchased, cost more than 500 ETB per year, with higher costs for improved seed. Herbicide and pesticide costs were lower. Treatment arms tended to have higher crop input use and expenditures than the control arm.

Table 7: Crop input indicators by treatment arm, among households using a given input

	ACGG	ACGG+ATONU	Control
Amount of DAP in Kg past year	88.5	102.2	80.0
Total cost of DAP (ETB)	1272.1	1420.5	1123.2
Amount of NPS in Kg past year	144.8	135.1	97.4
Total cost of NPS (ETB)	1878.7	1713.7	1391.2
Amount of Urea in Kg past year	93.7	97.1	76.4
Total cost of Urea (ETB)	1174.6	1107.2	950.5
Amount of manure in Kg past year	538.8	571.2	510.6
Total cost of manure (ETB)	1041.0	926.1	934.6
Amount of local seed in Kg past year	96.0	113.1	96.8
If bought, total cost of local seed (ETB)	519.1	519.3	495.2
Amount of improved seed in Kg past year	56.0	73.5	60.3

	ACGG	ACGG+ATONU	Control
If bought, total cost of improved seed (ETB)	666.5	703.5	654.8
Total herbicide cost (ETB)	233.3	205.1	167.7
Total pesticide cost (ETB)	264.8	222.8	198.9

3.6 Livestock Production and Income

Summary of livestock owned by participating households, their value, and caretaker information are provided in Table 8 below. A typical household from the sample owned four animals (IQR 3,6), and over 85% of the households owned at least cattle and poultry. This was comparable to the rural livestock ownership from the Ethiopian 2011 DHS, where 89% of the households indicated ownership of farm animals.

Cattle owned were largely local rather than exotic breeds. Small ruminants such as goats and sheep were found in 54% of the households. Over 70% of household heads listed themselves as the primary caretaker of the large ruminants, while their spouses (largely women) were listed as the primary caretaker of local and improved chickens. The estimated value of cattle owned by a household was generally higher compared to other livestock, particularly for the exotic cows where the median value was 12,500 ETB (USD 540).

In terms of livestock used for transportation, over a third of the households owned donkeys, while less than 11% of the households owned a mule or a horse. There was no aquaculture or pig ownership in the sampled households. Thirteen percent of the households practiced apiculture, and this ranged from 11% in Tigray to 17% in Amhara.

Table 8: Summary of livestock owned, their value and primary caretaker, as reported by the household head

Livestock	% households owning	Median number of animals (IQR)	Median estimated value in ETB (IQR)	Primary Caretaker		
				Self	Spouse	Other
Local bull	61.4%	2(1,2)	9000 (5000-14000)	70.7%	18.3%	11.0%
Exotic bull	4.2%	1(1,2)	8000 (5000-12000)	73.0%	18.0%	91.0%
Local cows	72.4%	2(1,3)	7500 (4000- 12000)	59.7%	30.4%	90.1%
Exotic cows	8.3%	1(1,2)	12500 (7000- 20000)	71.0%	22.7%	6.3%
Sheep	37.4%	3(2,5)	2000 (1025-3600)	56.6%	26.1%	16.4%
Local goats	24.0%	3(2,5)	2000 (1000-4000)	58.9%	24.6%	16.9%
Exotic goats	0.5%	4 (2,6)	4000 (1700-6000)	63.6%	-	36.4%
Donkeys	35.9%	1(1,1)	2000 (1500-2500)	69.1%	17.2%	13.7%
Horses	10.6%	2(1,2)	4000 (2000-6000)	73.8%	15.6%	10.6%
Local Chicken	68.2%	3 (2, 6)	240 (130 - 420)	28.8%	65.1%	6.1%
Improved Chicken	45.9%	10 (3, 22)	660 (300 - 1400)	36.8%	58.3%	4.9%

Livestock	% households owning	Median number of animals (IQR)	Median estimated value in ETB (IQR)	Primary Caretaker		
				Self	Spouse	Other
Mule	5.4%	1 (1, 1)	7000 (6000 – 8000)	57.8%	24.6%	17.6%
Beehives	13.3%	2(1,4)	700 (300 – 1500)	81.1%	14.6%	4.3%

Table 9 provides indicators of chicken production and ownership. There were six genotypes introduced in Ethiopia's ACGG program by ILRI in 2016-2017. These include: Horro (local), Koekoek, Kuroiler, Sasso, and Sasso-RIR. These chickens were considered improved genotypes (ILRI 2017).

Over 87% of the households owned either local or improved chickens, and 27% indicated that they owned at least one improved and one local chicken. Despite the inclusion criteria, 12% of households indicated that they did not have chickens at the time of baseline data collection, which is possible if chickens had been recently consumed, marketed, gifted, or died, especially since the questions were asked about chicken production in the past week. An average chicken farmer had 9.1 (SD: 10.0) chickens, either local or improved. There were significantly higher improved chickens in the intervention arms (8-9 chickens extra) compared to the control arm, as expected since ACGG had already completed more than half of its chicken distribution at the time of baseline data collection. The average value of improved chickens was higher (ETB 987) compared to local chickens, which had an estimated value of ETB 371. Income from sale of live chickens for meat was limited, and sale of chicken manure was uncommon. On average, chickens produced 1.3 eggs per week, leading to an income of 1.9 ETB per chicken owned in a given week. Two thirds of eggs were sold. Only 22% of the produced eggs were retained for household consumption, while 11% were retained for hatching.

Table 9: Chicken production and ownership indicators

	Mean or %
Local chickens – quantity	5.2
Local chickens – total value (ETB)	370.8
Improved chickens – quantity	12.1
Improved chickens – total value (ETB)	987.7
Income from Chicken – Meat products in past 12 months (ETB)	143.8
Income from Chicken – Manure sales in past 12 months (ETB)	0.4
Income from Chicken – Egg sales in past 12 months (ETB)	179.1
Household owns at least 1 improved chicken	46%
Household owns at least 1 local chicken	68%
Household owns at least 1 improved and at least 1 local chicken	27%
Number of eggs produced per chickens owned last week	1.3
Amount earned from eggs last week, per chicken owned (ETB)	1.9
Household sold meat in the past 12 months	25%
Household sold manure in the past 12 months	0%
Household sold eggs in the past 12 months	41%
Households do not report poultry ownership	12%
Total # of local + improved chickens owned	9.1
Household's chickens produced eggs last week	47%

	Mean or %
Number of eggs produced by the household's chickens last week	6.1
% of eggs the household consumed last week	21%
% of eggs the household gave away last week	4%
% of eggs the household retained for chick production last week	11%
% of eggs the household sold last week	64%
Amount household earned from egg sales last week (ETB)	9.6

3.7 Food Shortages and Security

Food security in this study was measured using two different modules in the women's survey, which includes the Household Food Insecurity Access Scale (HFIAS) (Jennifer Coates & Bilinsky 2013) and the recall of food shortages in the last twelve months (Bilinsky & Swindale 2007). Additionally, women were also asked about the reasons for food shortages last time they had experienced the food shortages. Food shortages by treatment arm and region are summarized in Figure 12 (panel A), and the prevalence of food shortages varied from less than 5% to 18% by regions and arms. In Oromia and SNNPR, the treatments arms were consistent with regard to the food shortage prevalence. In Amhara and Tigray, the control arm had substantially higher levels of food shortages. Reported food shortages were seasonal (Figure 12, panel B), and were high in the month of July and August during the rainy seasons. The reasons for food shortage by region are summarized in Figure 13. The top two most listed reasons for food shortages were bad climate, which ranged from 22-42% across the four regions, and small land size (causing low production), which ranged from 13-27% across the regions.

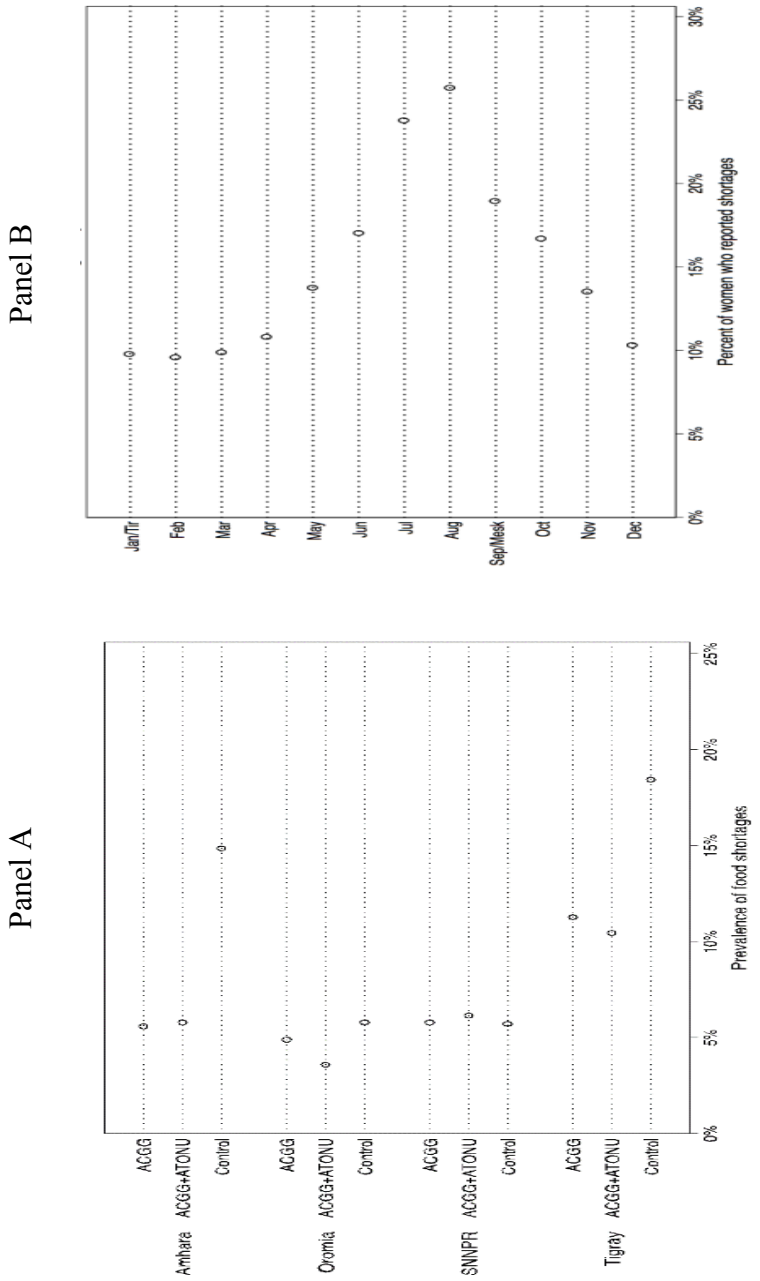


Figure 12: Panel of food shortage prevalence by treatment, region and seasons (months). Panel A on the left shows prevalence by treatment arm and ergion while Panel B on the right shows food shortages by season

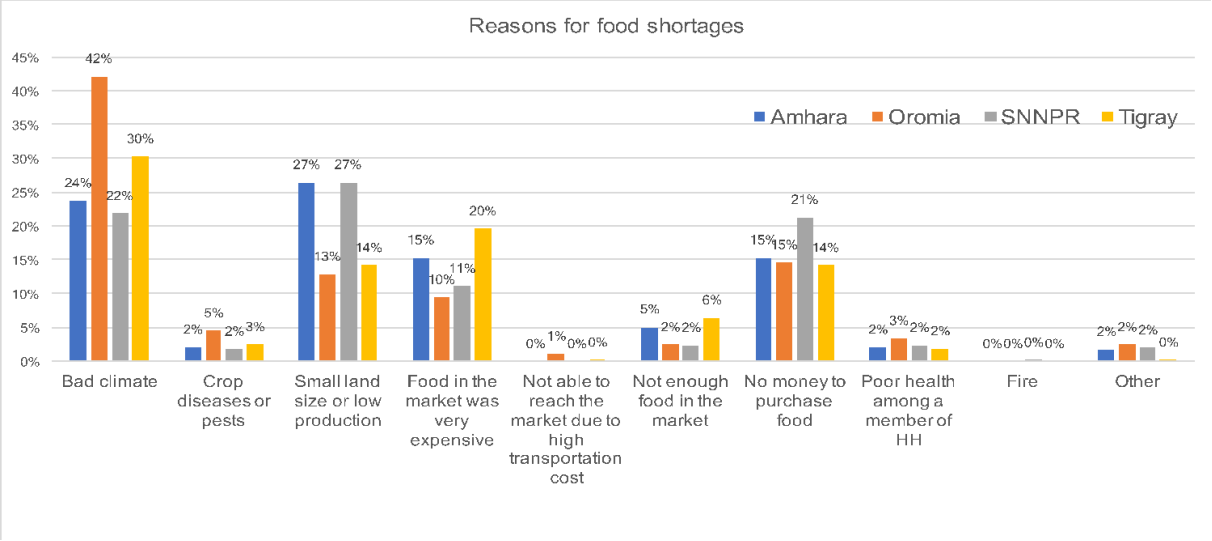


Figure 13: Reasons for food shortage by region

HFIAS is a 9-item survey that measures the perception of food insecurity access in the last four weeks from the time of interviews. Questions ask about reducing meal size, skipping meals, eating less preferred food, going to sleep hungry and not having enough food. These nine questions, which can be summed to a maximum score of 27, indicating the highest level of food insecurity, can classify a household into the following four categories: food secure, mildly food insecurity access (FIA), moderate FIA, and severe FIA. In Figure 14, household food security status is categorized by food shortages experienced in the last 12 months. Among those who experience food shortages in the last 12 months, 62% have been classified severe FIA compared to 8.8% among those who did not experience food shortages. Similarly, a higher proportion (64.3%) of HFIAS classified food secure households were among those who did not experience food shortages, compared to 10.4% who were classified as food secure. The comparison of these two metrics reveals the validity of the HFIAS tool to this population. Figure 15 shows the household food security status by treatment arm (panel A) and region (panel B). The control arm has a slightly higher proportion of households with moderate and severe FIA. SNNPR region had a significantly higher proportion in the FIA categories compared to all other regions. There were no differences in food security status among the households in Amhara, Oromia, and Tigray.

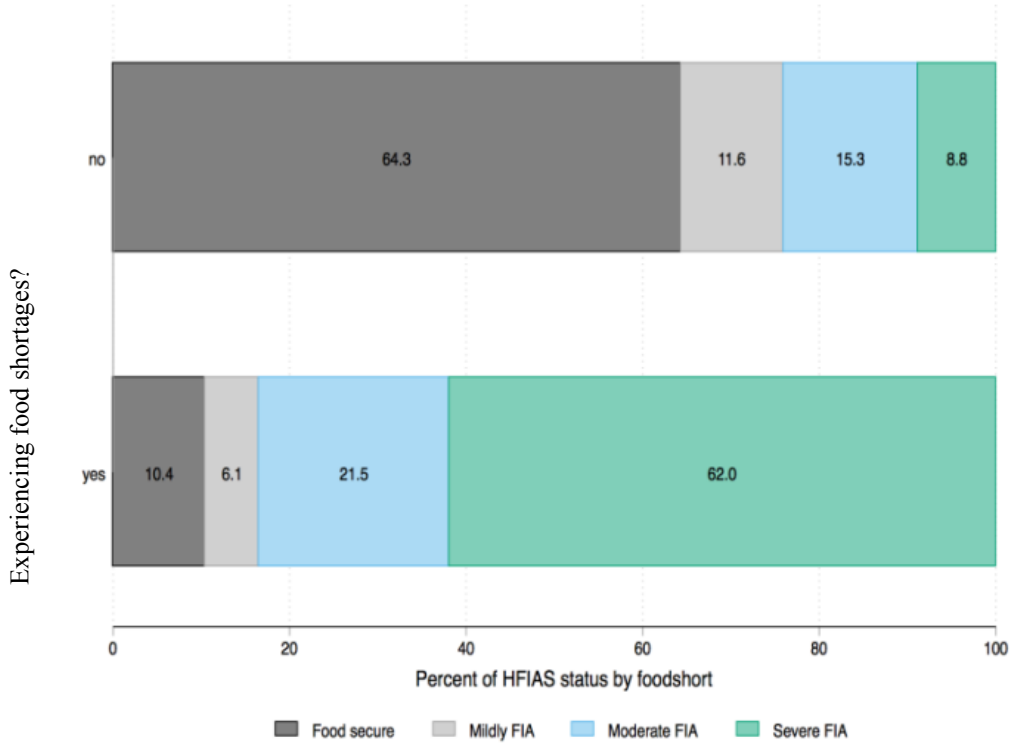


Figure 14: Food shortage by HFIAS status

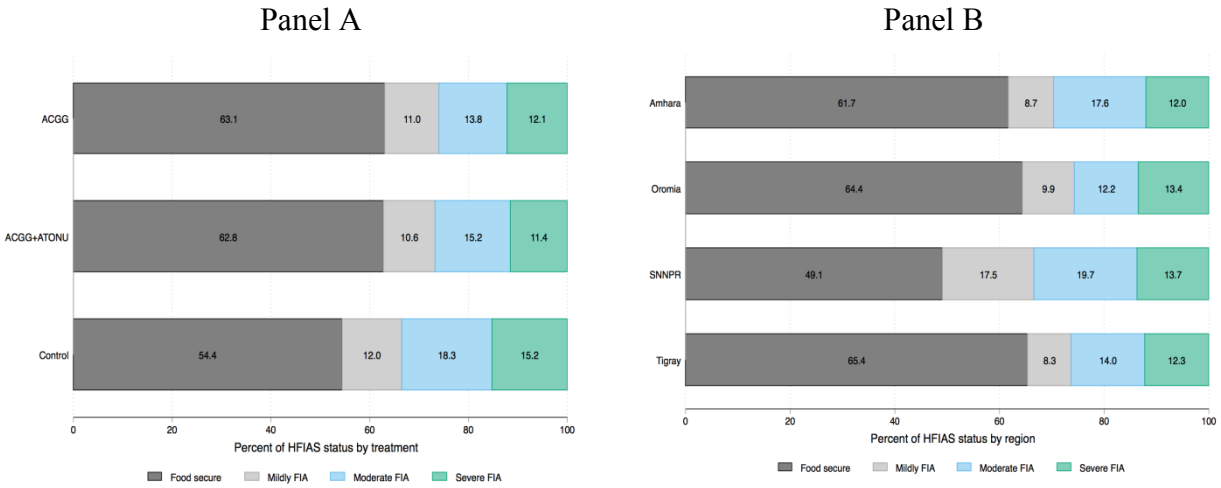


Figure 15: HFIAS status by treatment arm (panel A) and region (panel B)

3.8 Knowledge and Practices

Women were queried on sources of information on nutrition and health along with frequency of information received. Figure 16 shows the summary of sources of information on nutrition and health. Over 80% of the households mentioned that they receive information on nutrition and health from posters, farmers/marketing group, radio, social network (family, friends neighbors), health posts, 5:1 group, and community health workers. Shown in Figure 17 is the summary on the frequency of information received. Most frequent communication (daily basis) included the local administration (14%), social network (18%) and the radio (9.5%). Among those who got the information on nutrition and health, over 75% reported that the information was received only occasionally or rarely.

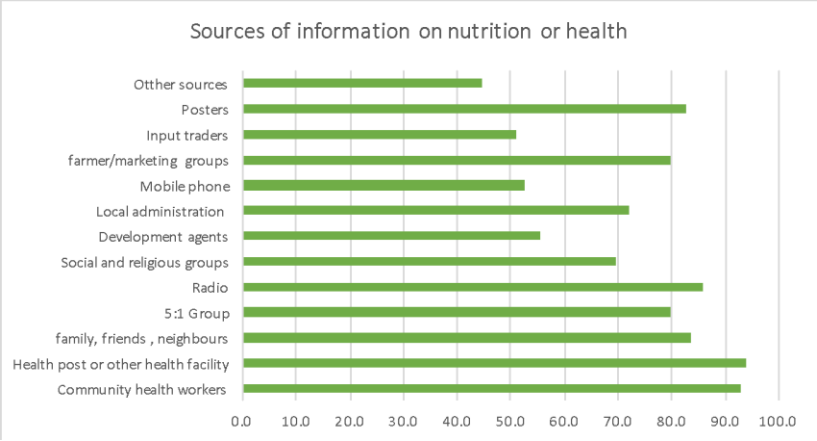


Figure 16: Sources of information on nutrition and health in the ATONU study

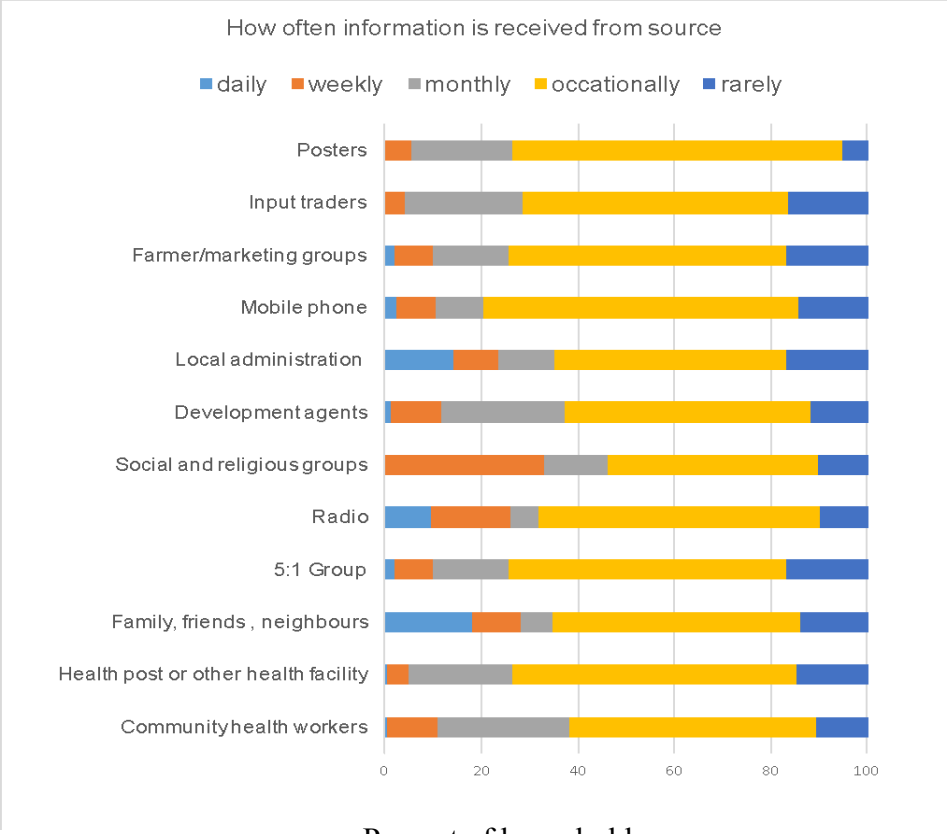


Figure 17: Frequency of information received from different sources

3.9 Women's Empowerment and Time Use

Women's empowerment was measured by two tools in the ATONU study. First, we asked the women's self efficacy using the New General Self Efficacy tool (NGSE), which evaluates "one's capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands (Wood & Bandura, 1989). This tool consists of eight questions across three domains: magnitude of task difficulty, strength or certainty of successfully performing a particular task, and generality, which evaluates magnitude and strength across a range of activities (Bandura, 1986, 1997). Questions include statements such as "I will be able to achieve most of the goals that I have set for myself" or "Compared to other people, I can do most tasks very well". Shown in Table 10 are the list of eight questions used in the NGSE tool. Scoring includes one for strongly disagreeing, two for disagreeing, three for neither agree or disagree, four for agree, and five for strongly agreeing.

Table 10: Eight question tool to measure self-efficacy

	New General Self Efficacy Tool
1	I will be able to achieve most of the goals that I have set for myself.
2	When facing difficult tasks, I am certain that I will accomplish them.
3	In general, I think that I can obtain outcomes that are important to me.
4	I believe I can succeed at most any endeavor to which I set my mind
5	I will be able to successfully overcome many challenges.
6	I am confident that I can perform effectively on many different tasks.
7	Compared to other people, I can do most tasks very well.
8	Even when things are tough, I can perform quite well.

In Figure 18 is the summary of responses across all treatment groups for each of eight questions in the NGSE tool. Across all of the questions, 50% of women stated that they neither disagree or agree. Distribution of summed score (maximum of 32) is shown in Figure 19 by region and treatment. There are bimodal spikes at scores of 24 and 32, which indicates that women mostly answered "neither disagree or agree" or "agree". Research indicates greater sensitivity at the lower end of the distribution. Currently, NGSE validation analysis for Ethiopia is being undertaken by the International Food Policy Research Institute (IFPRI), and the scores will be further analyzed based on the results from that analysis.

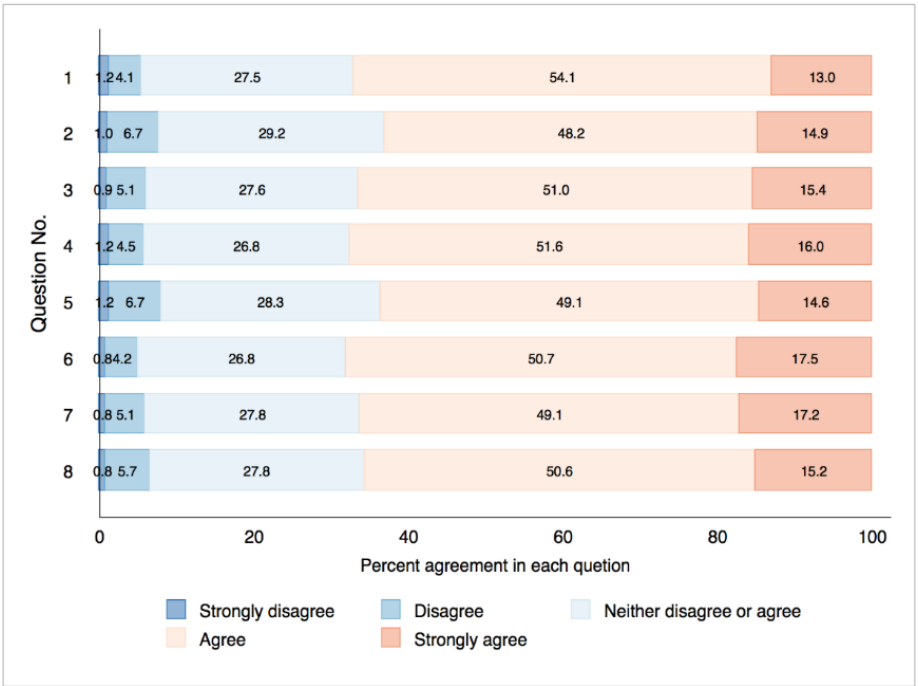


Figure 18: Summary of responses to the eight questions from the NGSE tool

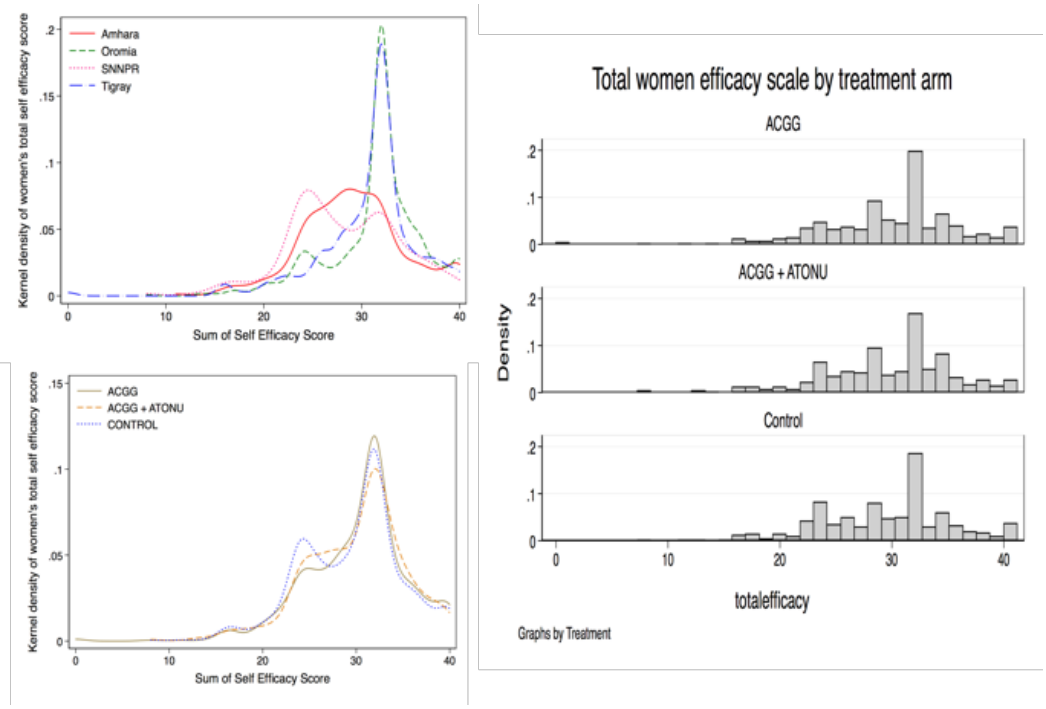


Figure 19: Distribution of NGSE scores by region and treatment

A second approach to assessing women's empowerment is the participation and contribution to decision making in physical and economic activities in the household. Women were asked about their participation, input into decision making, and perceived extent to which they felt they contributed to the decisions on the following activities: chicken production (daily tasks, feeding,

watering, cleaning), chicken input use (feed, medicine), use of eggs for home consumption, marketing of eggs, slaughter of chickens for home consumption, marketing of chickens, land use (choice of crops and varieties), crop input se (Seeds, fertilizer, pesticide), daily tasks (home consumption, wedding ,watering), daily tasks for crops that are grown primarily for sale, use of food crops for home consumption, marketing of food crops, marketing of cash crops (chat, coffee, fodder, tobacco), non-farm economic activities (small business, self-employment, petty trade) and food expenditures. Figures 20-22 summarizes women's participation in poultry activities. Overall, 35-42% of women reported that they make the sole decision on chicken production, input, marketing and home consumption of eggs and chickens, while 22-35% reported that decisions on these activities are jointly made by both the spouse and the wife. Interestingly, 24-28% of women reported that they do not participate in economic activities such as marketing eggs and chicken. Non-participation of women was the highest in non-farm activities (54%).

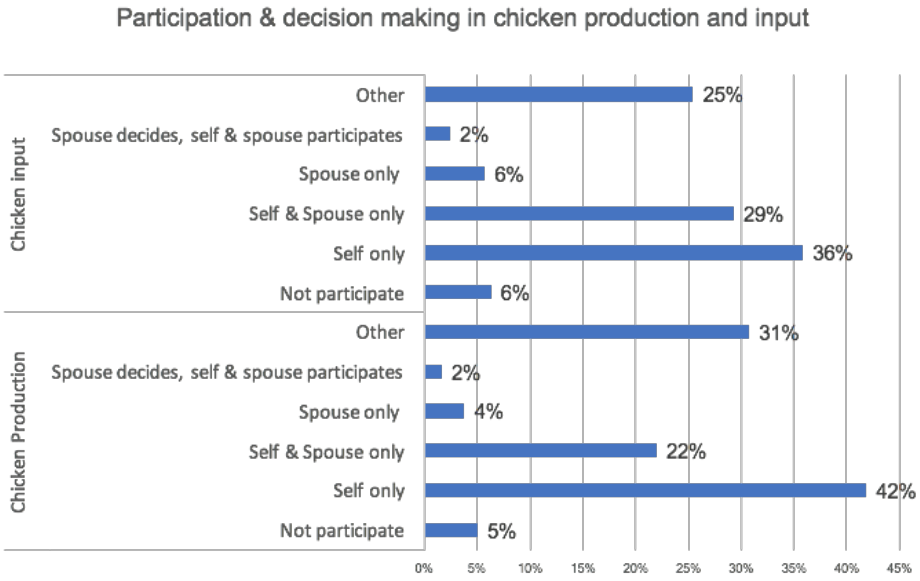


Figure 20: Women's participation and decision making on chicken production

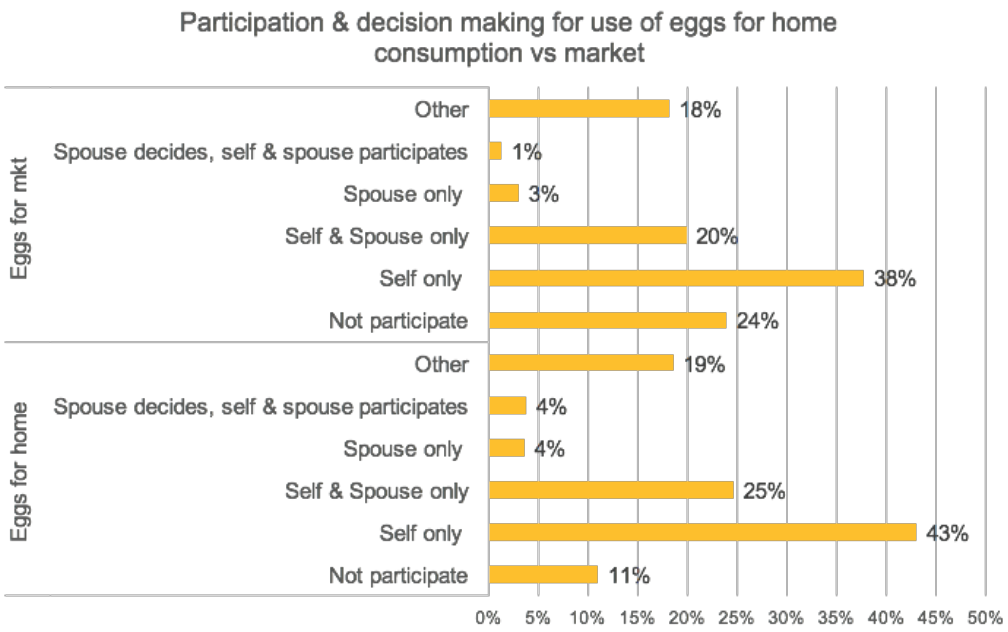


Figure 21: Women's participation and decision making on the eggs for home consumption versus selling in market

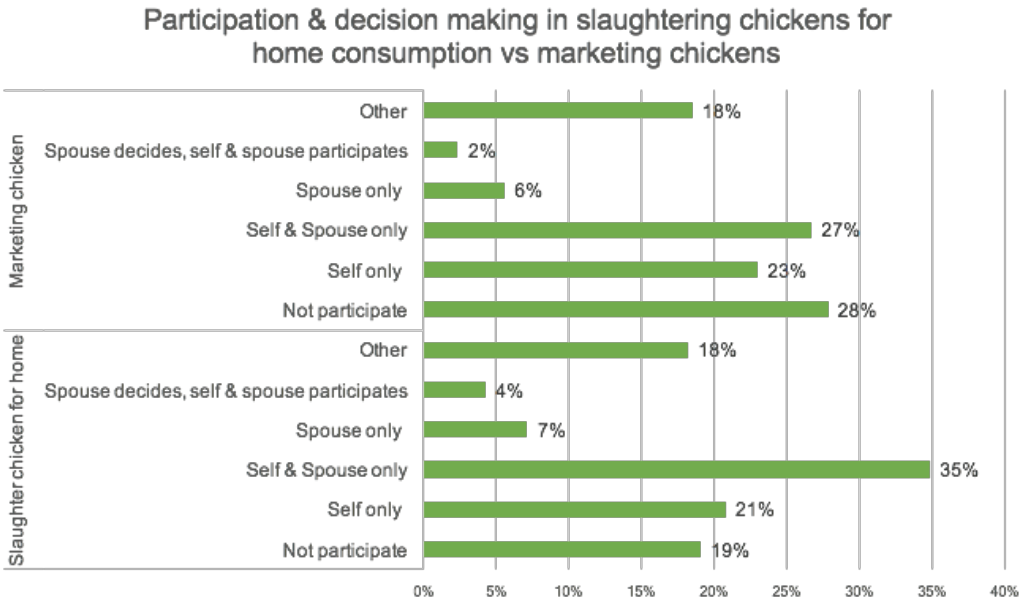


Figure 22: Women's participation and decision making on slaughtering chickens for home consumption versus selling in market

Although improving chicken production has the potential to improve overall household income and dietary intake, current literature suggests that there is a tradeoff between women's time use for poultry and child rearing. Given the existing evidence, ATONU measured women's time use using 24-hour recall with 15 minute intervals to assess the tradeoff. For each 15 minute interval,

participants were asked about resting, eating, personal care, caring for children, cooking, shopping socializing, agricultural activities such as farming, gardening and livestock rearing. Because some child rearing activities can be done in tandem, such as collecting water while carrying the child or cooking and watching over a sleeping child, women were also asked if they cared for the children for those 15 minute intervals. Results of the time use in hours by study arms are summarized in Figure 23. Overall, women spent less than 1 hour caring for children as a primary activity and spent 5-6 hours caring for children as a secondary activity. The largest time-intensive activities (besides sleeping and resting) were cooking, eating, and domestic work, which took about six hours a day. Agriculture activities took about 2.3-2.5 hours a day across the treatment arms. Women spent 1.1-1.5 hours in recreational activities such as religious events, social activities, and hobbies.

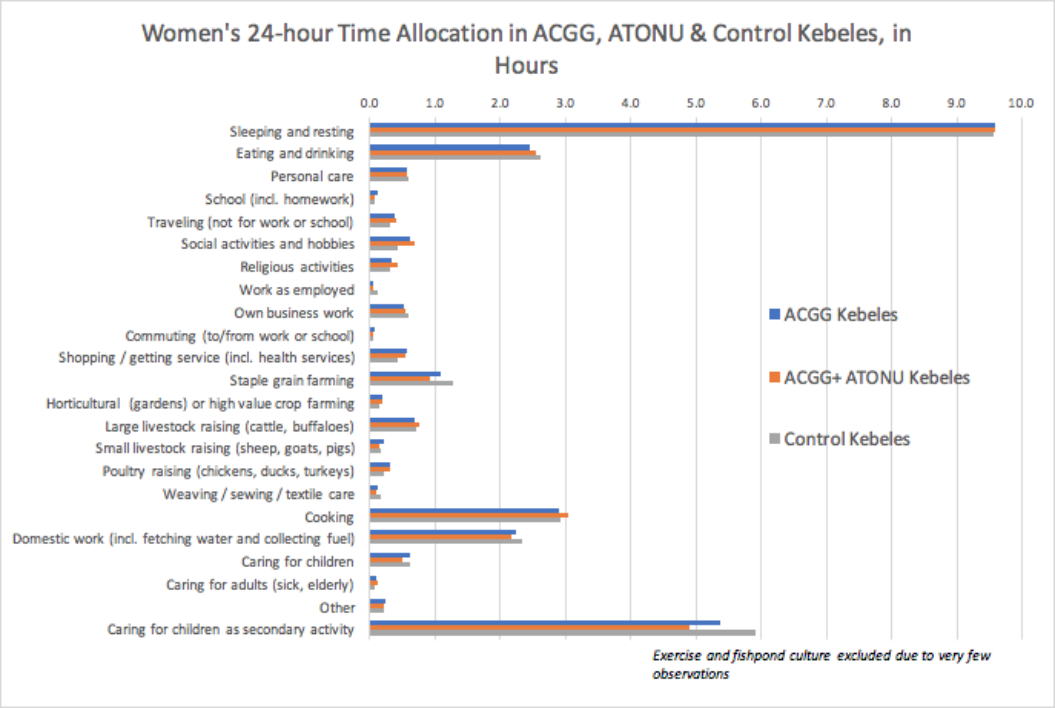


Figure 23: Women's time allocation by treatment arm

3.10 Food consumption and utilization

To assess the pathway between chicken production and consumption, women were specifically queried about egg consumption and cooking methods. Across the treatment arms, 28% of the women reported that the household consumed eggs in the last seven days, and among those households that consumed eggs in the last seven days, 66.3% were consumed by women, and 46.1% were consumed by the index child (Figure 24). Shown in Figure 25 is the method of cooking eggs with the most recent consumption. Half of the women reported that the eggs were fried and scrambled, while 18% reported cooking the egg in a stew.

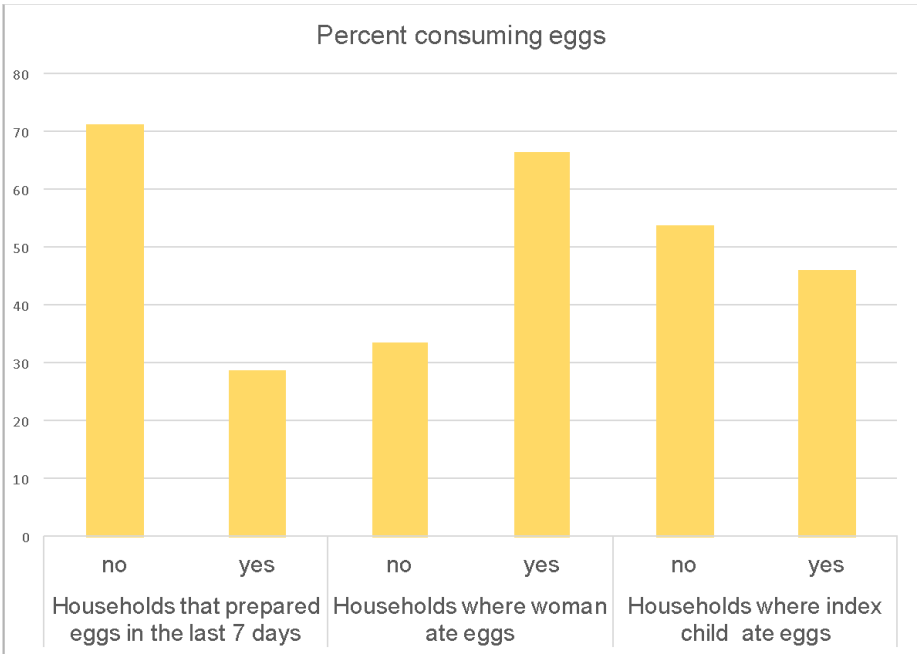


Figure 24: Household consumption of eggs

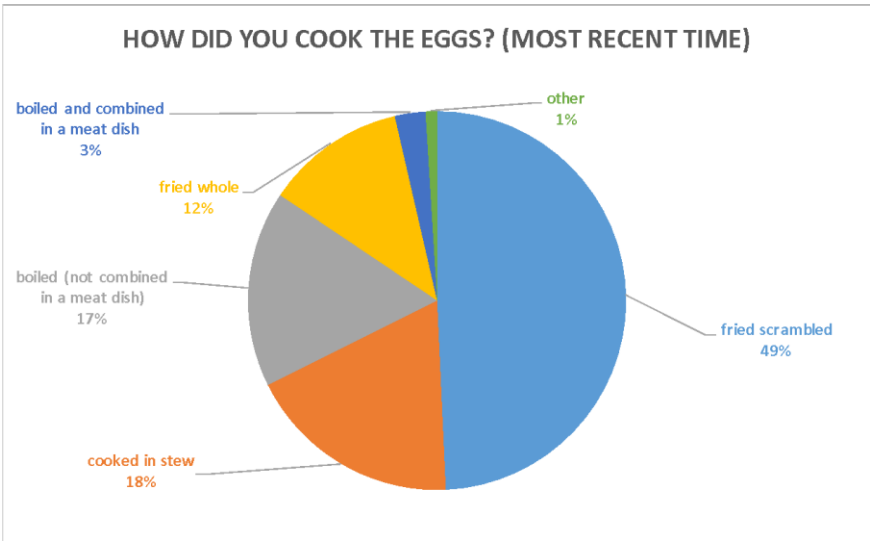


Figure 25: Method of cooking

3.11 Poultry related WASH indicators

A growing body of research has examined the role of environmental enteric disorder (EED), a sub-clinical disorder of the gut resulting from repeated exposure to contamination, in relation to child growth outcomes (Lin et al. 2013; Brown et al. 2013; Keusch et al. 2014;) . Given the recent research on the role of contamination in rural environments, it is critical to determine whether increased chicken production might introduce a harmful vector of contamination for

women and young children, and which WASH and chicken management practices are most strongly associated with child growth. Women in the ATONU study were questioned about poultry-related WASH indicators, which are summarized in Figure 26. Over 50% of the women reported that chickens sleep in the house and entered houses at some point during the last 24 hours. Direct observation from the enumerators show that over 60% of the households had visible animal feces around the house/compound. Shown in Figure 27 is the location of the poultry housing. One third of households reported the poultry coop was located either near or connected to the sleeping room. The average distance between dwelling area to corral was 4.2 meters and the average distance between dwelling area to trash heap with manure was 13.2 meters.

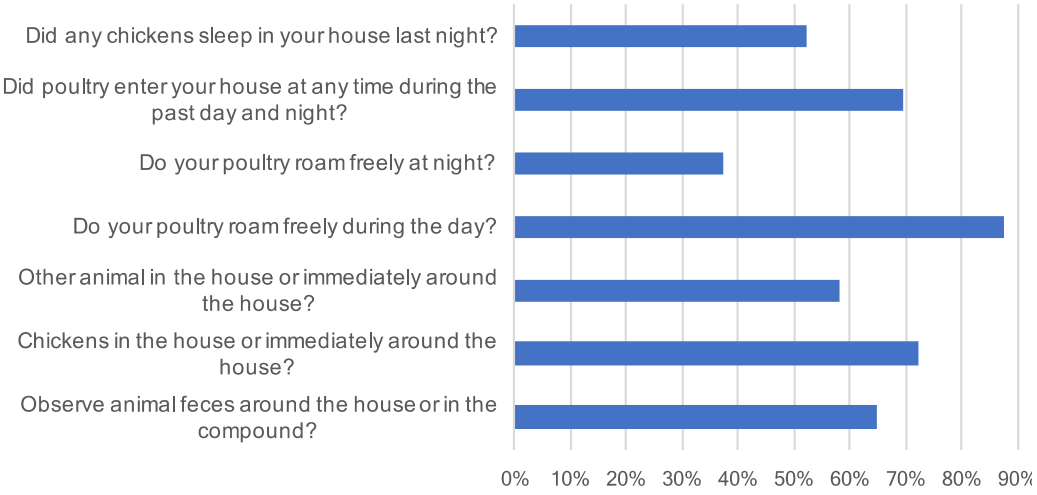


Figure 26: Poultry related WASH indicators

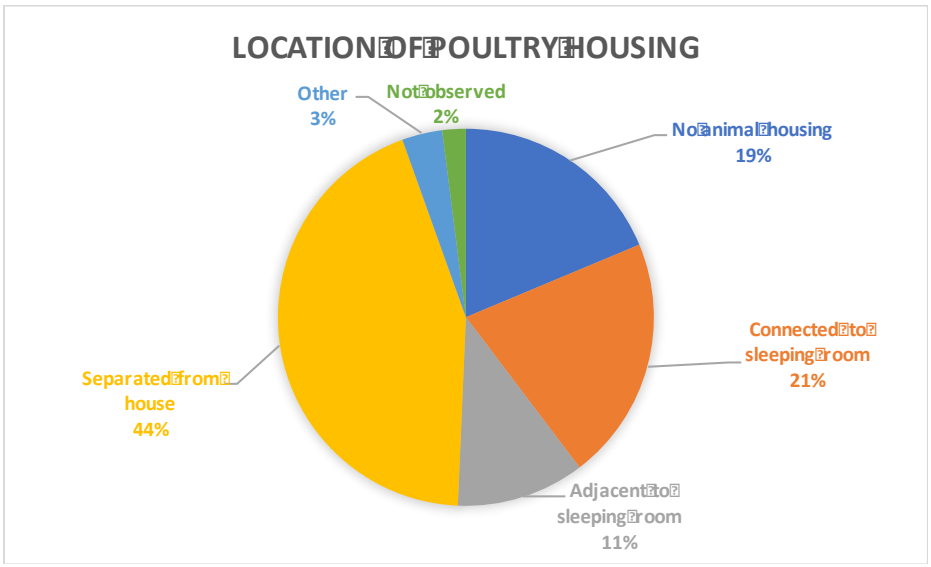


Figure 27: Location of the poultry housing

3.12 Dietary Diversity

The primary outcome of maternal dietary diversity in the ATONU project was assessed using two methods, (i) 24-hour dietary recall, and (ii) food frequency questionnaires administered to study women at baseline. In the 24-hour recall method, women were asked to recall foods consumed in the previous 24 hours from a provided list of common foods in Ethiopia. In the food frequency questionnaire method, women were asked to recall foods consumed in the previous 7 days from the provided list of common foods. Reported foods were converted to food groups based on guidance provided by Food and Agriculture Organization (FAO) for new Minimum Dietary Diversity for Women (MDD-W). As proposed by the FAO report, 10 food groups were computed: starchy staples; beans and peas; nuts and seeds; dairy; flesh foods (meats); eggs; vitamin A rich dark green vegetables; other vitamin A rich fruits and vegetables; other vegetables; and, other fruits. A dietary diversity score (DDS) was computed as the sum of food groups consumed out of the 10 possible food groups.

The 24-hour dietary recall findings suggest that the most commonly consumed staples in the study areas were maize and teff, and the most common vegetables were peas, cabbage and common beans. The most commonly consumed food groups were starchy staples, other fruits and vegetables (not Vitamin A rich produce), and legumes such as beans and peas, which were consumed by 50% or more women the previous day (see Figure 28). Consumption of fruits, nuts and seeds, eggs and meat groups were the lowest, with less than 6% of the women consuming these foods in the previous 24 hours. Overall, dietary diversity for women was poor, with most women consuming an average of 2.7 food groups out of 10 (standard deviation 1.1) in the previous 24 hours. When low dietary diversity was defined as consuming less than 5 out of 10 food groups, approximately 95 percent of the study women did not meet adequate dietary diversity requirements based on their consumption the previous 24 hours.

Findings from the 7-day food frequency method, as expected, showed more diversified consumption for women, although dietary diversity remained low (see

Table *11*). While the most common foods were similar, the least commonly consumed food groups with the 7-day food frequency questionnaire were nuts and seeds, other fruits, vitamin A rich orange and red fruits and vegetables, and meats. Overall, dietary diversity using the food frequency questionnaire was 3.7 food groups out of 10 (standard deviation 1.6). When low dietary diversity was defined as consuming less than 5 out of 10 food groups, approximately 71% of the study women did not meet adequate dietary diversity requirements.

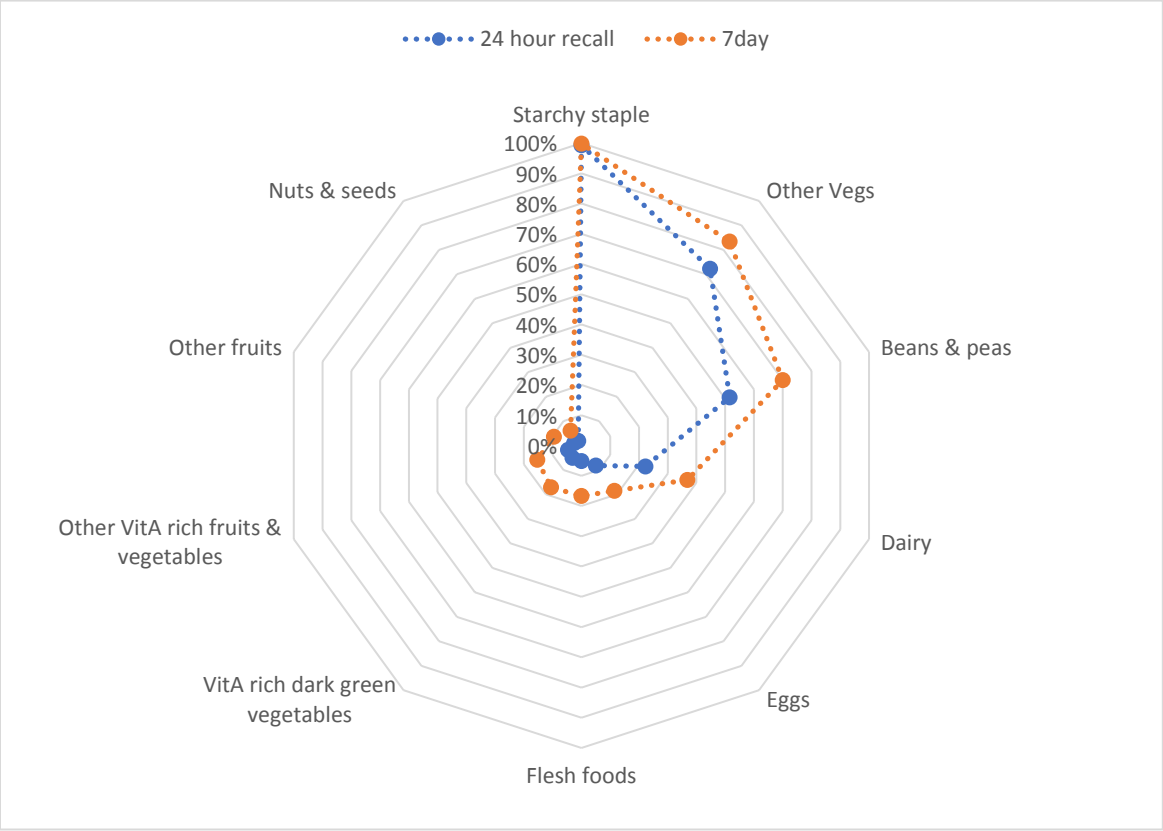


Figure 28: Dietary Diversity among women by 24-hour recall and 7 day FFQ

Table 11: Summary of DDS for women by 7 day FFQ and 24-hour recall

7 Day FFQ	**N**	**Mean**	**SD**	**Minimum**	**Maximum**
ACGG	710	3.8	1.6	1	9
ACGG/ATONU	709	3.9	1.7	1	9
Control	698	3.6	1.5	1	9
24-hour recall	**N**	**Mean**	**SD**	**Minimum**	**Maximum**
ACGG	710	2.8	1.1	1	7
ATONU	709	2.8	1.4	1	8
CONTROL	698	2.7	1.0	1	7

Dietary diversity for children in the study population was assessed based on the consumption of eight food groups: grains, roots and tubers; legumes and nuts; dairy; meats; eggs; vitamin A rich fruits and vegetables; other fruits and vegetables and fats and oils (Working Group on Infant and Young Child Feeding Indicators n.d.). The study findings indicate that on average children consumed 2.7 food groups (standard deviation 1.4) out of eight possible food groups (see Figure 29). The most commonly consumed food groups in both 24-hour recall and 7 day FFQ were staples, other fruits and vegetables, and dairy. DDS scores improved over age from 1.5 among 6-11 month old children to 3.2 among 24-35 month old children (see Figure 30). Despite the increase in DDS with age, child dietary diversity was still poor in this population.

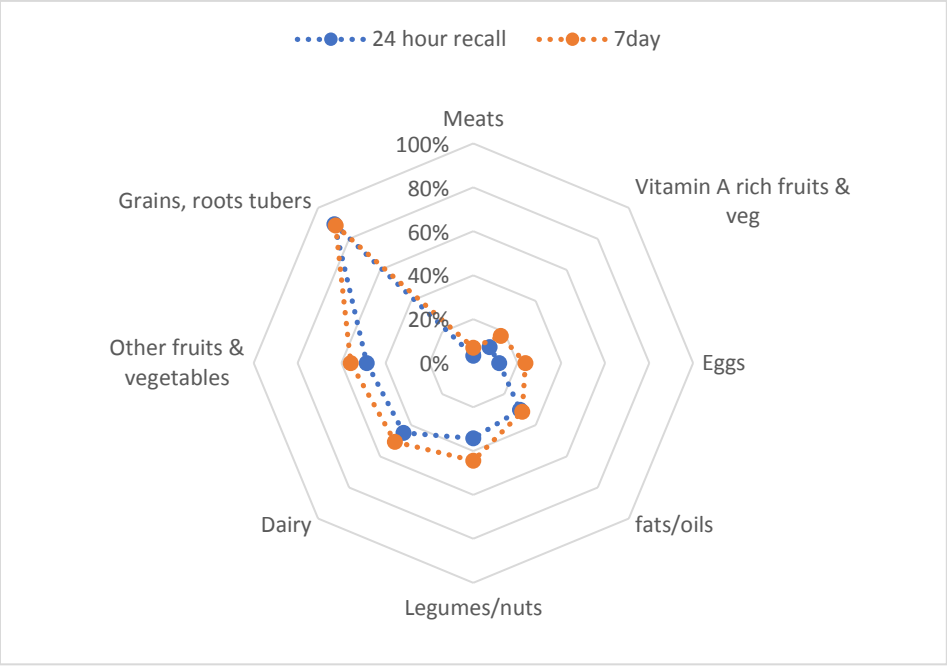


Figure 29: Dietary Diversity among children by 24-hour recall and 7 day FFQ

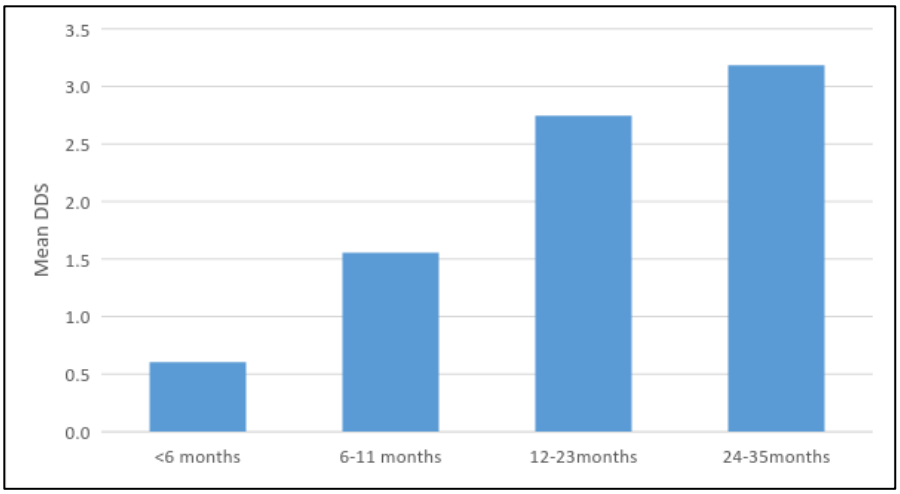


Figure 30: Average DDS among children by age

3.13 Nutritional Status of Women and Children

Breastfeeding

There is high prevalence of breastfeeding among children in the sampled population. Over 85% of women reported breastfeeding within the first hour of birth and giving their child colostrum. Over 97% of the mothers with children under six months of age reported that the child received breastmilk in the previous 24 hours. Across the age groups, 84% reported that their child had received breastmilk in the previous 24 hours. These results, summarized in Table 12, are consistent with the Ethiopia DHS 2016 where the decrease in breastfeeding rates occurs between 18 and 23 months of age (Central Statistical Agency 2016).

Table 12: Percent of children breastfed in the preceding day by age group

Age group	% Breastfed yesterday
0-5 mon	98.0
6-9 mon	98.8
10-12 mon	97.1
13-17 mon	89.6
18-24 mon	80.7
25-36 mon	55.5

Nutritional status

The sample population had poor maternal and child nutrition status. Child nutrition indicators show that malnutrition was relatively high among children with a stunting prevalence of 36.6%, underweight at 16.1% and wasting at 5.7%. Further, the prevalence of severe acute malnutrition was 2.0% and severe stunting affected 14.6% of the children. As summarized in Table 13,

stunting was lowest in Amhara at 29.7% compared to over 35% in the other regions, wasting was lowest in Oromia (2.8%), while underweight was least prevalent in SNNPR region (10.8%). Overall, child nutrition indicators suggest that malnutrition may be most challenging in Tigray region and least in Amhara region. While child weight for height (wasting) seems to improve in older children compared to younger children (see Figure 31), other indicators are more severe in older children compared to younger children in the study. Stunting (low height/length for age) and underweight (low weight for age) indicators decline with age and most children fall below -2 standard deviations and are stunted at 36 months of age (see Figure 32). There were minimal differences by gender: boys had slightly lower height for age z scores. Further, child malnutrition was higher in male compared to female children, with stunting (37% vs. 31%), wasting (6% vs. 5%) and underweight (18% vs. 15%) all showing similar trends.

Table 13: Prevalence of stunting by region

		Amhara	Oromia	SNNPR	Tigray
Stunting	N	54	99	71	56
	Prevalence	29.7	35.2	35.5	35.4
Wasting	N	8	8	10	21
	Prevalence	4.5	2.8	4.9	12.9
Underweight	N	28	49	22	37
	Prevalence	14.9	16.7	10.8	23.3

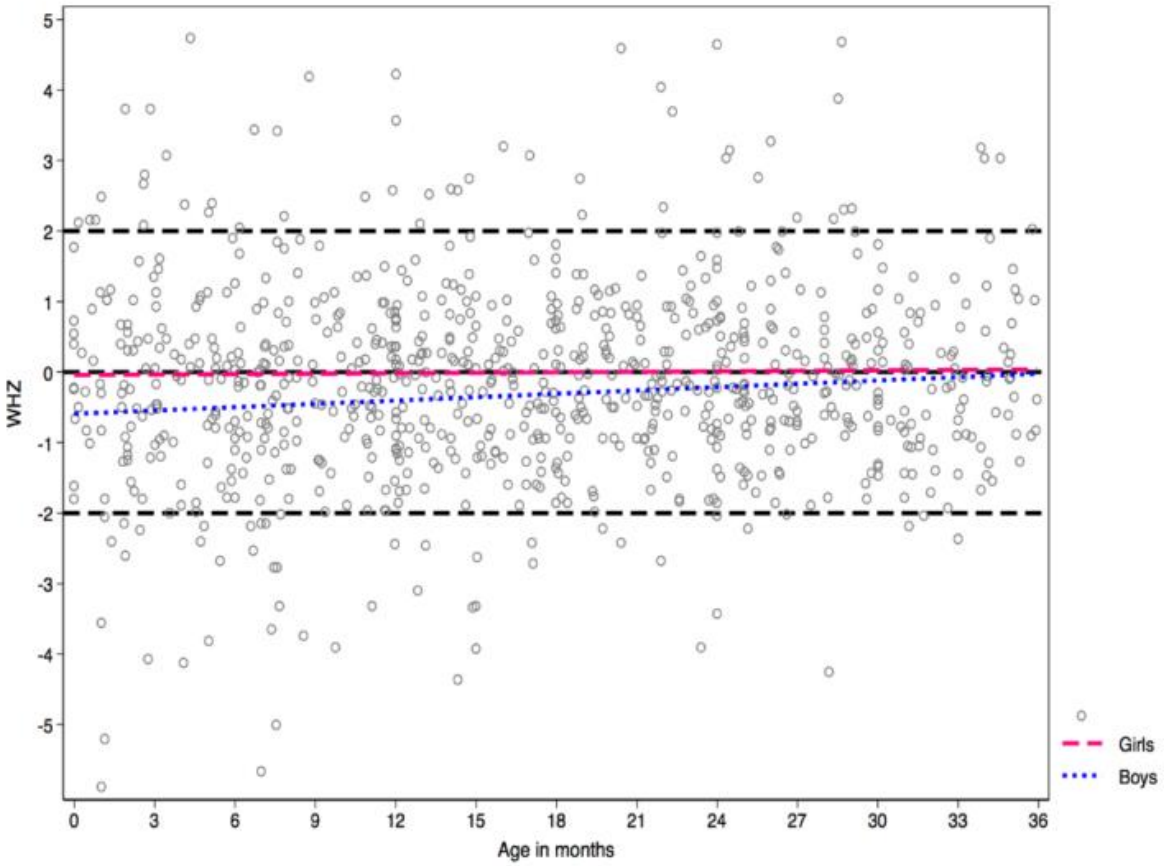


Figure 31: Weight for Length/Height Z score by age and gender

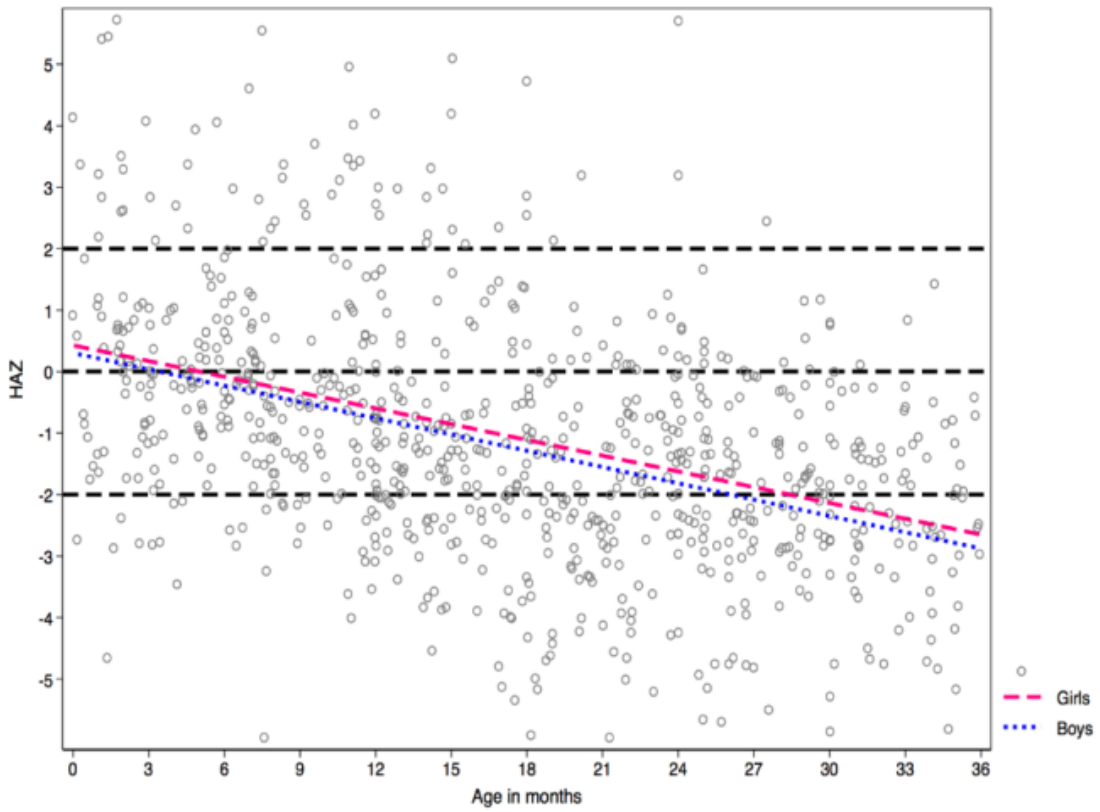


Figure 32: Height/Length for Age Z score by age and gender

Maternal nutritional status was poor, with 23.7% of women having a BMI of less than 18.5 kg/m^2, and 5.8% of the women were overweight or obese. Maternal wasting, shown in Figure 33, was assessed as mid upper arm circumference (MUAC) under 21 cm, and was generally low in the sampled population.

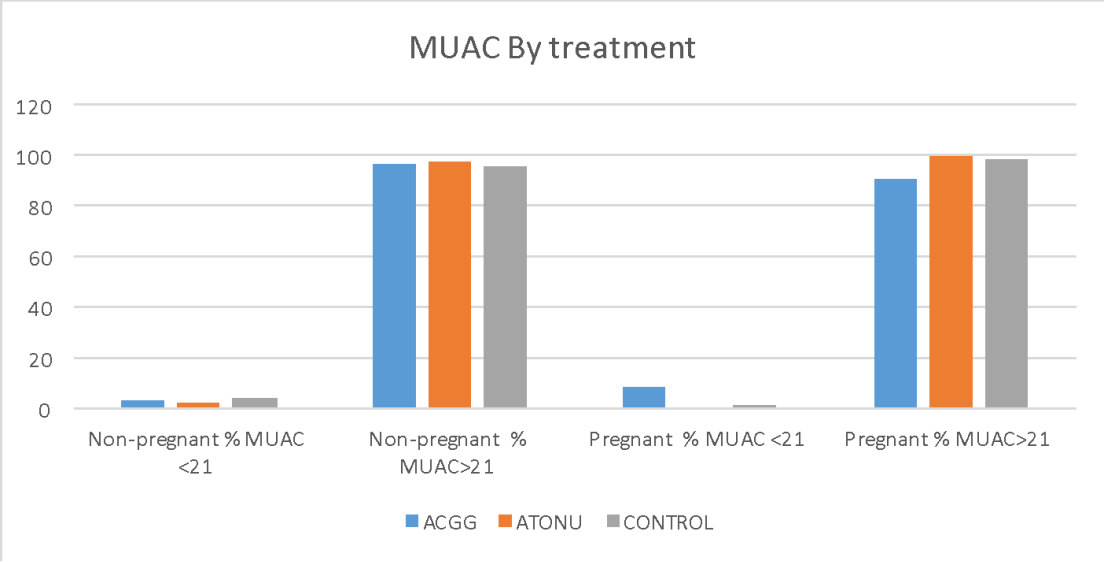


Figure 33: Mid upper arm circumference among women by treatment arm

Anemia among women and children

During the baseline assessment, 1,085 women of reproductive age (18-49 years) and 440 children (0-35 months) were randomly selected from the four regions of Amhara, Oromia, SNNPR and Tigray for hemoglobin assessments. HemoCue 201 machines were used in the field to determine the amount of hemoglobin from whole blood collected from selected participants. Individual hemoglobin results in (g/dl) were adjusted for altitude based on the GPS coordinates for respective regions (Sullivan et al. 2008). Children and women were categorized as anemic based on altitude adjusted values that fall below 110 g/l for children and pregnant and lactating women, and 120 g/l for women who are not pregnant or lactating (World Health Organization 2011). Over half the children were anemic, while only 20% of women were categorized as anemic (see Table 14). Summarized in Table 15 are the anemia rates by region. Amhara region had the lowest prevalence of anemia in both children and women compared to all other regions.

Table 14: Hemoglobin concentration in children (0-35 months) and women (15-49 years) olds

Hemoglobin (g/dl)	Children (0-35 months of age) n (%)	Women (15-49 years old) n (%)
Normal Hg	217 (49.3)	871 (80.4)
Anemia	223 (50.7)	212 (19.6)
Total	440 (100.0)	1083 (100.0)

Table 15: Hemoglobin concentration in children (0-35 months) and women (15-49 years) olds by region

Region	Hemoglobin (g/dl)	Children (0-35 months of age) n (%)	Women (15-49 years old) n (%)
Amhara	Normal Hg	52 (59.1)	228 (84.8)
	Anemia	36 (40.9)	41 (15.2)
Oromia	Normal Hg	61 (45.2)	260 (79.0)
	Anemia	74 (54.8)	69 (21.0)
SNNPR	Normal Hg	61 (50.8)	213 (78.6)
	Anemia	59 (49.2)	58 (21.4)
Tigray	Normal Hg	43 (44.3)	170 (79.4)
	Anemia	54 (55.7)	44 (20.6)

3.14 Market and Food Prices

Food availability and prices at the market were assessed at the kebele level among key informants that included developmental agents, traders, and farmers. One third of the respondents were developmental agents in the village, while another 40% were farmers. These respondents were asked about the availability of food, prices at which crops were sold and bought, along with units at which they are sold and bought. These questions covered prices for 25 items, which included four types of grains, four types of legumes, nine types fruits and vegetables, three dairy products, five meat products and cooking oil. Food price and availability were assessed for each of the last preceding 12 months. Shown in Figure 34 below is the heat map of food availability by calendar month sorted by lowest availability to highest availability of the 25 food items. Numbers in the cell indicate the frequency of respondents who reported availability. The color gradient between red to green indicates lower to higher frequency of foods. Frequently available foods across the seasons were cooking oil, maize, butter, and local chicken eggs, while vitamin A rich foods such as pumpkin, mango, papaya, carrots, dark green leafy vegetables, and organ meat were less frequently available. The largest trend observed in food availability were geo-spatial differences as summarized in Figure 35. Shown in Table 16 is the summary of food prices in the ATONU study areas. Wheat, sorghum, and barley show the smallest variation in prices, while meat products and dark green leafy vegetables show the largest variation in prices.

	January	February	March	April	May	June	July	August	September	October	November	December
	tir	yekatit	megabit	miyazia	ginbot	sene	hamle	nehase	meskerem	tikimet	hidar	tahsas
Pumpkin	10	4	3	3	2	4	7	8	13	6	7	7
Yogurt	11	13	10	13	14	11	14	20	10	13	12	10
Mango	10	16	23	12	16	14	14	12	11	11	10	17
Papaya	15	16	23	13	13	15	15	10	15	10	12	19
Carrots	46	27	12	15	15	12	13	13	17	16	18	21
Dark green leafy vegeti	19	17	21	17	16	15	27	17	29	19	18	29
Organ meat	21	20	18	33	18	37	37	36	26	26	45	16
Green Pepper	34	21	31	26	28	26	37	32	27	37	34	41
Orange	33	37	30	46	40	32	31	29	33	40	31	35
Milk	28	40	28	54	40	44	39	50	27	47	28	31
Banana	43	40	48	47	48	32	38	30	33	37	41	35
Chickpeas	31	43	31	50	52	39	40	43	38	46	38	37
Exotic chicken eggs	32	38	51	34	58	45	32	48	43	35	57	30
Peas	38	49	45	61	37	42	59	52	41	40	51	40
Barley	39	44	51	52	41	66	41	59	50	42	64	56
Lentils	62	68	57	49	50	49	39	45	63	59	41	60
Common beans	60	49	48	51	56	50	61	36	49	56	68	62
Live Chicken	64	60	61	52	82	77	52	50	58	53	65	58
Sorghum	89	51	64	63	48	59	61	67	63	53	55	72
Wheat	61	69	70	56	60	63	71	81	58	69	65	55
Beef meat	70	68	70	53	59	58	61	78	56	71	68	73
Local chicken egg	51	61	65	78	71	80	60	65	69	58	54	73
Butter	55	78	58	77	68	73	93	67	89	78	73	59
Cooking oil	88	93	100	60	92	83	82	86	84	88	66	85
Maize	120	108	112	115	106	104	106	96	128	120	109	109

Figure 34: Heat map of food availability by seasons across the ATONU study

Amhara

Amhara	January	February	March	April	May	June	July	August	September	October	November	December
	tir	yekatit	megabit	miyazia	ginbot	sene	hamle	nehase	meskerem	tikimet	hidar	tahsas
Maize	27	31	26	31	23	21	20	16	27	26	24	27
Wheat	10	9	9	9	11	11	8	14	8	10	11	10
Sorghum	15	10	16	15	10	16	14	18	13	12	12	8
Barley	7	9	10	9	14	10	7	9	13	11	12	8
Common bea	14	5	11	6	9	13	21	7	6	10	20	16
Chickpeas	7	17	5	13	3	9	7	3	6	3	4	5
Lentils	2	2	1	1	2	1	0	1	2	9	2	2
Peas	10	11	8	9	8	8	8	8	8	9	9	14
Dark green l	3	4	4	3	0	6	5	2	2	2	3	12
Pumpkin	0	0	0	0	0	0	0	2	1	1	1	0
Carrots	3	3	2	2	3	1	0	1	2	2	2	2
Mango	2	2	3	1	1	2	3	2	3	1	1	2
Papaya	4	6	4	4	3	3	3	3	4	4	4	4
Green peppe	9	5	8	7	7	4	12	11	6	9	6	7
Banana	6	4	5	4	4	5	5	5	4	4	4	4
Orange	5	6	9	5	5	4	7	4	4	4	7	7
Milk	4	6	4	8	10	3	3	4	3	6	3	4
Yogurt	1	1	1	2	1	1	1	1	1	1	1	1
Organ meat	1	1	1	1	1	1	1	1	1	1	1	1
Beef meat	5	4	4	4	4	4	4	5	4	4	4	4
Live chicken	16	16	11	12	23	11	13	14	18	11	14	14
Local chicken	15	13	24	15	18	18	17	31	14	18	15	16
Exotic chicke	10	11	10	11	10	19	10	10	12	11	12	9
Cooking oil	8	7	7	8	12	7	8	8	14	7	7	8
Butter	16	17	17	20	18	22	23	20	24	24	24	21

Oromia

Oromia	January	February	March	April	May	June	July	August	September	October	November	December
	tir	yekatit	megabit	miyazia	ginbot	sene	hamle	nehase	meskerem	tikimet	hidar	tahsas
Maize	45	44	41	41	38	41	38	33	39	45	45	37
Wheat	25	27	21	21	21	22	26	25	21	28	32	27
Sorghum	29	16	18	17	17	17	13	21	16	25	17	18
Barley	7	9	9	10	11	9	11	8	8	9	10	9
Common bea	15	23	13	18	18	15	15	18	12	21	15	19
Chickpeas	4	7	7	7	11	9	9	9	9	7	14	10
Lentils	19	15	16	16	22	17	14	14	12	17	17	11
Peas	12	15	16	15	15	13	17	24	21	14	14	18
Dark green l	1	1	0	4	1	0	0	0	1	0	0	0
Pumpkin	2	0	0	0	0	1	2	4	2	3	2	2
Carrots	13	18	5	6	5	5	4	7	6	6	5	7
Mango	0	0	1	2	1	2	1	0	0	0	0	1
Papaya	1	2	1	1	0	0	1	1	1	1	1	2
Green peppe	12	6	6	7	9	10	12	7	10	16	11	15
Banana	7	13	10	12	9	8	10	7	8	7	13	8
Orange	3	5	3	5	5	5	4	5	9	4	6	5
Milk	6	7	7	22	7	19	7	7	7	7	11	7
Yogurt	3	2	2	4	4	4	3	6	3	2	3	4
Organ meat	0	0	0	0	0	0	1	0	0	0	0	0
Beef meat	21	14	25	16	17	16	13	20	13	15	16	14
Live chicken	24	16	14	16	29	20	13	13	13	14	18	16
Local chicken	12	26	21	22	21	26	17	15	25	14	19	16
Exotic chicke	6	9	12	5	6	8	6	9	7	7	8	5
Cooking oil	24	21	46	21	32	27	33	43	27	30	26	33
Butter	16	11	12	17	14	14	21	26	15	12	16	15

SNNPR

SNNPR	January	February	March	April	May	June	July	August	September	October	November	December
	tir	yekatit	megabit	miyazia	ginbot	sene	hamle	nehase	meskerem	tikimet	hidar	tahsas
Maize	24	12	13	12	16	12	20	16	17	17	15	12
Wheat	13	13	9	16	8	9	10	9	11	15	11	12
Sorghum	14	10	15	8	7	16	8	11	9	10	9	19
Barley	15	16	21	18	11	37	16	24	12	11	32	24
Common bea	22	12	17	14	22	12	12	10	13	20	17	17
Chickpeas	14	12	13	26	24	12	18	20	18	17	15	20
Lentils	36	46	38	26	29	31	23	29	39	28	24	44
Peas	14	19	17	30	13	13	22	19	14	14	17	13
Dark green l	10	7	15	8	11	8	21	9	21	13	8	8
Pumpkin	8	4	3	3	1	2	3	4	8	3	4	4
Carrots	12	4	5	5	5	6	6	6	6	5	5	5
Mango	7	9	9	5	6	10	10	9	8	10	8	6
Papaya	9	5	14	4	5	10	10	5	10	5	6	10
Green peppe	7	6	8	9	7	8	9	10	9	9	8	10
Banana	24	16	27	22	27	27	15	20	16	17	15	19
Orange	18	21	12	29	25	17	15	14	14	16	26	12
Milk	11	20	10	17	16	10	22	22	10	21	11	9
Yogurt	7	7	7	7	9	7	7	7	16	7	9	7
Organ meat	20	19	17	30	17	35	36	36	35	24	25	44
Beef meat	37	43	34	25	30	30	35	45	45	33	39	41
Live chicken	16	17	27	17	21	37	18	15	15	19	19	22
Local chicken	12	10	12	23	11	16	12	11	13	12	11	21
Exotic chicke	10	9	21	12	32	10	10	23	13	13	10	30
Cooking oil	46	51	37	22	41	29	30	28	34	39	25	32
Butter	17	35	22	35	29	31	30	16	42	34	27	22

Tigray

Tigray	January	February	March	April	May	June	July	August	September	October	November	December
	tir	yekatit	megabit	miyazia	ginbot	sene	hamle	nehase	meskerem	tikimet	hidar	tahsas
Maize	24	21	32	34	26	33	33	24	39	34	36	21
Wheat	13	20	31	10	19	17	28	37	11	12	16	10
Sorghum	31	15	15	23	14	14	18	22	16	14	16	18
Barley	10	10	10	14	7	8	10	18	16	10	11	11
Common bea	9	9	7	13	10	10	10	7	9	11	12	15
Chickpeas	6	7	6	4	14	9	6	11	7	12	9	7
Lentils	5	5	2	0	2	3	2	3	5	5	4	5
Peas	2	4	4	7	3	4	5	4	5	3	7	2
Dark green l	5	5	2	2	4	1	1	5	6	4	7	7
Pumpkin	0	0	0	0	0	0	0	0	1	0	0	0
Carrots	18	2	2	2	2	1	0	0	3	4	4	5
Mango	1	5	10	5	7	1	1	1	0	0	0	3
Papaya	1	3	4	5	5	1	1	1	0	0	0	3
Green peppe	6	4	9	3	5	4	4	4	2	4	9	9
Banana	6	7	6	9	8	4	3	2	4	11	7	4
Orange	7	5	6	7	5	7	4	2	9	4	4	5
Milk	7	7	7	7	7	7	12	7	17	7	9	7
Yogurt	0	3	0	0	0	0	0	0	0	0	0	1
Organ meat	0	0	0	2	0	0	0	0	0	1	0	0
Beef meat	7	7	7	8	8	8	9	8	8	6	13	7
Live chicken	8	11	9	7	9	9	8	8	8	9	4	11
Local chicken	12	12	8	18	21	20	14	8	17	14	9	20
Exotic chicke	6	9	8	6	10	8	6	6	11	7	7	6
Cooking oil	10	14	10	9	7	20	11	7	9	12	8	12
Butter	6	15	7	5	7	6	19	5	8	8	8	9

Figure 35: Food availability by four regions of the ATONU study

Table 16: Summary of food prices in the ATONU study (ordered by standard deviation)

Food prices	Mean	SD	Min	Max
Wheat [A]	9	3.07	4	21
Sorghum [A]	8	3.58	3	48
Barley [A]	8	4.06	2	24.5
Carrots [A]	8	4.12	1	20
Mango [A]	14	5.88	1	40
Pumpkin [C]	7	6.14	2	25
Yogurt [B]	14	6.61	4	30
Milk [B]	13	7.49	2	36
Cooking oil [B]	33	8	2	60
Chickpeas [A]	15	8.06	2	48
Peas [A]	18	8.3	4	50
Common beans [A]	18	9.67	1	40
Exotic chicken eggs [C]	3	0.5	1.2	3.5
Orange [A]	22	10.55	1	35
Maize [A]	8	12.55	1.5	99
Lentils [A]	40	12.74	1	120
Green pepper [A]	18	12.98	2	60
Local chicken eggs [C]	4	0.44	1	3
Beef meat [A]	127	28.58	1	180
Organ meat [A]	53	29.42	10	180
Live chicken [C]	110	34.57	1	200
Butter [A]	132	47.32	2.5	250

[A] ETB/ Kg
[B] ETB /liter
[C] ETB/ number, e.g. ETB per 1 egg or ETB per 1 chicken

4. Summary and Future Steps

Overall, the study population for this evaluation—rural, chicken-producing smallholders in Ethiopia's four main regions—are vulnerable households with high food insecurity and high prevalence of poor nutritional outcomes among women of reproductive age and young children. These outcomes are the target of the ACGG and ATONU interventions.

In general, the study population is comparable to the general rural population in the study areas, as described by the DHS and other nationally representative surveys. It is possible that our study population may be slightly wealthier compared to the general population as a result of the

inclusion criterion of owning chickens. The baseline data show that the treatment arms are largely comparable, though with a few differences noted between intervention arms and the control arm. For key outcomes such as food security and nutritional status, there is also regional variation. The sampling, which was designed such that all treatment arms are represented in each woreda, allows for comparison of treatment arms with balance across regions. In addition to intention-to-treat primary analyses, secondary analyses will additionally control for baseline characteristics. Further statistical methods will be explored to account for any potential bias that may be due to baseline differences between the treatment arms.

Overall, the implementation of baseline data collection proceeded efficiently, with 2,658 households screened and 2,117 enrolled over six weeks, despite security concerns throughout the study area at the time of data collection. The use of tablets for electronic data collection reduced the time required for data compilation and cleaning and ensured data quality.

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Appendices

Appendix A. ATONU Ethiopia Baseline Household Head Questionnaire

1. Cover Page

Respondent Identification		
The items below (shaded in grey) should be filled in by the FIELD SUPERVISOR OR COORDINATOR before data collectors leave for the field. If you have any questions, see your FIELD SUPERVISOR before visiting the household.		
	Household ID:	
	Respondent Name:	
	Woreda:	
	Kebele:	

Visit Details		
	Date (Western calendar)	[_|_] - [_|_] - [_|_|_|_] DD – MM – YYYY
	Enumerator ID:	
	Supervisor ID:	
	Time started	[_|_] : [_|_] AM: PM
	Time completed	[_|_] : [_|_] AM: PM
	Latitude	☐.☐☐☐☐☐☐select one: N S
	Longitude	☐☐.☐☐☐☐☐☐
	Altitude	☐☐☐☐ meters above sea level

2. Eligibility Confirmation

If household is not in an ACGG kebele, skip to question 2.2.

NUM	QUESTION	CODE	
2.1	If household is in an ACGG intervention kebele, has household consented to participate in ACGG?	0. No 1. Yes	If 0, >> end interview If 1, >> 2.4
2.2	If household is not in an ACGG intervention kebele, has the household been raising chickens for two years or more?	0. No 1. Yes	If 0, >> end interview
2.3	If household is not in an ACGG intervention kebele, does the household keep less than 50 chickens?	0. No 1. Yes	If 0, >> end interview
2.4	Does the household have a woman 18-49 years of age or else a younger girl who is an emancipated minor?	0. No 1. Yes	If 0, >> end interview
2.5	Does the woman in 2.4 intend to remain in the study area for the duration of this study?	0. No 1. Yes	If 0, >> end interview
2.6	Has the respondent provided fully documented informed consent?	0. No 1. Yes	If 0, >> end interview

3. Basic Household Head Information

	Household head's full name		
	Sex of household head	1=Female 2=Male	
	Age of household head (years)	☐☐	
	Household head's marital status	1=married, monogamous 2=married, polygamous 3=cohabiting 4=single 5=widowed 6=divorced/separated	
	Religion of household head	1. Orthodox 2. Muslim 3. Protestant	

		4. Catholic 5. Other (specify)	
	What is the relationship of the household head (respondent) to the woman of reproductive age identified for interview?	Woman is the household head Spouse Child Grandchild Sibling In-law Other relative Non-relative Other (specify)	

4. Household Roster:

READ: A household includes persons who live together (sleep in the same compound) and take most of their food from the same pot (i.e., share food) for at least half of the past 12 months. Include hired labour, students, and spouses living and working in another location who meet this definition, as well as recently born children. Exclude visitors and individuals who have passed away or permanently left the household (e.g., through marriage or migration).

PID NUMBER	List names of household members, starting with the household head (respondent)	Sex 1 Male 2 Female	How old is [NAME]? **Use years only if 5 years or older.** **Use both years and months if less than 5 years. For example, a child aged 40 months in total would be recorded as 3 years and 4 months.**		Relationship to head Member is the household head Spouse Child Grandchild Sibling Parent In-law Other relative Non-relative	Primary Occupation Farmer/works on family farm Agricultural wage laborer Non-agricultural wage laborer Student Too young for school or work Domestic work Trader/petty trade Professional (teacher, health care worker, local government, etc.) Unemployed/ looking for work 10. Other (specify___)	Highest grade of schooling obtained Did not complete any schooling 1st grade 2nd grade 3rd grade 4th grade 5th grade 6th grade 7th grade 8th grade 9th grade 10th grade 11th grade, vocational (TVT) 11th grade, preparatory 12th grade, vocational (TVT) 12th grade, preparatory Incomplete university education Completed university education Adult literacy program participation Other literacy program Some Church/Mosque School
			YEARS	MONTHS			

01							
02							
03							
04							
05							
06							
07							
08							
09							
10							
11							
12							
13							
14							
15							

5. Housing and Assets

5.1: Housing

	Main house	**Responses**	**SKIP**
	Main type of walls	Rudimentary wall (mud, cardboard, …) Palm, bamboo, straw, leaves Traditional wall made from stones Finished wall (concrete, corrugated metal, wood) Other (specify_____)	
	Main type of roof	Rudimentary: grass, palm, leaves, straw Plastic sheeting, cardboard Finished roof (metal, wood, corrugated metal, tile, etc) Other (specify_____)	
	Main type of floor	Natural (EARTH/SAND) Wood/Bamboo Concrete Finished (TILE/CERAMIC/MOSAIC) Other (specify_____)	

	Does your household have running water?	1=Yes, 0=No	
	Does your household have grid electricity?	1=Yes, 0=No	
	What is the most common cooking fuel used in this household?	1. Wood 2. Charcoal 3. Dung 4. Plant stalks (maize and others) 5. Kerosene/paraffin 6. Other (specify_____)	
	What is your household's main source of fuel or energy for lighting?	Electricity Solar power Gas Paraffin Open firewood place Other (specify_____)	

5.2: Household Assets

	Question Num.	*Asset*	*How many of each of the following items does your household own? (if none or item is non-functional, write 0)*
Farm implements		Sickle	
		Hoe	
		Spade or shovel	
		Axe	
		Knapsack sprayer	
		Ox-plough	
Transport		Horse/mule cart	
		Donkey/oxen cart	
		Horse/mule saddle	
		Bicycle	

		Motorbike/motor scooter (Motor scooter)	
		Car/truck	
Household implements		Stone grain mill	
		Motorized grain mill	
		Improved charcoal/wood stove	
		Kerosene stove	
		Water carrier	
		Refrigerator	
		Watch/clock	
		Table	
		Chair	
		Bed with cotton/sponge/spring mattress	
		Electric mitad	
		Kerosene lamp/pressure lamp	
Communication		Radio	
		Tape player	
		Mobile phone	
		Non-mobile phone (land line)	
		Television	
Land		Land owned (timad)	
		Land cultivated (including rented land) (timad)	

5.3: Participation in Institutions

Participation in rural institutions

		Is there a [GROUP] in your community?	Are you yourself currently an active member of [GROUP] ?
1	Savings and credit association, equb	0=no 1=yes 2=don't know	0=no 1=yes
2	Input supply group, farmer cooperative or	0=no 1=yes 2=don't know	0=no 1=yes
3	Crop marketing group	0=no 1=yes 2=don't know	0=no 1=yes
4	Women's association	0=no 1=yes 2=don't know	0=no 1=yes
5	Youth association	0=no 1=yes 2=don't know	0=no 1=yes
6	Church/mosque association or congregation	0=no 1=yes 2=don't know	0=no 1=yes
7	Funeral association	0=no 1=yes 2=don't know	0=no 1=yes

1 Has your household received food or other aid or participated in any government or NGO programs in the past 12 months? _____ 1 Yes, 0 No
IF "NO", >>NEXT TABLE

Type of aid/program	Did you participate in this program in the last 12 months? 1 Yes 2 No	Which agency or organization implemented the program? 1 Federal government 2 Regional government 3 NGO 4 Private company 5 Research organization 6 Other, specify_____	How much income or in-kind payment did you receive in the last 12 months from the program?	
			Cash (Birr)	Value of in-kind (Birr) *Have respondent estimate the value if they received any goods in-kind*
Productive Safety Net Program (PSSP)				
Emergency relief				
Agricultural support program				

Nutrition program				
Health program				
Other (specify name)_____				

In the past 12 months, have you yourself received any nutrition or agriculture information from the following sources?

Source of information	Do you own or have access to [source]: 1=Yes, =No	Do you receive information from following sources		How often do you get information from [source]? 1= Daily 4= Occasionally 2= Weekly 5= Rarely 3= Monthly 6= Never	
		On crops or livestock 1=Yes, 0=No	On human nutrition or health 1=Yes, 0=No	Crops or livestock	Human nutrition or health
Radio					
Mobile phone					
Posters					
Farmer/marketing group					
Social or religious group					
5:1 group					
Family, friends, or neighbors					
Development agents					
Training at farmer training center (FTC)					
Input traders					
Community health workers					
Health post or other health facility					
NGOs					
Local administration					
Other, specify: ……..…….					

6. Agricultural Production

6.1: Land

[ENUMERATOR]: *Now I would like to ask you about your agricultural land.*

	How many plots does your household currently have for agricultural use? Please include land used for crop cultivation, home gardening, livestock production, grazing, fodder,	**___ ___ plots**

	renting out, keeping fallow, and as forest/timber. This land may be owned, rented, borrowed, or sharecropped.	

List plot numbers below, starting with Plot 1 Starting with plot number 1,	How long does it take to walk to this plot from your house ?	What is the size of this plot?	Is this plot____? 1. Owned 2. Rented 3. Borrowed 4. Sharecropped 5. Other	How was this plot used in the previous Meher? 1. Crop cultivation 2. Homegarden 3. Livestock production 4. Grazing land/fodder 5. Rented out 6. Fallow 7. Forest/timber 8. Other	How was this plot used in the previous Belg? 1. Crop cultivation 2. Homegarden 3. Livestock production 4. Grazing land/fodder 5. Rented out 6. Fallow 7. Forest/timber 8. Other
	MINUTES	**# Timads**	**CODE**	**CODE**	**CODE**

6.2: Crop Production

Copy plot numbers with codes 1 (crop cultivation) or 2 (home garden) from questions 6.1.6 and 6.1.7 for the corresponding seasons. Repeat plot number if there are multiple crops on the plot.

[ENUMERATOR]: Now I would like to ask you about the crops produced by your household on these plots, starting with the full Major season and full Minor season.

Major Season

Season		Plot Number *Repeat plot number if there are multiple crops on the plot.*	What crop was planted on this plot during [SEASON]?	What was the area planted with [CROP] on this plot during [SEASON]?	How much TOTAL [CROP] was harvested from this plot during [SEASON]?	Of this, how much was sold? *If none sold, skip >> 6.2.8*	What was the total income earned from [CROP] during [SEASON]?	How much of the amount harvested was lost, due to things like spoilage and pests?	How much of the amount harveste d was consum ed?	How much of the amount harvested was saved for seed?	How much of the amount harvested was used for other purposes, like exchange or gifts?
			CODE 1	**# Timads**	**# KGS**	**# KGS**	**ETB**	**# KGS**	**# KGS**	**# KGS**	**# KGS**
Meher	1										
	1										
	1										
	1										
	1										
	1										
	1										
	1										
	1										
	1										
	1										
	1										

	1										
	1										
	1										

Minor Season

Season		Plot Number *Repeat plot number if there are multiple crops on the plot*	What crop was planted on this plot during [SEASON] ?	What was the area planted with [CROP] on this plot during [SEASON]?	How much TOTAL [CROP] was harvested from this plot during [SEASON]?	Of this, how much was sold? *If none sold, skip >> 6.2.19*	What was the total income earned from [CROP] during [SEASON]?	How much of the amount harvested was lost, due to things like spoilage and pests?	How much of the amount harveste d was consum ed?	How much of the amount harvested was saved for seed?	How much of the amount harvested was used for other purposes, like exchange or gifts?
			CODE 1	**# Timads**	**# KGS**	**# KGS**	**ETB**	**# KGS**	**# KGS**	**# KGS**	**# KGS**
Belg	1										
	1										
	1										
	1										
	1										
	1										
	1										
	1										
	1										
	1										
	1										
	1										
	1										
	1										

	1										
	1										

Code 1: Crops

GRAINS	White maize	Yellow maize	White teff	Black teff	Mixed teff	Wheat
	Millet	Sorghum	Rice	Oats	Amaranth	Barley
FODDER/FIBER	Clover	Alfalfa	Eucalyptus			
LEGUMES	Fava beans	Field peas	Pigeon peas	Haricot bean	Lentils	Chickpea
	Cow pea	Groundnut				
OILSEEDS	Sunflower	Sesame	Linseed	Rapeseed		
ROOTS/TUBERS	Yellow sweet potato	White sweet potato	Orange sweet potato	Cassava	Irish potato	Enset
DARK GREEN LEAVES	Sweet potato leaves	Cassava leaves	Amaranth leaves			
VEGETABLES	Onions	Tomato	Carrot	Cabbage	Squash	Lettuce
	Garlic	Spinach	Peppers	Cucumber		
CASH CROPS	Chat	Sugarcane	Coffee	Tobacco		
FRUITS	Pawpaw	Banana	Pineapple	Avocado	Orange	Mango
OTHER CROP, SPECIFY						

7. Agricultural inputs

7.1: Crop inputs

For the past full major and minor season (specify months/year), I would like to ask you about the inputs for each of these crops, starting with the first crop you mentioned. Note: this is asked at the crop level, not the plot level

Crop (Copied from previous module)		Inorganic fertilizer used (If not used, put Zero)				Manure Used			Seed use				Herbicide and/or pesticide use	
		Amount of DAP (Kg)	Total cost DAP (ETB)	Amount of Urea (Kg)	Total cost of Urea (ETB)	Total amount (kg)	Total cost (ETB)	Source 1.Own farm 2.Neighbor 3.Market 4. Other	Main Source of improved seed	Amount of Improved seed used (KG)	If Bought Total cost of impro	Amount of own saved/ gift seed/se	Litres	Total herbicide cost (ETB)

									(Code A)		ved seed (ETB)	edlings (kg)		
	CODE													

Code A

Own saved	Farmer groups/Coops	Bought from seed company
Gift from family/neighbor	Local seed producers	Provided free by NGOs
Farmer to farmer seed exchange	Local trader	Govt subsidy program
On-farm trials	Agro-dealers	OTHER (specify)_____
Extension demo plots		

8. Livestock

8.1: Livestock Ownership

Please tell me of the livestock your household currently owns. *[HELP THE RESPONDENT TO ESTIMATE THE PRESENT VALUE OF LIVESTOCK IF HE/SHE WERE TO SELL]*

	Animal type	**Quantity** (if 0, skip >>NEXT ROW)	**Total Value (ETB)**	**Owned by** *(Choose all applicable)* 1.Self 2.Spouse 3. Other adult HH member 4. Other non-household member 5. Children 6. Other	**Primary caretaker** *(Choose all applicable)* 1.Self 2.Spouse 3. Other adult HH member 4. Other non-household member 5. Children 6. Other
	Local bulls				
	Exotic bulls				
	Local cows				
	Exotic cows				
	Sheep				
	Local goats				
	Exotic goats				
	Pigs				
	Donkeys				
	Rabbits				
	Local chickens				
	Improved chickens				
	Turkeys				
	Ducks				
	Other poultry (specify___)				
	Fish/aquaculture				
	Beehives				
	Other livestock (specify___)				

	Animal type	Which genotype(s) is/are your [ANIMAL TYPE]? **Use codes below**	Over the past 12 months, how many of your [ANIMAL TYPE] have you been given to you for free?	Over the past 12 months, how many of your [ANIMAL TYPE] have been purchased?	Over the past 12 months, how many of your [ANIMAL TYPE] have been born/hatched?	Over the past 12 months, how many of your [ANIMAL TYPE] have been **slaughtered** to be consumed In the household?	Over the past 12 months, how many of your [ANIMAL TYPE] were **lost** (e.g. died, culled, stolen, eaten by predators)? *If 0, skip >>11*	What did you do with the chickens that died? **Code** 1. Ate them 2. Disposed of them 3. Fed them to animals 4. Nothing 5. Other	Over the past 12 months, how many of your [ANIMAL TYPE] have been **given out as gift**?	Over the past 12 months, how many of your [ANIMAL TYPE] have you **sold**? [WRITE 0 IF NONE and >> NEXT LINE]
CODE										
	Local chickens									
	Improved chickens									

Genotype codes:
Kuroiler, 2. Koekoek, 3. Embrapa 051, 4. Sasso, 5. Fayoumi, 6. Horro, 7. Other (specify_____), 8. Don't know

8.2: Income from livestock

How much income did you earn in the past 12 months from the following sources?

NUM	ANIMAL TYPE	Meat products or sale of animals from [ANIMAL Type]?	Dairy products from [ANIMAL Type]?	Manure sales from [ANIMAL Type]?	Egg sales from [ANIMAL Type]?	Honey sales from [ANIMAL Type]?	Other (rental/hide/ wool)
		ETB	**ETB**	**ETB**	**ETB**	**ETB**	**ETB**
	Large ruminants (cattle)						
	Equines (e.g. horses, donkeys, and mules)						
	Small ruminants (sheep, goats)						
	Chickens						
	Other monogastrics (e.g. pigs, pheasants, ducks)						
	Honey bees						

8.3: Egg production

NUM	QUESTION	CODE	SKIP
	How many eggs were produced by your household's chickens last week?	__ __ __ eggs	
	How many of these did your household sell last week?	__ __ __ eggs	If "0"→ 8.3.4
	How much did your household earn from egg sales last week?	__ __ __ ETB	
	How many eggs did your household give away?	__ __ __ eggs	
	How many eggs did your household retain for chick production?	__ __ __ eggs	
	How many eggs did your household consume as food last week?	__ __ __ eggs	

8.4: Chicken Inputs

In the past 12 months, how much did you spend on the following for your household's chickens?

NUM	QUESTION	CODE	SKIP
	Feed?	__ __ __ ETB	
	Veterinary services, including immunizations?	__ __ __ ETB	
	Housing and fencing?	__ __ __ ETB	

9. Household Income from Non-Agricultural Sources

Source No.	Source	Did your household receive any amount (cash and cash equivalency of in-kinds) during the last year from [source]? 1 Yes 2 No >> Next source	What was the frequency of receipts? 1 Monthly 2 Yearly >>Q7.3.6	For how many months did your household receive any amount during the last year from [source]?	Average amount of monthly receipts >>next item	Total Amount Received in past year (if yearly)
		CODE	**CODE**	**NUMBER**		**Birr**
1	Agricultural employment outside homestead (day labor, etc.)					
2	Non-farm employment, including laborer, business, office work, and all services (do not include self-employment)					
3	Family business/self-employment/petty trade					
4	Building rent					
5	Land rent					
6	Gifts/ assistance from family or friend					
7	Rent from equipment/tools/vehicle					
8	Rent from animals leased out					
9	Pension					
10	Remittances from a household member who migrated (in country or abroad)					
11	Sale of farm assets					
12	Sale of non-farm assets					
13	Assistance from government/NGO/UN organization (specify_____)					
14	Other (specify): _____					

10. Household Expenditures

10.1: Frequent Expenditures (monthly)

	Item name	In the **last 30 days** did your household	How much did the household spend on the item in the	Who makes decisions on these expenditures?

		spend money on this item? *(0=no, 1=yes)*	*last 30 days*? [ETB]	*(Choose all applicable)* 1.Self 2.Spouse 3. Other adult HH member 4. Other non-household member 5. Children 6. Other
	Food expenditures (cash only)			
	Fuel (firewood, charcoal, kerosene, gas, …)			
	Other household expenses (soap, detergent, …)			
	Transport expenses			
	Communication (mobile phone, post, …)			
	Entertainment (socializing)			
	Utilities (electric bill, water)			
	Personal care (barber, hair dresser, …)			
	Savings (individual or group)			
	Other, specify			

10.2: Less Frequent Expenditures (past 12 months)

	Item name	In the past 12 months, did your household spend money on this item? *(*0=no, 1=yes)	How much did the household spend on the item in the *last 12 months*? (ETB)	Who makes decisions on these expenditures? *(Choose all applicable)* 1.Self 2.Spouse 3. Other adult HH member 4. Other non-household member 5. Children

				6. Other
	Clothes and shoes (including school uniforms)			
	School fees and other educational expenses			
	Social events (wedding, funeral, etc)			
	Housing improvement (latrine, new roof, etc)			
	Human health expenses (medicine, hospital , …)			
	Taxes			
	Other, specify_____			

Appendix B. ATONU Ethiopia Baseline Woman of Reproductive Age Questionnaire
A. Cover Page

Respondent Identification		
The items below (shaded in grey) should be filled in by the FIELD SUPERVISOR OR COORDINATOR before data collectors leave for the field. If you have any questions, see your FIELD SUPERVISOR before visiting the household.		
	Household ID:	
	Household Head Name:	
	Woreda:	
	Kebele:	

Visit Details		
	Date (Western calendar)	[_|_] - [_|_] - [_|_|_|_] DD – MM – YYYY
	Enumerator ID:	
	Supervisor ID:	
	Time started	[_|_] : [_|_] AM: PM
	Time completed	[_|_] : [_|_] AM: PM
	Latitude	☐.☐☐☐☐☐☐select one: N S
	Longitude	☐☐.☐☐☐☐☐☐
	Altitude	☐☐☐☐ meters above sea level
	Respondent's (Woman's) Name	

B. Eligibility Confirmation

THE INTERVIEWED WOMAN OF REPRODUCTIVE AGE (18-49 YEARS OR AN EMANCIPATED MINOR 15-17 YEARS) SHOULD BE THE BIOLOGICAL MOTHER OF THE INDEX CHILD AGED 0-35 MONTHS WHEN AN INDEX CHILD IS PRESENT IN THE HOUSEHOLD. IF THE BIOLOGICAL MOTHER IS NOT AVAILABLE OR IS NOT A HOUSEHOLD MEMBER, INTERVIEW THE CAREGIVER OF THE INDEX CHILD. IF THE HOUSEHOLD DOES NOT HAVE AN INDEX CHILD, RANDOMLY SELECT ONE WOMAN OF REPRODUCTIVE AGE (18-49 YEARS OR AN EMANCIPATED MINOR 15-17 YEARS) TO BE THE RESPONDENT.

If the household is not in an ACGG kebele, skip to question B2.

NUM	QUESTION	CODE	
	If household is in an ACGG intervention kebele, has household consented to participate in ACGG?	0. No 1. Yes	If 0, >> end interview If 1, >> B4
	If household is not in an ACGG intervention kebele, has the household been raising chickens for two years or more?	0. No 1. Yes	If 0, >> end interview
	If household is not in an ACGG intervention kebele, does the household keep less than 50 chickens?	0. No 1. Yes	If 0, >> end interview
	Is the respondent a woman 18-49 years of age or an emancipated minor 15-17 years?	0. No 1. Yes	If 0, >> end interview
	Does the woman intend to remain in the study area for the duration of this study?	0. No 1. Yes	If 0, >> end interview
	Has the woman provided fully documented informed consent?	0. No 1. Yes	If 0, >> end interview

IF ALL ELIGIBILITY CRITERIA ARE MET, PROCEED TO SECTION C. IF ANY CRITERIA ARE NOT MET, STOP THE INTERVIEW.

C. Woman's Information

NUM	QUESTION	CODING CATEGORIES	SKIP
	What is your relationship to the household head?	Respondent is household head Respondent is spouse of head Respondent is child of head Respondent is grandchild of head Respondent is sibling of head Respondent is in-law of head Respondent is other relative of head Respondent is non-relative of head	
	HOW OLD ARE YOU?	Years	
	DO NOT READ: *Did the woman sign her own name on the consent form?*	0. No 1. Yes	
	Identify the 0-35 month-old child who will serve as index child and for whom the respondent is the biological mother or primary caregiver. Prioritize interviewing the biological mother of the index child. If there are multiple children 0-35 months, randomly select one child to be the index child. Has an index child 0-35 months been identified?	0. No 1. Yes	

	If there is an index child, what is the child's birth date *If exact birthdate unknown, probe respondent for month and year, and approximate day based on whether it was the beginning or end of the month. Whenever possible, confirm this from the child's health card.*	[_|_] - [_|_] - [_|_|_|_] DD – MM – YYYY		D. Food
	How was the child's birth date assessed?	Child's health card Official document other than health card Caregiver's recall Other person's recall Other (specify)_____		
	If there is an index child, what is your relation to him/her?	Respondent is biological mother Respondent is caregiver, no relation Respondent is caregiver, relation Respondent is other (specify_____)		
	If there is an index child, identify the next oldest child in the household. What is your relationship to this next oldest child?	Respondent is biological mother Respondent is caregiver, no relation Respondent is caregiver, relation Respondent is not a caregiver There is no next oldest child		

Consumption

D1: Food Frequency Questionnaire
What best characterizes yesterday?
Typical day
Fasting day
Holiday
Special event such as wedding
Other (please specify_____)
Ask woman respondent questions D.1.2-D.1.4 about each food listed below, beginning with "Teff".

	FOOD	Did you consume [FOOD] in the last 7 days? 0. No 1. Yes *If "0"→ next food*	How many days in the past 7 days did you consume [FOOD]? ____*days*	Did you consume [FOOD] yesterday? 0. No 1. Yes
Foods made from grains (such as injera, bread, porridge)	Teff			
	Maize			
	Rice			
	Wheat			
	Sorghum			
	Barley			
	Amaranth grain			
	Pasta			
	Other foods made from grain (specify_____)			
oots and tubers and plantains	Plantains			
	Enset			
	White or yellow-sweet potato			
	Yam			
	White cassava			
	Other white starchy staples (specify_____)			
Puls es (bea ns,	Common beans			

	Chickpeas			
	Lentils			
	Peas			
	Cowpea			
	Bambara			
	Other beans, peas, or bean/pea products (specify_____)			
Nuts and seeds	Sunflower seeds			
	Sesame seeds			
	Groundnuts			
	Other nuts or seeds (specify_____)			
Dark green leady vegetables	Kale			
	Spinach			
	Amaranth leaves			
	Cassava leaves			
	Sweet potato leaves			
	Other dark leafy greens, incl. foraged leaves (specify_____)			
Vitamin A-rich vegetables, roots and tubers	Pumpkin			
	Carrots			
	Squash			
	Orange-fleshed sweet potato			
	Yellow cassava (improved variety)			
	Other vitamin A rich vegetables that are orange or red (e.g. red sweet pepper) (specify_____)			
Vitamin-A rich fruits	Ripe mango			
	Guava			

	Ripe papaya			
	Cantaloupe			
	Other locally available orange fruits (specify_____)			
	100% fruit juice made from these orange fruits			
Other vegetables	Tomato			
	Onion			
	Eggplant			
	Green pepper			
	Cucumber			
	Cabbage			
	Other local vegetables (specify_____)			
Other fruits	Ripe banana			
	Pineapple			
	Apple			
	Orange			
	Other local and/or wild fruits (specify_____)			
	100% fruit juice made from these other fruits			
Red palm oil	Red palm oil			
Milk and milk products	Milk			
	Cheese			
	Yogurt			
	Other milk products, NOT incl. ice cream and butter (specify_____)			
Organ meat	Liver			
	Other organ meat (kidney, heart, intestines) (specify_____)			
Meat and pou	Beef meat			

	Goat meat			
	Chicken meat			
	Other poultry meat (specify_____)			
	Lamb			
	Rabbit			
	Other flesh meat (specify_____)			
Fish and seafood	Fish or dried fish, shellfish or seafood			
Eggs	Chicken eggs			
	Other eggs (specify_____)			
Other oils and fats	Butter			
	Vegetable oil (fortified)			
	Vegetable oil (unfortified)			
	Other oil/fats for cooking and adding to food (specify_____)			
Savory and fried snacks	Crisps, chips, French fries, fried dough and other fried foods			
Sweets and sweetened beverages	Vitamin A-fortified sugar			
	Unfortified Sugar/honey (including use in beverages)			
	Cakes/Candies/chocolates/sweet biscuits			
	Other sweets (specify_____)			
	Sweetened juice, soda and other sugar-sweetened beverages			

Condiments and Seasonings	Iodized salt *(if they do not know, can check container if available)*			
	Non-iodized salt			
	Hot sauce, fish sauce, chilies, spices, herbs, tomato paste, flavor cubes, or other condiments			
Other beverages and foods	Tea			
	Coffee			
	Clear broth			
	Alcohol			
	Any other foods (specify)			

Ask woman respondent questions D.1.5-D.1.7 about index child's consumption of each food listed below, beginning with "Teff".

c	**FOOD**	Did [INDEX CHILD NAME] consume [FOOD] in the last 7 days? 0. No 1. Yes *If "0"→next food*	How many days in the past 7 days did [INDEX CHILD NAME] consume [FOOD]? ____*days*	Did [INDEX CHILD NAME] consume [FOOD] yesterday? 0. No 1. Yes
Foods made from grains (such as injera, bread, porridge)	Teff			
	Maize			
	Rice			
	Wheat			
	Sorghum			
	Barley			
	Amaranth grain			
	Pasta			
	Other foods made from grain (specify_____)			

Roots and tubers and plantains	Plantains			
	Enset			
	White and yellow sweet potato			
	Yam			
	Cassava			
	Other white starchy staples (specify_____)			
Pulses (beans, peas and lentils)	Common beans			
	Chickpeas			
	Lentils			
	Peas			
	Cowpea			
	Bambara			
	Other beans, peas, or bean/pea products (specify_____)			
Nuts and seeds	Sunflower seeds			
	Sesame seeds			
	Groundnuts			
	Other nuts or seeds (specify_____)			
Dark green leafy vegetables	Kale			
	Spinach			
	Amaranth leaves			
	Cassava leaves			
	Sweet potato leaves			
	Other dark leafy greens, incl. foraged leaves (specify_____)			
Vitamin A-rich vegetables, roots and	Pumpkin			
	Carrots			
	Squash			

	Orange-fleshed sweet potato			
	Yellow-fleshed cassava (improved variety)			
	Other vitamin A rich vegetables that are orange or red (e.g. red sweet pepper) (specify_____)			
Vitamin-A rich fruits	Ripe mango			
	Guava			
	Ripe papaya			
	Cantaloupe			
	Other locally available orange fruits (specify_____)			
	100% fruit juice made from these orange fruits			
Other vegetables	Tomato			
	Onion			
	Eggplant			
	Green pepper			
	Cucumber			
	Cabbage			
	Other local vegetables (specify_____)			
Other fruits	Ripe banana			
	Pineapple			
	Apple			
	Orange			
	Other local and/or wild fruits (specify_____)			
	100% fruit juice made from these other fruits			
Red palm oil	Red palm oil			
Milk and milk	Milk			

	Cheese			
	Yogurt			
	Other milk products, NOT incl. ice cream and butter (specify_____)			
Organ meat	Liver			
	Other organ meat (kidney, heart, intestines) (specify_____)			
Meat and poultry	Beef meat			
	Goat meat			
	Chicken meat			
	Other poultry meat (specify_____)			
	Lamb			
	Rabbit			
	Other flesh meat (specify_____)			
Fish and seafood	Fish or dried fish, shellfish or seafood			
Eggs	Chicken eggs			
	Other eggs (specify_____)			
Other oils and fats	Butter			
	Vegetable oil (fortified)			
	Vegetable oil (unfortified)			
	Other oil/fats for cooking and adding to food (specify_____)			
Savory and fried snacks	Crisps, chips, French fries, fried dough and other fried foods			
Sweets and swe	Vitamin A-fortified sugar			

	Unfortified Sugar/honey (including use in beverages)			
	Cakes/Candies/chocolates/sweet biscuits			
	Other sweets (specify_____)			
	Sweetened juice, soda and other sugar-sweetened beverages			
Condiments and Seasonings	Iodized salt *(if they do not know, can check container if available)*			
	Non-iodized salt			
	Hot sauce, fish sauce, chilies, spices, herbs, tomato paste, flavor cubes, or other condiments			
Other beverages and foods	Tea			
	Coffee			
	Clear broth			
	Alcohol			
	Any other foods (specify)			

D2: Egg Consumption

	Did you prepare eggs in the past 7 days?	Yes 0. No If "no", skip to D.2.12

The questions in the following section ONLY refer to the last time eggs were prepared in the last 7 days.

NUM	QUESTION	CODING CATEGORIES	SKIP
	The most recent time you prepared eggs this past week, how did you cook them?	Boiled and combined in a meat dish Boiled (not combined in a meat dish) Fried scrambled Fried whole	

		Cooked in stew Other (specify)	
	How many eggs did you cook at this time?	____ ____ (Number)	
	What other ingredients were included? (check all that apply)	No other ingredients Oil Butter Legumes White sweet potatoes Orange sweet potatoes Leafy green vegetables Other vegetables Chicken, beef or other meats Herbs/spices Other (specify_____)	
	Who ate the eggs at this time? *select all that apply*	Self Index child Next oldest child Household head Other household members Non-household members	
	Number of eggs you (*woman of reproductive age*) consumed at this time	____ ____ . ____ _____ eggs	
	Number of eggs index child consumed at this time	____ ____ . ____ _____ eggs	*If no index child in household, → skip*
	Number of eggs next oldest child consumed at this time	____ ____ . ____ _____ eggs	*If no "next oldest child" in household, → skip*

	Number of eggs any other children in household consumed at this time	____ ____ . ____ _____ eggs	*If no other children in household, → skip*
	Number of eggs household head consumed at this time	____ ____ . ____ _____ eggs	*If woman is household head → skip*
	Number of eggs others consumed at this time	____ ____ . ____ _____ eggs	
	How old should a child be before they are given eggs?	____ ____ Months	
	How old should a child be before they are given chicken meat?	____ ____ Months	
	How old should a child be before they are given chicken liver?	____ ____ Months	

D3: Food Expenditures

	FOOD CATEGORY	Did the household consume any items from (*category*) in the last month? 1. Yes 2. No *If no, >>next food*	What was the main source? 1. Own production 2. Market 3. Hunting/ fishing/gathering 4. Received as gift 5. Received in exchange for labor 6. Food aid 7. Other (specify)	*If "2" for D.3.2* What was the price the last time you purchased (*item*)? **Price in ETB per KG**	What was the total household expenditure on (*category*) in the last month? **ETB**
	Foods made from grains (such as injera, bread, porridge, or rice)				
	Other starchy foods such as roots, tubers (like white sweet potato, yam or cassava) and plantains or enset				
	Pulses (like beans, peas and lentils)				
	Nuts and seeds, (like groundnuts, treenuts and sunflower seeds)				

	Dark green leady vegetables, like spinach, amaranth leaves, or sweet potato leaves				
	Vitamin A-rich vegetables, roots and tubers				
	Vitamin-A rich fruits				
	Other vegetables				
	Other fruits				
	Milk and milk products (not butter)				
	Chicken meat or organs				
	Other organ meat				
	Other meat and poultry				
	Fish and seafood				
	Chicken eggs				
	Other eggs				
	Red palm oil				
	Other oils and fats (including butter)				
	Savory and fried snacks (like fried dough, chips)				
	Sweets, sweetened beverages, condiments, seasonings, and other beverages and foods				

D4: Household Food Insecurity

Ask of each month below. Begin with the current month of the previous year.

Record starting month:
Tarr
Yekatit
Makawit
Miaziah
Genbot
Sanni
Hamle
Nashi
Quaggimi
Maskarram
Tekemr
Hadar
Tahsas

Record starting year (Ethiopian calendar): [ ][ ][ ][ ]
Y Y Y Y

Did you experience shortage of food in the [MONTH] the past year?

Tarr	Yekatit	Makawit	Miaziah	Genbot	Sanni	Hamle	Nashi	Maskarram	Tekemr	Hadar	Tahsas	1st	2nd	3rd
No Yes	No Yes	No Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes			

D.4.18. In the past four weeks, did you worry that your household would not have enough food? *Please circle a number.*	Never……..	0
	Rarely (once or twice in the past four weeks)……	1
	Sometimes (three to ten times in the past four weeks)…..	2
	Often (more than ten times in the past four weeks)……....	3
D.4.19. In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources? *Please circle a number.*	Never……..	0
	Rarely (once or twice in the past four weeks)……	1
	Sometimes (three to ten times in the past four weeks)…..	2
	Often (more than ten times in the past four weeks)……....	3
D.4.20. In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources? *Please circle a number.*	Never……..	0
	Rarely (once or twice in the past four weeks)……	1
	Sometimes (three to ten times in the past four weeks)…..	2
	Often (more than ten times in the past four weeks)……....	3
D.4.21. In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of	Never……..	0
	Rarely (once or twice in the past four weeks)……	1
	Sometimes (three to ten times in the past four weeks)…..	2
	Often (more than ten times in the past four weeks)……....	3

resources to obtain other types of food? *Please circle a number.*	
D.4.22. In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food? *Please circle a number.*	Never…….. 0 Rarely (once or twice in the past four weeks)…… 1 Sometimes (three to ten times in the past four weeks)….. 2 Often (more than ten times in the past four weeks)…….. 3
D.4.23. In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food? *Please circle a number.*	Never…….. 0 Rarely (once or twice in the past four weeks)…… 1 Sometimes (three to ten times in the past four weeks)….. 2 Often (more than ten times in the past four weeks)…….. 3
D.4.24. In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food? *Please circle a number.*	Never…….. 0 Rarely (once or twice in the past four weeks)…… 1 Sometimes (three to ten times in the past four weeks)….. 2 Often (more than ten times in the past four weeks)…….. 3
D.4.25. In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food? *Please circle a number.*	Never…….. 0 Rarely (once or twice in the past four weeks)…… 1 Sometimes (three to ten times in the past four weeks)….. 2 Often (more than ten times in the past four weeks)…….. 3
D.4.26. In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food? *Please circle a number.*	Never…….. 0 Rarely (once or twice in the past four weeks)…… 1 Sometimes (three to ten times in the past four weeks)….. 2 Often (more than ten times in the past four weeks)…….. 3

E. Infant and Young Child Health and Feeding

Enumerator: Ask of respondent for identified INDEX CHILD. If there is no index child, skip to next section.

E1: General Health Information

NUM	Question	CODE	SKIP
	What is the child's full name?	_____	

	Has (*name*) had diarrhea in the last two weeks, that is, since (*day of the week*) of the week before last? **Diarrhea** is determined as perceived by mother or caregiver, or as three or more loose or watery stools per day, or blood in stool.	0. No 1. Yes 2. Don't know	If "0" or "2", →E1.7
	In the last two weeks (14 days), for how many days did *(name)* have diarrhea?	___ ___ days	
	During this last episode of diarrhea, did (*name*) drink any of the following: Read each item aloud and record response before proceeding to the next item. A. A FLUID MADE FROM A SPECIAL PACKET CALLED ORS LOCALLY KNOWN AS „HIWOT ADHIN NITRE MEDHANIT"?	0. No 1. Yes 2. Don't know	
	B. GOVERNMENT-RECOMMENDED HOMEMADE FLUID? („ATIMIT"?)	0. No 1. Yes 2. Don't know	
	During (*name's*) illness, did he/she drink much less, about the same, or more than usual?	1. Much less or none 2. About the same (or somewhat less) 3. More	
	Was the child (*name*) given zinc treatment during diarrheal episode?	0. No 1. Yes 2. Don't know	
	The last time *(name)* passed stools, what was done to dispose of the stools?	Child used toilet/latrine Put/rinsed into toilet or latrine Put/rinsed into drain or ditch Thrown into garbage (solid waste) Buried Left in the open. Other (*specify*_____) Not sure	
	Does this child have a health card [or vaccination record]?	0. No 1. Yes	
REVIEW INFORMATION CONTAINED IN HEALTH CARD AND CIRCLE IN THE "HEALTH CARD" OR "CHILD'S CAREGIVER" COLUMNS DEPENDING ON WHICH SOURCE WAS USED TO DETERMINE THE RESPONSE.			

Has the child received the following vaccinations? (*fill in from health card/immunization record when possible)*		**According to Health Card**	**From Child's Caregiver**
	BCG	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	DPT 1	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	DPT 2	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	DPT 3	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	Hepatitis B1	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	Hepatitis B2	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	Hepatitis B3	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	PENTA (DPT, Hep-B, Hib)-1	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	PENTA (DPT, Hep-B, Hib)-2	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	PENTA (DPT, Hep-B, Hib)-3	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	OPV (Polio) – 0 (At birth)	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	OPV (Polio) - 1	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	OPV (Polio) – 2	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	OPV (Polio) – 3	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	Measles	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	Vitamin A given to mother post delivery	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	In the last six months, has this child received a Vitamin A supplement like these [*show vitamin A capsules]*?	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know
	In the last six months, has this child been given a drug for intestinal worms like these [*show medication]*?	0. No 1. Yes 2. No card	0. No 1. Yes 2. Don't know

	In the last 7 days, has this child received an iron supplement like these [*show supplement]*?	0. No 1. Yes 2. Don't know	
	In the last 2 weeks, has the child had an illness with a cough at any time?	0. No 1. Yes 2. Don't know	If 0 or 2→E1.32
	In the last two weeks, for how many days did *(name)* have a cough?	___ ___ days	
	When (NAME) had an illness with a cough, did he/she breathe faster than usual with short, rapid breaths or have difficulty breathing?	0. No 1. Yes 2. Don't know	If 0 or 2→E1.32
	In the last two weeks, for how many days did *(name)* have fast or difficult breathing?	___ ___ days	
	In the last 2 weeks, has the child had a fever?	0. No 1. Yes 2. Don't know	If 0 or 2→E1.34
	In the last two weeks, for how many days did *(name)* have a fever?	___ ___ days	
	In the last 2 weeks, has the child had vomiting?	0. No 1. Yes 2. Don't know	If 0 or 2→E1.36
	In the last two weeks, for how many days did *(name)* have vomiting?	___ ___ days	
	Has (INDEX CHILD) had any hospitalization and /or clinic visits or any traditional treatment due to any illness in the last 2 weeks?	0. No 1. Yes 2. Don't know	If "0"→E1.38
	Where did you seek health care assistance when (INDEX CHILD) was ill with any illness in the last 2 weeks? (select all that apply)	Govt. hospital. Govt. health center Govt. health post Village health worker Mobile/outreach clinic Other public (*specify*) Private hospital/clinic Private physician Pharmacy Other private medical (*specify*)_____ Relative or friend Shop Traditional practitioner Other (*specify*)_____	
	Is INDEX CHILD involved in any of the following programs?	1. Productive safety net program	

	SELECT ALL THAT APPLY. *READ OFF ALL OPTIONS*	2. Outpatient therapeutic program (OTP) 3. Inpatient therapeutic feeding program (Stabilization Center) 4. Targeted supplementary feeding program (TSF) 5. Other (specify)	

E2: Infant and Young Child Feeding

Enumerator: Ask of respondent for identified INDEX CHILD. If there is no index child, skip to next section.

NUM	QUESTION	CODE	SKIP
	Has ***(child's NAME)*** ever been breastfed?	0. No 1. Yes 2. Don't know	If "0", →E2.2 If "1" → E2.3
	Why wasn't (name) breastfed?	Mother ill/weak Child ill/weak Nipple/breast problem Insufficient milk Mother working/busy Child refused Other (specify_____)	Then, >>E2.8
	Was (NAME) breastfed yesterday during the day or at night? How many times was (NAME) breastfed yesterday during the day or at night?	0. No 1. Yes 2. Don't know | ___ ___ times	
	How many times did (NAME) eat any solid or semi-solid or soft foods yesterday during the day or night?	___ ___ times	
	What did you do with the first milk (colostrum)?	Gave it to child Threw it away Not applicable	
	How long after birth did you first put (NAME) to the breast? *If less than 1 hour but not immediately, select "other" and record 0 days and 0 hours.* *If more than 24 hours, record number of days and enter "0" for hours.*	Immediately after birth Not applicable Other: specify: ___ days ___ hours	

	At what age (in months) were solids or liquids besides breastmilk introduced into the child's diet, for example plain water, teas, gripe water, herbal medicines, or soft foods? *If less than 1 month, enter number of days. Otherwise, enter number of months and enter "0" for days.*	1. So far, child has received nothing but breastmilk 2. Don't know 3. Other: specify: ___ ___ Days ___ ___ Months	
	Did you attend any prenatal visits during your pregnancy for (NAME), either at home or at a health center?	0. No 1. Yes 2. Don't know	If "0", →E2.10
	How many prenatal visits did you attend for [NAME]?	Number of visits_____	
	Did you have any nutrition or child feeding counseling for [NAME]?	No 1. Yes	If "0" →next section
	How many nutrition or child feeding counseling sessions did you have for [NAME]?	Number of sessions_____	

F. Household WASH Conditions

F1: Food and WASH Conditions

The following questions are observation only. Ask the respondent if you can please observe the compound for a brief moment and you will be right back to proceed with the interview.

NUM	Question	CODE	SKIP
	[OBSERVATION]: *What is the woman's general appearance (observe cleanliness of her hands, hair, clothes, face; Dirty=Visible dirt on the woman's body and/or clothes; Dusty=Visible dust on the woman's body and/or clothes; Clean=Neither visible dirt nor visible dust on body and/or clothes)*	Clean Dirty Dusty	
	[OBSERVATION]: *What is the index child's general appearance (observe cleanliness of hands, hair, clothes, face. Dirty=Visible dirt on the child's body and/or clothes; Dusty=Visible dust on the child's body and/or clothes; Clean=Neither visible dirt nor visible dust on body and/or clothes)*	Clean Dirty Dusty No index child	

	OBSERVATION ONLY: *Are respondent's hands soiled?*	0. No 1. Yes 2. Not observed *Yes= Visible dirt for all parts of the hand (e.g., finger pads, nails, and palms).*	
	OBSERVATION ONLY: *Are index child's hands soiled?*	0. No 1. Yes 2. Not observed 3. No index child *Yes= Visible dirt for all parts of the hand (e.g., finger pads, nails, and palms).*	
	[OBSERVATION]: *What is the general appearance of the compound (relative to hygiene)?*	Clean Dirty	
	[OBSERVATION]: Can we observe animal feces (chicken, dogs, cats, etc.) around the house or in the compound?	No Yes	
	[OBSERVATION]: Are there chickens in the house or immediately around the house?	No Yes	
	[OBSERVATION]: Are there other animals in the house or immediately around the house, such as ducks, goats, sheep, dogs, or cattle?	0. No 1. Yes	
	OBSERVATION ONLY: *Location of poultry housing*	No animal housing Connected to sleeping room Adjacent to sleeping room Separated from house Other (specify_____) Not observed	If 1>>F2.15
	OBSERVATION ONLY: *Distance of poultry corral from house* *If connected to sleeping room, enter "0"*	__ __ __ meters	
	OBSERVATION ONLY: Characteristics of poultry corral *Choose all that apply*	Enclosed housing (chickens cannot enter/leave) Open housing (chickens can enter/leave) Fencing Other (specify) Not observed	

	OBSERVATION ONLY: *Where is index child most of the time during the interview?*	On respondent or another person (lap or carrying) On a bed On floor/ground with a mat or blanket On dirt floor/ground On floor/ground, not dirt Not observed Other (SPECIFY_____) No index child	

	What is the main source of domestic water?	Piped into dwelling Piped into plot/yard Public tap/standpipe Borehole Unprotected dug well Protected dug well Protected spring Unprotected spring River/pond/stream Tanker-trunk vendor Irrigation channel Bottled Rainwater Other (specify)_____	
	Do you do anything to the water to make it safe to drink?	0. No 1. Yes 2. Don't know	If "0"→F1.13
	What do you usually do to make the water safer to drink?	Boil Add bleach/chlorine/ waterguard/Pur/Aquatabs Strain through cloth Bio sand/composite/ ceramic pot filter Solar disinfection Let stand and settle	

		Other (specify)_____	
	What type of fuel do you usually use for cooking?	Wood Cornstalks Charcoal Other (specify)	
	Where is your cooking fire/stove?	In the main house In a separate building Outdoors sheltered Outdoors unsheltered	
	What kind of toilet facility do members of your household usually use? *If the respondent is unsure, ask to observe and select the appropriate response.*	Flush or pour flush toilet Flush to piped sewer system Flush to septic tank Flush to pit latrine Flush to somewhere else Flush, don't know where Pit latrine Ventilated improved pit latrine Pit latrine with slab Pit latrine without slab / open pit Composting toilet Bucket toilet Hanging toilet / hanging latrine No facility / bush/ field Other (specify)_____	
	Did you wash your hands yesterday, anytime during the day or night?	0. No 1. Yes 2. Don't know	If "0" → F21
	If yes, what was used to wash hands? *(Multiple responses possible)*	Ash Soap/soap water (liquid/powder/bar) Only water Other (specify) _____ Don't know	
	Yesterday when you washed your hands, what were the reasons for washing your hands? *(Choose all that apply. Do not read responses: let respondent describe and then categorize)*	After using the toilet Before preparing/cooking food Before eating Before preparing child's food/Before feeding the child While taking a shower/bath/washing clothes After cooking After cleaning a child who has defecated After work After handling animals After touching something dirty	

		Before prayer Others Don't know	
	Did you wash the (INDEX CHILD NAME)'s hands yesterday, anytime during the day or night?	0. No 1. Yes 2. Don't know	If no index child, →F23 If "0"→F23
	What was the reason for washing the (INDEX CHILD NAME)'s hands? *(Choose all that apply)*	They were dirty/dusty During bath Before eating After index child had defecated Before prayer Other (specify)_____ Don't know	
	Please show me where members of your household most often wash their hands	Observed Not observed: not in dwelling/yard/plot Not observed: no permission to see Not observed: other reason	If 2-4, →next section
	OBSERVATION ONLY: *Observe presence of water at specific handwashing site.*	Water is not available Water is available There is no handwashing site	
	OBSERVATION ONLY: *Observe presence of soap at handwashing site*	No cleaning agent Soap or detergent (bar, liquid, powder, paste) Ash, mud, sand	

F.2: Poultry Care Practices

NUM	QUESTION	CODE	SKIP
	Do your poultry roam freely during the day?	0. No 1. Yes	
	Do your poultry roam freely at night?	0. No 1. Yes	
	Did poultry enter your house at any time during the past day and night?	0. No 1. Yes	If 0, >>F2.35
	Did any chickens sleep in your house last night	0. No 1. Yes	

	Who else slept in this room? *Choose all that apply*	Index child Respondent Not index child, but other children Household head Whole family Others No one else slept in this room	
	What is done with poultry manure? *Choose all that apply*	Nothing; left where it falls Collected and used on-farm for agriculture Collected and sold Collected and disposed of in waste heap/location on property Collected and disposed of in waste heap/location not on property Other (specify____)	If 4 or 5 >> next question; otherwise, next section
	How far is this trash heap from the dwelling?	__ __ __ meters	

G. Women's Health and Pregnancies

G1: Caregiver Health and Birth History

[Enumerator]: Now I would like to ask some questions about your health and pregnancies.

NUM	Question	CODE	SKIP
	Are you pregnant and/or lactating?	Pregnant Lactating Pregnant and lactating Non-pregnant, non-lactating	
	How many pregnancies have you ever had, including your current pregnancy if you are currently pregnant?	___ ___ pregnancies	

	How many live born children have you ever had?	___ ___ children	
	Have you ever had any children pass away?	0. No 1. Yes	If "0"→G6
	How many children have you had pass away?	___ ___ children	
	Have you had an illness in the past 2 weeks that prevented you from working?	0. No 1. Yes 2. Don't know	If "0"→G8
	For how many days were you unable to work since (day of the week) the week before last?	__ __ days	
	In the past 12 months, have you been hospitalized?	0. No 1. Yes	

G2: Pregnancy with Index Child

Ask the mother the following questions about her pregnancy with the INDEX CHILD. If there is no index child in the household, proceed to the next section.

	Are you the biological mother of [INDEX CHILD NAME]	0. No 1. Yes	If no index child, →Next section If "1"→G2.3
	Where is the mother of the [INDEX CHILD NAME]?	Permanently lives outside of village Died Unable to care for child Other (specify)_____	
	During your pregnancy with [INDEX CHILD NAME], did you seek antenatal care?	0. No 1. Yes 2. Don't know	
	How many times did you seek antenatal care?	__ __ times	
	Did you take iron tablets while you were pregnant with [INDEX CHILD NAME]?	0. No 1. Yes 2. Don't know	
	Where was [INDEX CHILD NAME] born?	Home Govt hospital Govt health center Govt health post NGO health facility Traditional medical doctor Private clinic or hospital House of relative/friend/neighbor Other (specify) _____	

H. Women's Empowerment

This interview should be conducted in privacy, where other members of the household or community cannot overhear or contribute answers. If you need to relocate at this time, ask the respondent if she minds asking others to step outside, or if you can go somewhere private. DO NOT read response options unless it specifically specifies to do so. Instead, enumerators should characterize responses based on the most applicable category/categories.

NUM	Question	CODE	SKIP
	DO NOT READ: *Ability of interview to be conducted alone; check all that apply.*	Respondent only Household head or spouse Parents In laws Other adults in the household Neighbors/visitors Children With adult females present With adult males present	

H1: Household Decision Making

Activity	Who participated in [ACTIVITY] <u>in the past 12 months</u> (that is during the last [one/two] cropping seasons)? CHOOSE ALL APPLICABLE Self Spouse	When decisions are made regarding [ACTIVITY], who is it that normally takes the decision? CHOOSE ALL APPLICABLE; IF THE RESPONSE IS SELF ONLY SKIP TO QUESTION H6	How much input did you have in making decisions about [ACTIVITY]? **CODE** No input Input into very few decisions Input into some decisions	To what extent do you feel you can make your own personal decisions regarding [ACTIVITY] if you want(ed) to? **CODE** Not at all Small extent Medium extent High extent	How much input did you have in decisions on the use of income generated from [ACTIVITY]? **CODE** No input Input into very few decisions

		Children Other HH member Other non HH member Household does not do this activity >> next activity	**CODE** Self Spouse Other HH member Other non HH member Not applicable →H6	Input into most decisions Input into all decisions No decision made		Input into some decisions Input into most decisions Input into all decisions No decision made
CODE	Activity Description					
	Chicken production (daily tasks: feeding, watering, cleaning, etc.)					
	Chicken input use (feed, medicine, etc.)					
	Use of eggs for home consumption					
	Marketing of eggs					
	Slaughter of chickens for home consumption					
	Marketing of chickens					
	Land use (including choice of crops and varieties)					

	Crop input use (seed, fertilizer, pesticide, etc.)					
	Daily tasks for crops primarily for home consumption, such as weeding, watering, etc.					
	Daily tasks for crops that are grown primarily for sale					
	Use of food crops for home consumption					
	Marketing of food crops					
	Marketing of cash crops (chat, coffee, etc. include fodder)					
F	Non-farm economic activities: Small business, self-employment, petty trade					
	Food expenditures					

H2: Access to Productive Capital

Productive Capital		Do you have access to [ITEM]? No → skip to next item Yes	When decisions are made regarding use of [ITEM], who is it that normally takes the decision? CHOOSE ALL APPLICABLE; IF THE RESPONSE IS SELF ONLY SKIP TO NEXT ITEM **CODE** Self Spouse Other HH member Other non HH member Not applicable →NEXT ITEM
	Productive Capital		
	Farm equipment (non-mechanized)		
	Radio		
	Mobile phone		
	Means of transportation (bicycle, motorcycle, car, animal cart)		

H3: Household Savings

NUM	QUESTION	CODE	SKIP
	Does your household currently have any savings?	0. No 1. Yes 2. Don't know	If "0" skip to H13
	Where do you save it?	Formal savings institution Women's community savings group Other community savings group At home Other (specify) ____	
	Who makes decisions about household savings most of the time? CHOOSE ALL THAT APPLY	Self Spouse Other HH member Other non HH member	

H4: Self-Efficacy Scale

Now I'm going to ask you some questions about different feelings you might have. Please listen to each of the following statements. Think about how each statement relates to your life, and then tell me how much you agree or disagree with the statement on a scale of 1 to 5, where 1 means you "strongly disagree" and 5 means you "strongly agree."

STATEMENTS		
A	I will be able to achieve most of the goals that I have set for myself.	STRONGLY DISAGREE 1 DISAGREE 2 NEITHER AGREE NOR DISAGREE 3 AGREE 4 STRONGLY AGREE 5
B	When facing difficult tasks, I am certain that I will accomplish them.	STRONGLY DISAGREE 1 DISAGREE 2 NEITHER AGREE NOR DISAGREE 3 AGREE 4 STRONGLY AGREE 5
C	In general, I think that I can obtain outcomes that are important to me.	STRONGLY DISAGREE 1 DISAGREE 2 NEITHER AGREE NOR DISAGREE 3 AGREE 4 STRONGLY AGREE 5
D	I believe I can succeed at most any endeavor to which I set my mind	STRONGLY DISAGREE 1 DISAGREE 2 NEITHER AGREE NOR DISAGREE 3 AGREE 4 STRONGLY AGREE 5
E	I will be able to successfully overcome many challenges.	STRONGLY DISAGREE 1 DISAGREE 2 NEITHER AGREE NOR DISAGREE 3 AGREE 4 STRONGLY AGREE 5
F	I am confident that I can perform effectively on many different tasks.	STRONGLY DISAGREE 1 DISAGREE 2 NEITHER AGREE NOR DISAGREE 3 AGREE 4 STRONGLY AGREE 5
G	Compared to other people, I can do most tasks very well.	STRONGLY DISAGREE 1 DISAGREE 2 NEITHER AGREE NOR DISAGREE 3 AGREE 4 STRONGLY AGREE 5
H	Even when things are tough, I can perform quite well.	STRONGLY DISAGREE 1 DISAGREE 2 NEITHER AGREE NOR DISAGREE 3

		AGREE 4 STRONGLY AGREE 5

I. Time Allocation

I-1: PLEASE RECORD A LOG OF THE ACTIVITIES FOR THE INDIVIDUAL IN THE LAST COMPLETE 24 HOURS (STARTING YESTERDAY MORNING AT 4 AM, FINISHING 3:59 AM OF THE CURRENT DAY). THE TIME INTERVALS ARE MARKED IN 15 MIN INTERVALS. MARK ONE ACTIVITY FOR EACH TIME PERIOD BY ENTERING THE CORRESPONDING ACTIVITY CODE IN THE BOX.

I-2: CHECK THE BOX BELOW IF THE RESPONDENT WAS CARING FOR CHILDREN WHILE PERFORMING EACH ACTIVITY.

Now I'd like to ask you about how you spent your time during the past 24 hours. We'll begin from yesterday morning, and continue through to this morning. This will be a detailed accounting. I'm interested in everything you did (i.e. resting, eating, personal care, work inside and outside the home, caring for children, cooking, shopping, socializing, etc.), even if it didn't take you much time. I'm particularly interested in agricultural activities such as farming, gardening, and livestock raising whether in the field or on the homestead. I'm also interested in how much time you spent caring for children, especially if it happened while you did some other activity (e.g., collecting water while carrying a child or cooking while watching after a sleeping child).

		Night				**Morning**	**Day**									
		4:00				5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00
I-1 Activity **(WRITE ACTIVITY CODE)**																
I-2 Did you also care for children?	YES CHECK BOX NO LEAVE	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□

		Day				**Evening**	**Night**									
		16:00				17:00	18:00	19:00	20:00	21:00	22:00	23:00	24:00	1:00	2:00	3:00
I-1 Activity **(WRITE ACTIVITY CODE)**																
I-2 Did you also care for children?	YES CHECK BOX NO LEAVE	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□

ACTIVITY CODES FOR I-1

A Sleeping and resting B Eating/drinking, personal care C Staple grain farming D Horticultural (gardens) or high value crop farming	E Large livestock raising (cattle, buffaloes) F Chicken raising G Small livestock raising (sheep, goats, other poultry, fishpond) H Non-farm economic activity (employment, self-employment, wage labor, petty trade)	I Caring for children J Caring for adults (sick, elderly) K Shopping / getting service (incl. health services) L Cooking	M Other domestic work (incl. cleaning, sewing, fetching water, collecting fuel) N Social or religious activities O Other activity (specify_____)

I-3. In the last 24 hours did you work (at home or outside of the home including chores or other domestic activities) less than usual, about the same as usual, or more than usual?
LESS THAN USUAL 1 ABOUT THE SAME AS USUAL 2 MORE THAN USUAL 3

J. Participation in Institutions

J1: Participation in Rural Institutions

		Is there a [GROUP] in your community? If no, skip to next question	Are you yourself currently an active member of [GROUP] ?
1	Savings and credit association, equb	0=no 1=yes 2=don't know	0=no 1=yes
2	Input supply group, farmer cooperative or	0=no 1=yes 2=don't know	0=no 1=yes
3	Crop marketing group	0=no 1=yes 2=don't know	0=no 1=yes
4	Women's association	0=no 1=yes 2=don't know	0=no 1=yes
5	Youth association	0=no 1=yes 2=don't know	0=no 1=yes
6	Church/mosque association or congregation	0=no 1=yes 2=don't know	0=no 1=yes
7	Funeral association	0=no 1=yes 2=don't know	0=no 1=yes

J2: Sources of Information

In the past 12 months, have you yourself received any nutrition or agriculture information from the following sources?

Source of information	Do you have access to [source]: 1=Yes, =No	Do you receive information from following sources		How often do you get information from [source]? 1= Daily 4= Occasionally 2= Weekly 5= Rarely 3= Monthly 6= Never	
		On crops & livestock 1=Yes, 0=No	On human nutrition or health 1=Yes, 0=No	Crops & livestock	Human nutrition / health
Radio					
Mobile phone					
Posters					
Farmer/marketing group					

Social or religious group					
5:1 group					
Family, friends, or neighbors					
Development agents					
Training at farmer training center (FTC)					
Input traders					
Community health workers					
Health post or other health facility					
NGOs					
Local administration					
Other, specify: ……..…….					

K. Anthropometry

K1: Women's Anthropometry

Take measurements for only the female respondent in the household. There are women who wear heavy clothes or a head cover and are unwilling to remove. If possible, ask woman to wear light clothing for measurement. **If a woman has BMI less than 16, she must be referred for treatment to the nearby health facility. Therefore, BMI must be calculated on-site.**

NUM	Result	Question
	|__|	Clothing worn (0=none,1=very light,2=light, 3=med., 4=heavy) If not sure, specify:_____
	|__|	Head cover, hair style, or other item worn on the head and unwilling to remove (Yes=1;No=0)
	|__|__|__|.|__|	kg- Weight 1 (Measure to 1 decimal point)
	|__|__|__|.|__|	kg- Weight 2 (Measure to 1 decimal point)
	|__|__|__|.|__|	cm- Height 1 (Measure to 1 decimal point)
	|__|__|__|.|__|	cm- Height 2 (Measure to 1 decimal point)

	|__|__|.|__|	cm- MUAC 1 (Measure to 1 decimal point)
	|__|__|.|__|	cm- MUAC 2 (Measure to 1 decimal point)
	0. No 1. Yes **If "1", refer**	**MUAC < 21cm for adult women or MUAC < 18.5 cm for girls 15 to less than 18 years?**
	0. No 1. Yes	Referral given?

K2: Index Child Anthropometry

ENUMERATOR: *CONFIRM PERMISSION OF PARENT/CAREGIVER OF INDEX CHILD TO TAKE MEASUREMENTS.*

Build in a tablet check to make sure child is the index child; if not, list reason index child is unavailable

NOTE: MEASURE A CHILD < 24 MONTHS LYING DOWN & MEASURE A CHILD > 24 MONTHS STANDING.
If child's MUAC<11.5 cm, refer to local health worker or to next EOS/ CHD/ or the local NGO or CHW.
If bilateral pitting edema, refer to the nearby health post

CHILD NAME	Gender	HEIGHT (Measure 1)	HEIGHT (Measure 2)	How was height measured? 1= Standing 2= Lying down	WEIGHT (Measure 1)	WEIGHT (Measure 2)	MUAC (Measure 1)	MUAC (Measure 2)	Clothes worn by child during weighing 1. No clothes 2. Light clothing 3. Mid-weight clothing 4. Heavy clothing	Bilateral pitting edema? 0 No 1 Yes	MUAC < 11.5 cm? 0 No 1 Yes	Referral given? 0 No 1 Yes
	1: Male 2: Female	**cm**	**cm**	**Code**	**KG**	**KG**	**cm**	**cm**	**Code 1**	**Code**	**Code**	
		___._	___._		__._	__._						

L. Hemoglobin

L1: Woman Respondent's Anemia Test

In this section, you will take the Hemocue reading of the primary woman respondent. You must confirm her consent before taking the reading.

NUM	QUESTION	CODE	SKIP
	Is the woman in the subgroup selected for hemoglobin testing and dried blood spot collection?	0 No 1 Yes	If "0">>END SURVEY
	Is the woman's hemoglobin test able to be administered at this time?	0 No 1 Yes	If "1">>L.1.4
	Reason for not administering hemoglobin test	Woman requested later test Woman refused Equipment not working Equipment unavailable/short of supplies Other (specify)	
	Hemoglobin reading 1	__ __ . __ g/dL	
	Hemoglobin reading 2 (only if necessary)	__ __ . __ g/dL	
	Hemoglobin level <8.5 g/dL?	0 No 1 Yes	If "1">> REFER
	Referral given?	0 No 1 Yes	
	Was a dried blood spot collected for this individual?	0 No 1 Yes	If "0">>Skip L.1.9
	Has the enumerator confirmed that the dried blood spot is labeled with the correct subject ID and the letter "W" to indicate Woman?	0 No 1 Yes	

L2: Index Child's Anemia Test

In this section, you will take the Hemocue reading of the index child. You must confirm the consent of the mother or of a caregiver before proceeding with the test.

Confirm child name	Hemoglobin reading 1	Hemoglobin reading 2 (only if necessary)	Hemoglobin < 8.5 g/dL? 0 No	Referral given? 0 No	Was a dried blood spot	Has the enumerator confirmed that the dried blood spot is labeled

	(g/dL)	(g/dL)	1 Yes If "1">> REFER	1 Yes	collected for this individual? 0 No 1 Yes	with the correct subject ID and the letter "C" to indicate Child? 0 No 1 Yes
	__ __ . __	__ __ . __		_ _._		

THIS CONCLUDES THE SURVEY. Thank the respondent very much for her time, and ask if she has any questions for you before leaving.

Appendix C. ATONU Ethiopia Baseline Kebele Level Questionnaire

Supervisors should complete this questionnaire using an electronic tablet. In each kebele, interview two people in separate interviews. If the responses are discrepant, interview one other person in that kebele. Do not interview any members of ACGG or ATONU staff; instead, select individuals who have been resident in that kebele over the past year or longer.

Supervisor ID	
Date	
Woreda	
Kebele	
Name of respondent	
Respondent phone number	
Role of respondent	1. Development agent 2. Local farmer/resident 3. Local leader 4. Local trader 5. Other (specify_____)

The questions below should be asked for each of the following foods:

1. Maize 2. Wheat 3. Sorghum 4. Barley 5. Common beans	6. Chickpeas 7. Lentils 8. Peas 9. Dark green leafy vegetables 10. Pumpkin	11. Carrots 12. Mango 13. Papaya 14. Green pepper 15. Banana	16. Orange 17. Milk 18. Yogurt 19. Organ meat 20. Beef meat	21. Live chicken 22. Local chicken eggs 23. Exotic chicken eggs 24. Cooking oil 25. Butter

The following questions refer to availability of foods from local informal or formal vendors or in local markets, rather than more distant markets. If the respondent does not know a given response, leave the item blank.

	Tarr	Yekatit	Makawit	Miaziah	Genbot	Sanni	Hamle	Nashi	Maskarram	Tekemr	Hadar	Tahsas
1. Was [ITEM] available for purchase in the last [MONTH]?	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes	0. No 1. Yes

2. If yes, what was the price to purchase [ITEM] in [MONTH]? Birr per unit												
3. To what unit does this purchase price apply?	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)
4. If yes, what was the price to sell [ITEM] in [MONTH]												

? Birr per unit												
5. To what unit does this selling price apply?	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)	1. kg 2. liter 3. number 4. other (specify unit___) (specify __kg for 1 such unit)