

[PHOTO]

Feed the Future [COUNTRY]

Zone of Influence Survey [Survey Year(s)]—Baseline

[Month] [Year]



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# List of abbreviations

5DE five domains of empowerment

A-WEAI Abbreviated Women’s Empowerment in Agriculture Index

ARSSI Ability to Recover from Shocks and Stresses Index

BFS Bureau for Food Security

BMI body mass index

CI confidence interval

CWI comparative wealth index

DEFF design effect

DHS Demographic and Health Survey

EA enumeration area

FIES Food Insecurity Experience Scale

GPI Gender Parity Index

LCC land capability classification

MAD minimum acceptable diet

PPP purchasing power parity

SD standard deviation

SDG Sustainable Development Goals

SEI shock exposure index

USAID United States Agency for International Development

VCC value chain commodity

WEAI Women’s Empowerment in Agriculture Index

WHO World Health Organization

ZOI Zone of Influence

# Executive summary

## Background

Feed the Future seeks to sustainably reduce global poverty, hunger, and malnutrition by helping partner countries boost agriculture-led growth, resilience, and nutrition. Program efforts are designed to impact the population in Zones of Influence (ZOI) in Feed the Future target countries. The ZOI is the targeted sub-national regions and districts where the program intends to achieve the greatest household- and individual-level impacts on poverty, hunger, and malnutrition. Progress in achieving Feed the Future’s objectives is tracked using population-based performance indicators collected at baseline then periodically thereafter.

The purpose of the [Country] Feed the Future ZOI Survey [Survey Year(s)] is to provide the U.S. Government interagency partners, the United States Agency for International Development (USAID) Bureau for Food Security (BFS), USAID/[Country], the Government of [Country], and development partners with information on the current status of the Feed the Future ZOI-level population-based survey indicators. The survey is designed to establish the current status of Feed the Future indicators in the ZOI for the second phase of Feed the Future, which are presented in this report.

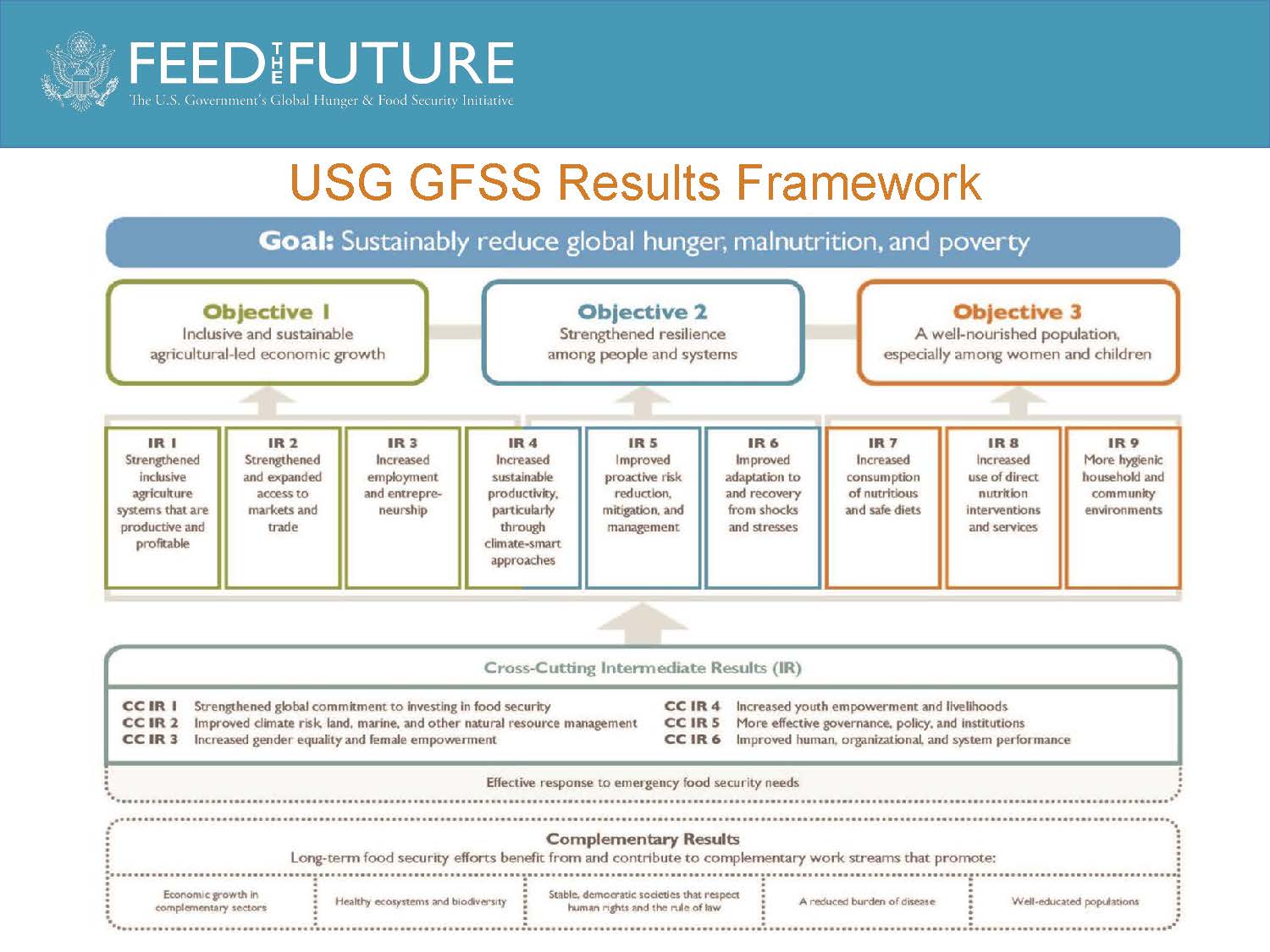
The Feed the Future ZOI in [Country] includes [insert brief description of the ZOI as well as any resilience focus areas if they are distinct from the ZOI].

## [Country] Feed the Future ZOI Survey [Survey Year(s)] indicators

The Feed the Future ZOI indicators, which correspond to the Global Food Security Strategy Results Framework (**Figure ES1**), calculated for this survey are as follows:

1. Prevalence of poverty: Percent of people living on less than $1.90/day 2011 PPP [EG-c][[1]](#footnote-2)
2. Depth of poverty of the poor: Mean percent shortfall of the poor relative to the $1.90/day 2011 PPP poverty line [EG-h]
3. Percent of people who are “near-poor,” living on 100 percent to less than 125 percent of the $1.90 2011 PPP poverty line [FTF Context-9]
4. Percent of households below the comparative threshold for the poorest quintile of the asset‑based comparative wealth index [EG-g]
5. Prevalence of moderate and severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES) [EG-e]
6. Ability to recover from shocks and stresses index [RESIL-a]
7. Percent of households that believe local government will respond effectively to future shocks and stresses [RESIL-c]
8. Index of social capital at the household level [RESIL-b]
9. Percent of households participating in group-based savings, micro-finance, or lending programs [EG.4.2-a]
10. Abbreviated Women’s Empowerment in Agriculture Index (A-WEAI) [EG.3-f]
11. Average percent of women achieving adequacy across the six indicators of the A-WEAI [FTF Context-25]
12. Yield of targeted agricultural commodities within target areas [EG.3-h]
13. Percent of producers who have applied targeted improved management practices or technologies [EG.3.2-a]
14. Prevalence of stunted (HAZ < -2) children under five (0-59 months) [HL.9-a]
15. Prevalence of wasted (WHZ < -2) children under five (0-59 months) [HL.9-b]
16. Prevalence of healthy weight (WHZ ≤ 2 and ≥-2) children under five (0-59 months) [HL.9-i]
17. Prevalence of underweight (BMI < 18.5) women of reproductive age [HL.9-d]
18. Percent of children 6-23 months receiving a minimum acceptable diet [HL.9.1-a]
19. Prevalence of exclusive breastfeeding of children under six months of age [HL.9.1-b]
20. Percent of women of reproductive age consuming a diet of minimum diversity [HL.9.1-d]
21. Percent of households with access to a basic sanitation service [HL.8.2-a]
22. Percent of households with soap and water at a hand-washing station commonly used by family members [HL.8.2-b]

Figure ES1: U.S. Government Global Food Security Strategy Results Framework



These 20 performance and 2 context indicators at the goal level measure hunger, malnutrition, and poverty among the population in the [Country] Feed the Future ZOI. Roughly half of the indicators measure impact and outcomes at the goal or strategic objective levels, and the other indicators are relevant to programming in [Country]. Indicator estimates—in total and by key disaggregates—are presented in **Table ES1.**

Table ES1: Feed the Future Indicator Estimates, by Key Disaggregates, [Country] [Year]

| **Feed the Future indicator** | **Estimate** | **95% CI** | **Sig.a** | **Number (*n*)b** |
| --- | --- | --- | --- | --- |
| **Prevalence of poverty: Percent of people living on less than $1.90 per day (2011 PPP)** | | | | |
| **All households** |  |  |  |  |
| **Gendered household type** |  |  |  |  |
| Male and female adults |  |  |  |  |
| Female adults only |  |  |  |  |
| Male adults only |  |  |  |  |
| Children only |  |  |  |  |
| **Depth of poverty of the poor: Mean percent shortfall of the poor relative to $1.90 per day (2011 PPP) poverty line** | | | | |
| **All households** |  |  |  |  |
| **Gendered household type** |  |  |  |  |
| Male and female adults |  |  |  |  |
| Female adults only |  |  |  |  |
| Male adults only |  |  |  |  |
| Children only |  |  |  |  |
| **Percent of people who are near-poor, living on 100% to less than 125% of the $1.90 per day (2011 PPP) poverty line** | | | | |
| **All households** |  |  |  |  |
| **Gendered household type** |  |  |  |  |
| Male and female adults |  |  |  |  |
| Female adults only |  |  |  |  |
| Male adults only |  |  |  |  |
| Children only |  |  |  |  |
| **Percent of households below the comparative threshold for the poorest quintile of the asset‑based comparative wealth index** | | | | |
| **All households** |  |  |  |  |
| **Gendered household type** |  |  |  |  |
| Male and female adults |  |  |  |  |
| Female adults only |  |  |  |  |
| Male adults only |  |  |  |  |
| Children only |  |  |  |  |
| **Ability to recover from shocks and stresses index** | | | | |
| **All households** |  |  |  |  |
| **Gendered household type** |  |  |  |  |
| Male and female adults |  |  |  |  |
| Female adults only |  |  |  |  |
| Male adults only |  |  |  |  |
| Children only |  |  |  |  |
| **Index of social capital at the household level** | | | | |
| **Overall index** |  |  |  |  |
| **All households** |  |  |  |  |
| **Gendered household type** |  |  |  |  |
| Male and female adults |  |  |  |  |
| Female adults only |  |  |  |  |
| Male adults only |  |  |  |  |
| Children only |  |  |  |  |
| **Bonding sub-index** |  |  |  |  |
| **All households** |  |  |  |  |
| **Gendered household type** |  |  |  |  |
| Male and female adults |  |  |  |  |
| Female adults only |  |  |  |  |
| Male adults only |  |  |  |  |
| Children only |  |  |  |  |
| **Bridging sub-index** |  |  |  |  |
| **All households** |  |  |  |  |
| **Gendered household type** |  |  |  |  |
| Male and female adults |  |  |  |  |
| Female adults only |  |  |  |  |
| Male adults only |  |  |  |  |
| Children only |  |  |  |  |
| **Percent of households that believe local government will respond effectively to future shocks and stresses** | | | | |
| **All households** |  |  |  |  |
| **Gendered household type** |  |  |  |  |
| Male and female adults |  |  |  |  |
| Female adults only |  |  |  |  |
| Male adults only |  |  |  |  |
| Children only |  |  |  |  |
| **Percent of households participating in group-based savings, micro-finance, or lending programs** | | | | |
| **All households** |  |  |  |  |
| **Gendered household type** |  |  |  |  |
| Male and female adults |  |  |  |  |
| Female adults only |  |  |  |  |
| Male adults only |  |  |  |  |
| Children only |  |  |  |  |
| **Abbreviated Women’s Empowerment in Agriculture Index (A-WEAI)** | | | | |
| **All women** |  |  |  |  |
| **Women’s age** |  |  |  |  |
| 18-29 years |  |  |  |  |
| 30 years and older |  |  |  |  |
| **Percent of women achieving adequacy in the six indicators of the A-WEAI** | | | | |
| **All women** |  |  |  |  |
| **Women’s age** |  |  |  |  |
| 18-29 years |  |  |  |  |
| 30 years and older |  |  |  |  |
| **Percent of producers who have applied targeted improved management practices or technologies in targeted areas** | | | | |
| **All producers** |  |  |  |  |
| **Farmers’ sex** |  |  |  |  |
| Male |  |  |  |  |
| Female |  |  |  |  |
| **Farmers’ age** |  |  |  |  |
| 15-29 years |  |  |  |  |
| 30 years and older |  |  |  |  |
| **Commodity** |  |  |  |  |
| Maize |  |  |  |  |
| Fishponds |  |  |  |  |
| Dairy cows |  |  |  |  |
| **Management practice or technology type** |  |  |  |  |
| Agriculture water management non-irrigation based |  |  |  |  |
| Aquaculture management |  |  |  |  |
| Climate adaptation, climate risk management |  |  |  |  |
| Crop genetics |  |  |  |  |
| Cultural practices |  |  |  |  |
| Irrigation |  |  |  |  |
| Livestock management |  |  |  |  |
| Marketing and distribution |  |  |  |  |
| Natural resource or ecosystem management |  |  |  |  |
| Pest and disease management |  |  |  |  |
| Post-harvest handling and storage |  |  |  |  |
| Soil-related fertility and conservation |  |  |  |  |
| Value-added processing |  |  |  |  |
| Wild-caught fisheries management |  |  |  |  |
| Other |  |  |  |  |
| **Yield of targeted agricultural commodities within target areas** | |  |  |  |
| **Maize** |  |  |  |  |
| **Farm size** |  |  |  |  |
| **Smallholder** |  |  |  |  |
| **Farmers’ sex** |  |  |  |  |
| Male |  |  |  |  |
| Female |  |  |  |  |
| **Farmers’ age** |  |  |  |  |
| 15-29 years |  |  |  |  |
| 30 years and older |  |  |  |  |
| **Non-smallholder** |  |  |  |  |
| **Farmers’ sex** |  |  |  |  |
| Male |  |  |  |  |
| Female |  |  |  |  |
| **Farmers’ age** |  |  |  |  |
| 15-29 years |  |  |  |  |
| 30 years and older |  |  |  |  |
| **Fishponds** |  |  |  |  |
| **Farmers’ sex** |  |  |  |  |
| Male |  |  |  |  |
| Female |  |  |  |  |
| **Farmers’ age** |  |  |  |  |
| 15-29 years |  |  |  |  |
| 30 years and older |  |  |  |  |
| **Dairy cows** |  |  |  |  |
| **Production system** |  |  |  |  |
| **Agro-pastoral/extensive grassland** |  |  |  |  |
| **Farmers’ sex** |  |  |  |  |
| Male |  |  |  |  |
| Female |  |  |  |  |
| **Farmers’ age** |  |  |  |  |
| 15-29 years |  |  |  |  |
| 30 years and older |  |  |  |  |
| **Smallholder mixed livestock-crop** |  |  |  |  |
| **Farmers’ sex** |  |  |  |  |
| Male |  |  |  |  |
| Female |  |  |  |  |
| **Farmers’ age** |  |  |  |  |
| 15-29 years |  |  |  |  |
| 30 years and older |  |  |  |  |
| **Urban/peri-urban** |  |  |  |  |
| **Farmers’ sex** |  |  |  |  |
| Male |  |  |  |  |
| Female |  |  |  |  |
| **Farmers’ age** |  |  |  |  |
| 15-29 years |  |  |  |  |
| 30 years and older |  |  |  |  |
| **Intensive industrial** |  |  |  |  |
| **Farmers’ sex** |  |  |  |  |
| Male |  |  |  |  |
| Female |  |  |  |  |
| **Farmers’ age** |  |  |  |  |
| 15-29 years |  |  |  |  |
| 30 years and older |  |  |  |  |
| **Prevalence of moderate and severe food insecurity in the population, based on the Food Insecurity Experience Scale** | | | | |
| **All households** |  |  |  |  |
| **Gendered household type** |  |  |  |  |
| Male and female adults |  |  |  |  |
| Female adults only |  |  |  |  |
| Male adults only |  |  |  |  |
| Children only |  |  |  |  |
| **Severity** |  |  |  |  |
| Moderate |  |  |  |  |
| Severe |  |  |  |  |
| **Prevalence of exclusive breastfeeding among children under 6 months of agec** | | | | |
| **All children** |  |  |  |  |
| **Children’s sex** |  |  |  |  |
| Male |  |  |  |  |
| Female |  |  |  |  |
| **Percent of children 6-23 months of age receiving a minimum acceptable dietc** | | | | |
| **All children** |  |  |  |  |
| **Children’s sex** |  |  |  |  |
| Male |  |  |  |  |
| Female |  |  |  |  |
| **Percent of women of reproductive age consuming a diet of minimum diversityc** | | | | |
| **All women** |  |  |  |  |
| **Women’s age** |  |  |  |  |
| 15-18 years |  |  |  |  |
| 19-49 years |  |  |  |  |
| **Prevalence of stunted children under 5 years of agec** | | | | |
| **All children** |  |  |  |  |
| **Children’s sex** |  |  |  |  |
| Male |  |  |  |  |
| Female |  |  |  |  |
| **Children’s age** |  |  |  |  |
| 0-23 months |  |  |  |  |
| 24-59 months |  |  |  |  |
| **Prevalence of wasted children under 5 years of agec** | | | | |
| **All children** |  |  |  |  |
| **Children’s sex** |  |  |  |  |
| Male |  |  |  |  |
| Female |  |  |  |  |
| **Children’s age** |  |  |  |  |
| 0-23 months |  |  |  |  |
| 24-59 months |  |  |  |  |
| **Prevalence of healthy weight children under 5 years of agec** | | | | |
| **All children** |  |  |  |  |
| **Children’s sex** |  |  |  |  |
| Male |  |  |  |  |
| Female |  |  |  |  |
| **Children’s age** |  |  |  |  |
| 0-23 months |  |  |  |  |
| 24-59 months |  |  |  |  |
| **Prevalence of underweight women of reproductive agec** | | | | |
| **All non-pregnant women 15-49 years** |  |  |  |  |
| **Women’s age** |  |  |  |  |
| 15-18 years |  |  |  |  |
| 19-49 years |  |  |  |  |
| **Percent of households with access to basic sanitation service** | | | | |
| **All households** |  |  |  |  |
| **Gendered household type** |  |  |  |  |
| Male and female adults |  |  |  |  |
| Female adults only |  |  |  |  |
| Male adults only |  |  |  |  |
| Children only |  |  |  |  |
| **Residence** |  |  |  |  |
| Urban |  |  |  |  |
| Rural |  |  |  |  |
| **Percent of households with soap and water at handwashing station family members use** | | | | |
| **All households** |  |  |  |  |
| **Gendered household type** |  |  |  |  |
| Male and female adults |  |  |  |  |
| Female adults only |  |  |  |  |
| Male adults only |  |  |  |  |
| Children only |  |  |  |  |
| **Residence** |  |  |  |  |
| Urban |  |  |  |  |
| Rural |  |  |  |  |

^ Results not statistically reliable, n<30

n/a=not available, CI=confidence interval, PPP=purchasing power parity

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Number is the number of units (individuals, households) in the sample.

c Estimates are based on de facto household members.

Notes:

Estimates are sample-weighted; numbers are unweighted.

Estimates are based on de jure household members, except where noted.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

## Summary of key findings

### Household economic status

#### *Prevalence of poverty: Percent of people living on less than $1.90/day (2011 PPP)*

#### *Depth of poverty of the poor: Mean percent shortfall relative to the $1.90/day (2011 PPP) poverty line*

#### *Prevalence of people who are “near-poor,” living on 100 percent to less than 125 percent of the $1.90 (2011 PPP) poverty line [Context Indicator]*

#### *Percent of households below the comparative threshold for the poorest quintile of the asset-based comparative wealth index*

### Resilience

#### *Ability to recover from shocks and stresses index*

#### *Percent of households that believe local government will respond effectively to future shocks and stresses*

#### *Index of social capital at the household level*

#### *Percent of households participating in group-based savings, micro-finance, or lending programs*

### Abbreviated Women’s Empowerment in Agriculture Index (A-WEAI)

#### *A-WEAI*

#### *Average percent of women achieving adequacy across the six indicators of the A-WEAI [Context Indicator]*

### Agriculture

#### *Yield of targeted agricultural commodities within target areas*

#### *Percent of producers who have applied targeted improved management practices or technologies*

### Food insecurity and dietary intake

#### *Prevalence of moderate and severe food insecurity in the population, based on the FIES*

#### *Prevalence of exclusive breastfeeding of children under 6 months of age*

#### *Percent of children 6-23 months receiving a minimum acceptable diet*

#### *Percent of women of reproductive age consuming a diet of minimum diversity*

### Nutritional status of women and children

#### *Prevalence of stunted children under 5 years of age*

#### *Prevalence of wasted children under 5 years of age*

#### *Prevalence of healthy weight children under 5 years of age*

#### *Prevalence of underweight women of reproductive age*

### Water, sanitation, and hygiene

#### *Percent of households with access to a basic sanitation service*

#### *Percent of households with soap and water at a hand-washing station commonly used by family members*

The Feed the Future [COUNTRY] Zone of Influence Survey [Survey year(s)] Baseline was implemented by [CONTRACTOR & PARTNERS].

# Background

This chapter provides background information on Feed the Future in [Country], including a description of the program and the Feed the Future Zone of Influence (ZOI), demographic information on the ZOI population, and a summary of the poverty, food security, nutrition, and agroclimatology[[2]](#footnote-3),[[3]](#footnote-4) in the ZOI.

## Feed the Future overview

[Describe the Feed the Future objectives, strategies, and intervention areas in [Country]].

## 1.2 Feed the Future ZOI profile

The Feed the Future ZOI is the geographic area where the Feed the Future program is expected to have an impact on hunger, poverty, and nutrition.

[Geographic description of the ZOI]

A map of the Feed the Future ZOI in [Country] is provided in Figure 1.2.

Figure 1.2: Map of [Country]: Feed the Future ZOI

### Rationale for ZOI selection

[Insert rationale.]

### Demography of the ZOI

**Table 1.2.1** and **Table 1.2.2** present individual and household population estimates for the ZOI in [Year]. Estimates of the total population as well as sub-populations of the ZOI are presented. The sub‑population categories correspond to the various sub-populations for the Feed the Future indicators and disaggregates.

[Summary of the values presented in Tables 1.2.1 and 1.2.2]

Table 1.2.1: Population of Individuals in the ZOI, by Category, [Country] [Year]

| **Category of individuals** | **Numbera** | **Percent** |
| --- | --- | --- |
| **Total number of individuals** |  |  |
| **Total number of individuals, by key sub–population** | |  |
| Children 0-5 months |  |  |
| Children 0-23 months |  |  |
| Children 6-23 months |  |  |
| Children 0-59 months |  |  |
| Youth 15-29 years |  |  |
| Women of reproductive age (15-49 years) |  |  |
| Maize farmers |  |  |
| Fishpond farmers |  |  |
| Dairy farmers |  |  |
| **Total number of individuals, by residenceb** |  |  |
| Urban |  |  |
| Rural |  |  |
| **Total number of individuals, by [region]** |  |  |
| [Region 1] |  |  |
| [Region 2] |  |  |
| [Region 3] |  |  |
| [Region 4] |  |  |
| **Total number of individuals, by gendered household type** | |  |
| Male and female adults |  |  |
| Female adults only |  |  |
| Male adults only |  |  |
| Children only (no adults) |  |  |
| **Children 0-5 months, by sex** |  |  |
| Male |  |  |
| Female |  |  |
| **Children 6-23 months, by sex** |  |  |
| Male |  |  |
| Female |  |  |
| **Children 0-59 months, by sex** |  |  |
| Male |  |  |
| Female |  |  |
| **Youth 15-29 years, by sex** |  |  |
| Male |  |  |
| Female |  |  |
| **Women of reproductive age, by pregnancy status** |  |  |
| Pregnant |  |  |
| Non-pregnant |  |  |
| **Primary adult female decisionmakers, by age** |  |  |
| 18-29 years |  |  |
| 30 years or older |  |  |

a Number is the number of individuals in the population.

b The urban/rural disaggregate uses the [Country]-specific definition of urban and rural reflected in the sampling frame at the time the sample was drawn.

Source: [National Statistics Office] data [Elaborate here]

Table 1.2.2: Population of Individual Farmers of Targeted Value Chain Commodities in the ZOI, by Category, [Country] [Year]

| **Category of farmers** | **Numbera** | **Percent** |
| --- | --- | --- |
| **Any targeted VCC** |  |  |
| **Total number of farmers** |  |  |
| **Farmers’ sex** |  |  |
| Male |  |  |
| Female |  |  |
| **Farmers’ age** |  |  |
| 15-29 years |  |  |
| 30 years and older |  |  |
| **Maize** |  |  |
| **Total farmers** |  |  |
| **Smallholders** |  |  |
| **Farmers’ sex** |  |  |
| Male |  |  |
| Female |  |  |
| **Farmers’ age** |  |  |
| 15-29 years |  |  |
| 30 years and older |  |  |
| **Non-smallholders** |  |  |
| **Farmers’ sex** |  |  |
| Male |  |  |
| Female |  |  |
| **Farmers’ age** |  |  |
| 15-29 years |  |  |
| 30 years and older |  |  |
| **Fishpond aquaculture** |  |  |
| **Total farmers** |  |  |
| **Farmers’ sex** |  |  |
| Male |  |  |
| Female |  |  |
| **Farmers’ age** |  |  |
| 15-29 |  |  |
| 30 years and older |  |  |
| **Dairy cows** |  |  |
| **Total farmers** |  |  |
| **Rangelands farmers** |  |  |
| **Farmers’ sex** |  |  |
| Male |  |  |
| Female |  |  |
| **Farmers’ age** |  |  |
| 15-29 years |  |  |
| 30 years and older |  |  |
| **Mixed livestock-crop farmers** |  |  |
| **Farmers’ sex** |  |  |
| Male |  |  |
| Female |  |  |
| **Farmers’ age** |  |  |
| 15–29 years |  |  |
| 30 years and older |  |  |
| **Urban/peri-urban farmers** |  |  |
| **Farmers’ sex** |  |  |
| Male |  |  |
| Female |  |  |
| **Farmers’ age** |  |  |
| 15-29 years |  |  |
| 30 years and older |  |  |
| **Intensive/commercial production farmers** | |  |
| **Farmers’ sex** |  |  |
| Male |  |  |
| Female |  |  |
| **Farmers’ age** |  |  |
| 15–29 years |  |  |
| 30 years and older |  |  |

a Number of individuals in the population.

Note: Number is the number of individuals in the population.

Source: [National Statistics Office] data [Elaborate here]

Table 1.2.3: Number of Households in the ZOI, by Category, [Country] [Year]

|  |  |  |
| --- | --- | --- |
| **Category of households** | **Numbera** | **Percent** |
| **Total number of households** |  |  |
| **Total number of households, by gendered household type** | | |
| Male and female adults |  |  |
| Female adults only |  |  |
| Male adults only |  |  |
| Children only (no adults) |  |  |
| **Total number of households, by residenceb** | |  |
| Urban |  |  |
| Rural |  |  |
| **Total number of households, by [region]** | |  |
| [Region 1] |  |  |
| [Region 2] |  |  |
| [Region 3] |  |  |
| [Region 4] |  |  |

a Number of households in the population.

b The urban/rural disaggregate uses the [Country]-specific definition of urban and rural reflected in the sampling frame at the time the sample was drawn.

Source: [National Statistics Office] data [Elaborate here].

Table 1.2.4: Number of Households in the ZOI involved in Agriculture, by Category, [Country] [Year]

|  |  |  |
| --- | --- | --- |
| **Category of households** | **Numbera** | **Percent** |
| **Total number of households involved in agriculture** |  |  |
| **Total number of households, by crop cultivated** | | |
| Any crops |  |  |
| Maize |  |  |
| **Total number of households, by livestock owned** | | |
| Milk cows or bulls |  |  |
| Other cattle |  |  |
| Horses, donkeys, or mules |  |  |
| Goats |  |  |
| Sheep |  |  |
| Chickens or other poultry |  |  |
| Any other livestock |  |  |
| Fish |  |  |

a Number of households in the population.

Note: "Involved in agriculture" refers to ownership of the livestock presented in the table or cultivation of any crops.

Source: [National Statistics Office] data [Elaborate here].

### Climate and agriculture in the ZOI

[Insert contextual description of climate and agriculture according to instructions.]

## Purpose of this assessment

The purpose of this assessment is to provide the U.S. Government interagency partners, United States Agency for International Development (USAID) Bureau for Food Security (BFS), USAID/[Country], [Country] government, and development partners with a baseline for Feed the Future phase two population-based ZOI indicators and enable the measurement of changes in indicator estimates and select demographic and household characteristics between [Survey year(s)] and future Feed the Future ZOI Surveys. However, the Feed the Future ZOI Surveys are not designed to support conclusions of causality or program attribution.

# Methodology for obtaining values for Feed the Future indicators

This chapter describes the methodology used to obtain the Feed the Future population-based ZOI indicators. It provides information on the data sources and describes measures and reporting conventions used throughout the report.

## Methodology

This section describes the Feed the Future [Country] ZOI Survey [Survey year(s)], including discussion of the sample design (including targeted sample size), questionnaire customization, fieldwork, response rates, and limitations of the survey.[[4]](#footnote-5) Appendix 2.1 provides additional details on the sampling and weighting methodology.

### 2.1.1 Survey sample design

The Feed the Future [Country] ZOI Survey [Survey year(s)] included a representative, random sample of the entire population living in the ZOI. The ZOI Survey used a cross-sectional multi-stage cluster sampling design. The sample size was the largest required to capture an estimated meaningful amount of change over a [5 or 6]-year period across three Feed the Future goal-level indicators (prevalence of poverty, prevalence of food insecurity, and prevalence of stunting).

The Feed the Future [Country] ZOI Survey [Survey year(s)] sampling frame was stratified by [Country-specific strata] to create [XX] strata. The number of enumeration areas (EAs) in each stratum was proportional to the population in the strata, with at least one EA in each stratum. A total of [XX] EAs were selected based on [XX] households to be interviewed per EA. The [XX] indicator had the largest final sample size requirement and was therefore used to set the overall sample size for the survey: [XX] households. More information about the sample size calculation and weighting methodology is presented in Appendix 2.1.

In the first sampling stage, EAs (or segments, if there were any exceptionally large EAs) were selected using probability proportional to size methodology. Before main fieldwork began, a complete household listing was conducted in each EA or segment, from which [XX] households were selected for interview using fractional interval systematic sampling; this constituted the second stage of sampling. In the third stage, eligible individuals were selected within the households using a “take all” approach; that is, all eligible individuals were selected into the sample. During the main fieldwork, if more than one household was discovered in a single dwelling unit and they were not listed separately, all resident households were interviewed.

### 2.1.2 Questionnaire design

[Insert description per instructions.]

### 2.1.3 Timing of the survey

[Insert description per instructions.]

### 2.1.4 Listing

[Insert description per instructions.]

### 2.1.5 Training for main fieldwork

Prior to fieldwork, all field staff were trained on survey procedures, including preparing for fieldwork, questionnaire content, human subjects protection, fieldwork procedures, data management, reporting, and communications. Training included hands-on training and practice sessions that covered use of all technical equipment that was used in the survey, as well as a tablet pretest and a survey pilot test. [X] Field teams, composed of a field supervisor, two two-person interview teams, an agricultural interviewer, and a driver, collected data over [X] weeks, from [Start date] to [End date].

### 2.1.6 Fieldwork

[Insert description per instructions.]

### 2.1.7 Data management and analysis

[Insert description per instructions.]

### 2.1.8 Limitations of the survey

[Insert description per instructions.]

### 2.1.9 ZOI Survey response rates

**Table 2.1** presents the response rates for the [Country] ZOI Survey [Survey year(s)] in the ZOI. The table presents components and response rates for each group for which a sampling weight was generated: sampled households, women of reproductive age (15-49), primary adult male and female decisionmakers, children under 5 years of age, children under 2 years of age, producers of any targeted commodity, and producers of each targeted commodity separately. Response rates are presented by rural and urban residence as well as for the total sample.

Table 2.1: Results of Household and Individual Interviews for the [Country] Feed the Future ZOI Survey [Survey year(s)], in Total and by Residence

| **Response rates** | **Total** | **Residence** | |
| --- | --- | --- | --- |
| **Urban** | **Rural** |
| **Households** | | | |
| Number of households selected |  |  |  |
| Humber of households occupied |  |  |  |
| Number of households interviewed |  |  |  |
| Household response rate (%)a |  |  |  |
| **Women of reproductive age (15-49 years)** | | | |
| Number of eligible women |  |  |  |
| Number of eligible women interviewed |  |  |  |
| Eligible women response rate (%)b |  |  |  |
| **Primary adult female decisionmakers (18+ years)** | | | |
| Number of eligible women |  |  |  |
| Number of eligible women interviewed |  |  |  |
| Eligible women response rate (%)b |  |  |  |
| **Primary adult male decisionmakers (18+ years)** | | | |
| Number of eligible men |  |  |  |
| Number of eligible men interviewed |  |  |  |
| Eligible men response rate (%)b |  |  |  |
| **Children under 5 years of age** | | | |
| Number of eligible children |  |  |  |
| Number of caregivers of eligible children interviewed |  |  |  |
| Eligible children response rate (%)b |  |  |  |
| **Children under 2 years of age** | | | |
| Number of eligible children |  |  |  |
| Number of caregivers of eligible children interviewed |  |  |  |
| Eligible children response rate (%)b |  |  |  |
| **Farmers of any targeted value chain commodityc** | | | |
| Number of eligible farmers |  |  |  |
| Number of eligible farmers interviewed |  |  |  |
| Eligible farmer response rate (%)b |  |  |  |
| **Maize farmers** | | | |
| Number of eligible farmers |  |  |  |
| Number of eligible farmers interviewed |  |  |  |
| Eligible farmer response rate (%)b |  |  |  |
| **Fishpond farmers** | | | |
| Number of eligible farmers |  |  |  |
| Number of eligible farmers interviewed |  |  |  |
| Eligible farmer response rate (%)b |  |  |  |
| **Dairy farmers** | | | |
| Number of eligible farmers |  |  |  |
| Number of eligible farmers interviewed |  |  |  |
| Eligible farmer response rate (%)b |  |  |  |

a Household response rates are calculated based on the result codes of Module 1, the household roster, and are defined as the number of households interviewed divided by the number of households occupied. Households that were found to be vacant, not a dwelling unit, or destroyed were considered unoccupied and thus excluded from the response rates.

b Individual response rates are calculated based on the result codes in the relevant individual modules (i.e., Modules 4, 5, 6, and 7). These rates are defined as the number of eligible individuals interviewed divided by the number of eligible individuals. Eligibility determination for Modules 4, 5, and 6 is initiated in the household roster and confirmed in the respective module. (Note that for children under 5 years of age [Module 5], the primary caregivers of the children served as the respondents, not the children directly.) Eligibility determination for Module 7 is initiated in Module 2, *Dwelling characteristics,* and confirmed in Module 7.

c The targeted value chains in the [Country] [Year(s)] Feed the Future ZOI Survey were maize, fishpond aquaculture, and dairy farming.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

## Measures and reporting conventions used throughout this report

### Standard indicator disaggregates

A standard set of indicator disaggregate variables are used in tables throughout this report. This section lists each of the standard disaggregate variables and defines how the variable is calculated. Topic-specific disaggregates will be described within the relevant chapter (e.g., livelihood production system disaggregates will be described in the chapter that discusses the agriculture indicators).

#### Age in years

Data on household members’ age in years are collected in the household roster. For women 15-49 years of age and children under 6 years of age, more detailed age data are collected in subsequent questionnaire modules to confirm eligibility to respond to the module questions; these more detailed age data are used where available. Age is generally presented in the tables in 5- or 10-year age groups.

#### Age in months

The age of children in months is collected in the child nutrition-focused module of the questionnaire, rather than in the household roster, so that the children’s parents or primary caregivers can be prompted to provide the most accurate age possible. Children’s age in months is presented by monthly age groups as appropriate for the children’s dietary intake and anthropometry tables. For example, for the minimum acceptable diet table (**Table 8.3.2**), which presents the minimum acceptable diet indicator for children 6-23 months of age, children’s age in months is disaggregated into 6-month age groups as follows: 6-11 months, 12-17 months, and 18-23 months. For the children’s anthropometry tables (**Table 9.2.1** and **Table 9.2.2**), which present the prevalence of stunting, wasting, and underweight for all children under 5 years of age, children’s age in months is disaggregated into 12-month age groups as follows: 0-11 months, 12-23 months, 24-35 months, 36-47 months, and 48-59 months.

#### Sex

Sex—male or female—is a standard disaggregate for the tables presenting children’s indicators (e.g., children’s anthropometry [**Table 9.2.1** and **Table 9.2.2**]), as well as agricultural indicators. The sex of household members is collected in the household roster.

#### Educational attainment (household)

Household educational attainment reflects the highest level of education attained by any member of the household, as reported in the household roster. This variable is used in tables that present household‑level data, and comprises five categories: no education (households with no member who has received formal education); less than primary (households with at least one member who has received formal schooling, but with no member who has completed primary); completed primary (households with at least one member who has completed primary, but with no member who has completed secondary); completed secondary (households with at least one member who has completed secondary, but with no member who has completed any higher formal education); and higher (households with at least one member who has completed formal education higher than secondary—even if only one year). Households are categorized in only one of the five categories.

#### Educational attainment (individual)

Educational attainment at the individual level reflects the highest level of education attained by individual household members, as reported in the household roster. This variable comprises five categories: no education (those who have not received any formal education); less than primary (those who have received formal education but who have not complete primary); completed primary (those who have completed primary but who have not completed secondary); completed secondary (those who have completed secondary but who have not completed any higher formal education); and higher (those who have completed formal education higher than secondary—even if only for one year).

#### Gendered household type

Feed the Future disaggregates household-level indicators by gendered household type—that is: (1) households that include both male and female adults, 18 years of age or older; (2) households that include female adults, but no male adults; (3) households that include male adults, but no female adults; and (4) households with only members under 18 years of age (households with children only and no adult members). This approach to conceptualizing household type is distinct from the standard “head of household” approach, which is embedded with presumptions about household gender dynamics, and may perpetuate existing social inequalities and prioritization of household responsibilities that may be detrimental to women. This variable is calculated using data on the age and sex of household members, which are collected in the household roster.

#### Wealth quintile

The asset-based wealth index characterizes households into quintiles according to their wealth index score, which takes into account various dwelling characteristics and household ownership of various assets, which are collected in Module 2, *Dwelling characteristics*. Wealth quintile is used as a disaggregate for many household-level indicators, as well as some person-level nutrition and agriculture indicators. More details can be found in Section 4.2, and additional information about construction of the wealth index can be found in Appendix 2.2.b.

#### Poverty status

As described in greater detail in Section 4.1 of this report, poverty status characterizes households as poor if household members live below the poverty threshold—that is, on less than USD $1.90 per person per day at 2011 purchasing power parity (PPP), or as non-poor if household members live at or above the poverty threshold—that is, on USD $1.90 or more per person per day (2011 PPP). Poverty status is calculated using data collected in Module 8, *Household consumption expenditure*. Poverty status is used as a disaggregate for many household-level indicators, as well as some person-level nutrition and agriculture indicators.

#### Shock exposure index

The shock exposure index (SEI) assigns households a score depending on the number and severity of shocks the household experienced during the 12 months preceding the ZOI Survey. For the SEI, disaggregate households are then categorized into one of four categories based on their score: did not experience any shocks (SEI score=0), low (SEI scores [A]-[B]), moderate (SEI scores [C]-[D]), and high (SEI scores [E]-[F]). Households with an SEI score of 0 are assigned to the first category because they did not experience any shocks. The remaining three categories are meant to split households with an SEI score higher than 0 into roughly even categories. The SEI is calculated using data collected in Module 3, *Food security and resilience*. The SEI is used as a disaggregate for many household-level indicators, as well as some person-level nutrition and agriculture indicators. See Section 5.2 for greater detail on SEI.

### Reporting conventions

This section provides an overview of the conventions used in reporting the descriptive results from the Feed the Future [Country] ZOI Survey [Survey year(s)].

* In the tables throughout this report, weighted point estimates and unweighted sample sizes are presented.
* Most estimates are shown to one decimal place, with the specific exceptions of A-WEAI, the five domains of empowerment (5DE), and gender parity index (GPI) indicators, which are shown to two decimal places. Unweighted sample sizes in all tables and the population estimates in Section 1.2.2 tables are shown as whole numbers.
* Values in the tables are suppressed when the unweighted sample size is insufficient to calculate a reliable point estimate (n<30); this is denoted by the symbol “^” in the designated row and an explanatory footnote.
* Tests of difference are performed to determine whether there is an association between the outcome and the indicator disaggregates. Statistically significant differences are designated with asterisks (\* indicates a p<0.05, \*\* indicates a p<0.01, and \*\*\* indicates a p<0.001) in tables. For disaggregates that are categorical variables presented in rows, the level of significance is indicated in the “Sig.” column of disaggregate heading row, which is usually shaded light blue. In these cases, the “Sig.” column is greyed out for the category rows. For disaggregates presented in columns (e.g., many of the agriculture tables), the significance results are displayed in the same row as the estimates.

Analyses are performed in Stata using ‘*svy’* commands to handle features of data collected through the use of complex survey designs, including sampling weights, cluster sampling, and stratification.

# Demographic characteristics in the ZOI

This chapter describes the background characteristics of the ZOI population using data from the [Country] ZOI Survey [Survey year(s)], which are assumed to remain relatively static over time.

## Household demographics

**Table 3.1.1** presents demographic characteristics of the households in the ZOI for all households and by gendered household type. This table presents the average de jure household size, as well as the average number of de jure household members by key categories, the percentages of de jure adult household members who are male and female, and the percent distribution of households. Estimates are also presented by household education, defined as the highest level of education of any de facto member of the household.

[Insert description of the values in Table 3.1.1.]

Table 3.1.1: Household Demographic Characteristics in the ZOI, in Total and by Gendered Household Type

| **Household characteristic** | **All households** | **Gendered household type** | | | |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Male and female adults** | **Female adults only** | **Male adults only** | **Children only** | **Sig.a** |
| Mean household size |  |  |  |  |  |  |
| Mean number of children under 2 years of age |  |  |  |  |  |  |
| Mean number of children under 5 years of age |  |  |  |  |  |  |
| Mean number of children 5 years of age or older (5-17 years) |  |  |  |  |  |  |
| Mean number of youth (15-29 years) |  |  |  |  |  |  |
| Mean number of women of reproductive age (15-49 years) |  |  |  |  |  |  |
| Mean number of adult male household membersb |  |  |  |  |  |  |
| Mean number of adult female household membersb |  |  |  |  |  |  |
| Mean number of producers of any targeted commodityc |  |  |  |  |  |  |
| Percent of adults who are male (%)b |  |  |  |  |  |  |
| Percent of adults who are female (%)b |  |  |  |  |  |  |
| **Household size (%)** |  |  |  |  |  |  |
| Small (1-5 members) |  |  |  |  |  |  |
| Medium (6-10 members) |  |  |  |  |  |  |
| Large (11 or more members) |  |  |  |  |  |  |
| **Number of households (*n*)** |  |  |  |  |  |  |
| **Household education (%)d** |  |  |  |  |  |  |
| No education |  |  |  |  |  |  |
| Less than primary |  |  |  |  |  |  |
| Completed primary |  |  |  |  |  |  |
| Completed secondary |  |  |  |  |  |  |
| Higher |  |  |  |  |  |  |
| **Number of households (*n*)** |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.001, \*\*\* p<0.001; n/s=not significant.

b Feed the Future defines adult as an individual 18 years of age or older. Females and males 15-17 years of age are of reproductive age but are not considered adults by this definition.

c Targeted commodities in [Country] include maize, fishponds, and dairy cows.

d Estimates are based on de facto household members.

Note: Estimates are based on de jure household members, except where noted.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

**Table 3.1.2** shows characteristics of the primary adult female and male decisionmakers in the sampled households in the ZOI. The primary adult female and male decisionmakers are household members who are 18 years of age or older and who self-identify as the primary adult male or primary adult female responsible for both social and economic decisionmaking in the household. When both exist in a single household, primary adult female and male decisionmakers are typically, but not necessarily, husband and wife. Table 3.1.2 shows the age group, marital status, educational attainment, and participation in economic activity for these household members. [Insert description of the values in the table.]

Table 3.1.2: Characteristics of Primary Adult Decisionmakers in the ZOI, by Sex

| **Background characteristic** | **Female (%)** | **Male (%)** | **Sig.a** |
| --- | --- | --- | --- |
| **Age** |  |  |  |
| 18-24 |  |  |  |
| 25-29 |  |  |  |
| 30-34 |  |  |  |
| 35-39 |  |  |  |
| 40-44 |  |  |  |
| 45-49 |  |  |  |
| 50-54 |  |  |  |
| 55-59 |  |  |  |
| 60+ |  |  |  |
| **Marital status** | |  |  |
| Married |  |  |  |
| Living in a consensual union |  |  |  |
| Widowed |  |  |  |
| Divorced or separated |  |  |  |
| Never married or in a union |  |  |  |
| **Highest educational attainment** |  |  |  |
| No education |  |  |  |
| Less than primary |  |  |  |
| Completed primary |  |  |  |
| Completed secondary |  |  |  |
| Higher |  |  |  |
| **Economic activityb** |  |  |  |
| Participates in some form of economic activity |  |  |  |
| **Participation in economic activity by typec** |  |  |  |
| Farm |  |  |  |
| Non–farm |  |  |  |
| Wage or salaried |  |  |  |
| **Number of primary adult decisionmakers (*n*)d** |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Both paid and unpaid types of economic activity are included. Domestic work, such as caring for children and the elderly or cooking and cleaning, is not included.

c Farm work includes food crop farming, cash crop farming, livestock raising, or fishing/fishpond culture; non-farm work includes running small businesses or self-employment; and wage/salaried employment includes both agriculture or non-agriculture-based work that is salaried. Percentages do not add up to 100 percent because individuals can engage in more than one type of economic activity.

d Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

Note: Estimates are based on primary adult decisionmakers who are de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

## Household member education

**Table 3.2.1** and **Table 3.2.2** present school attendance and educational attainment in the ZOI. Table 3.2.1 presents the percentage of all de facto household members between 5 and 24 years of age who currently attend school—in total and by sex. Table 3.2.2 presents the percentage of household members 10 years of age or older who have completed primary school—in total and by sex. The tables also include sex ratios for school attendance and attainment of primary education.

In [Country], primary education is defined as [insert country-specific definition.]

The tables reveal that [insert description of the values in the tables.]

Table 3.2.1: School Attendance at Time of Survey among Children and Youth 5-24 Years of Age in the ZOI, in Total and by Age and Sex

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Age (years)** | **Total** | |  | **Female** | |  | **Male** | |  | **Female to male ratio** |
| **Percent** | **n** | **Percent** | **n** | **Percent** | **n** | **Sig.a** |
| **Age category** |  |  |  |  |  |  |  |  |  |  |
| 5-9 |  |  |  |  |  |  |  |  |  |  |
| 10-14 |  |  |  |  |  |  |  |  |  |  |
| 15-19 |  |  |  |  |  |  |  |  |  |  |
| 20-24 |  |  |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de facto household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Table 3.2.2: Completion of Primary Education among Individuals 10 Years of Age or Older in the ZOI, in Total and by Age and Sex

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Age (years)** | **Total** | |  | **Female** | |  | **Male** | | **Sig.a** | **Female to male ratio** |
| **Percent** | **n** | **Percent** | **n** | **Percent** | **n** |
| **Age category** |  |  |  |  |  |  |  |  |  |  |
| 10-14 |  |  |  |  |  |  |  |  |  |  |
| 15-19 |  |  |  |  |  |  |  |  |  |  |
| 20-24 |  |  |  |  |  |  |  |  |  |  |
| 25-29 |  |  |  |  |  |  |  |  |  |  |
| 30-34 |  |  |  |  |  |  |  |  |  |  |
| 35-39 |  |  |  |  |  |  |  |  |  |  |
| 40-44 |  |  |  |  |  |  |  |  |  |  |
| 45-49 |  |  |  |  |  |  |  |  |  |  |
| 50-54 |  |  |  |  |  |  |  |  |  |  |
| 55-59 |  |  |  |  |  |  |  |  |  |  |
| 60+ |  |  |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de facto household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

## Dwelling characteristics and living conditions

**Table 3.3.1** shows dwelling characteristics of the households in the ZOI. The table presents the percentage of households that have access to electricity and the average number of people per sleeping room, as well as the main roof, exterior wall, and floor materials of households’ dwellings. The percentage of households that use solid cooking fuel is also presented. Solid cooking fuels are not considered clean fuels and can have negative health impacts[[5]](#footnote-6); they include charcoal, wood, animal dung, crop residues, and straw, shrubs, or grass.

Table 3.3.1 reveals that [Insert description of the values in the table; provide comparisons with national rural averages based on data from Demographic and Health Surveys (DHS) or Multiple Indicator Cluster Surveys to illustrate degree of similarity in living conditions. Where possible, regional average based on data from DHS or Multiple Indicator Cluster Surveys can be used if the geographic coverage of the ZOI overlaps with specific regions.]

Table 3.3.1: Household Dwelling Characteristics in the ZOI, in Total and by Residence and Gendered Household Type

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Residence** | |  |  | **Gendered household type** | | | |  |
| **Household characteristic** | **Total** | **Urban** | **Rural** | **Sig.a** | **Male and female adults** | **Female adults only** | **Male adults only** | **Children only** | **Sig.a** |
| Percent using solid fuel for cooking (%)b |  |  |  |  |  |  |  |  |  |  |
| Percent with access to electricity (%) |  |  |  |  |  |  |  |  |  |  |
| Mean number of persons per sleeping roomc |  |  |  |  |  |  |  |  |  |  |
| **Household roof materials (%)d** |  |  |  |  |  |  |  |  |  |  |
| Natural |  |  |  |  |  |  |  |  |  |  |
| Rudimentary |  |  |  |  |  |  |  |  |  |  |
| Finished |  |  |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |  |  |
| **Household exterior wall materials (%)e** |  |  |  |  |  |  |  |  |  |  |
| Natural |  |  |  |  |  |  |  |  |  |  |
| Rudimentary |  |  |  |  |  |  |  |  |  |  |
| Finished |  |  |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |  |  |
| **Household floor materials (%)f** |  |  |  |  |  |  |  |  |  |  |
| Natural |  |  |  |  |  |  |  |  |  |  |
| Rudimentary |  |  |  |  |  |  |  |  |  |  |
| Finished |  |  |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |  |  |
| **Number of households (*n*)** |  |  |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Solid fuel is defined as charcoal, wood, animal dung, straw/shrubs/grass, and agriculture crop residue. Households in the “no food cooked in household” category are removed from percentages.

c The average number of persons per sleeping room is a common indicator of crowding (United Nations Development Programme, 2003).

d Natural roof includes no roof, thatch (palm leaf, straw, reed), and sod or bamboo. Rudimentary roof includes wood planks and cardboard. Finished roofs include metal, wood, calamine/cement fiber, ceramic tiles, cement, and roofing shingles.

e Natural wall includes no walls, cane/palm/tree trunks, dirt, bamboo with mud, and stone with mud. Rudimentary walls include plywood, cardboard, reused wood, and unbaked bricks. Finished walls include cement, stone with lime/cement, bricks, cement blocks, unbaked bricks covered with plaster, and wood planks/shingles.

f Natural floors include earth/sand, dung, and palm leaves. Rudimentary floors include wood planks and bamboo slats. Finished floors include parquet/polished wood, vinyl or asphalt strips, ceramic tiles, cement and wall-to-wall carpet.

Note: Estimates are based on de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

## Water, sanitation, and hygiene

This section presents water, sanitation, and hygiene indicators that align with the Sustainable Development Goals (SDG) definitions.[[6]](#footnote-7) **Table 3.4.1** presents the percentage of households that use an improved water source, use improved sanitation, and practice a correct drinking water treatment method, as well as the percentage of households in which open defecation is practiced.

Drinking water may be contaminated with human or animal feces containing pathogens, or with chemical and physical contaminants with harmful effects on health; therefore, improving water quality is critical to prevent transmission of diarrhea and other diseases. In addition to improving water quality, it is also important to improve accessibility and availability of drinking water, especially for women and girls, who often bear the primary responsibility for collecting water from distant sources.[[7]](#footnote-8) Therefore, in addition to collecting information on types of drinking water and treatment method, the ZOI Survey also collected information on accessibility and availability of drinking water services (i.e., main source of drinking water that the household uses, and time it takes to travel to and get water from the source).

[Describe drinking water results in the table, as well as other results related to drinking water that are not presented in the table (e.g., location of the main water source, time it takes to get water, availability of water from the main water source during 12 months preceding survey and 2 weeks preceding survey).]

Inadequate sanitation and lack of sanitation are closely associated with diarrheal diseases, which in turn exacerbate malnutrition. Open defecation is when people use fields, forests, open bodies of water, or other open spaces rather than toilets. Open defecation and inadequate sanitation are dangerous because contact with human waste can cause diseases such as cholera, typhoid, hepatitis, diarrhea, worm infestation, and under-nutrition. Although access to a hygienic toilet facility is critical in reducing the transmission of pathogens, sharing of sanitation facilities is also an important consideration, given the negative impacts on dignity, privacy, and personal safety, especially for women and girls.[[8]](#footnote-9) According to the World Health Organization (WHO)/UNICEF Joint Monitoring Programme for Water Supply, Sanitation, and Hygiene, a basic sanitation service consists of a sanitation facility that hygienically separates human excreta from human contact (i.e., an improved sanitation facility) that is not shared with other households.[[9]](#footnote-10)

 [Describe sanitation results in the table.]

Handwashing with soap and water is among the most cost-effective interventions for reducing the transmission of diseases. Research has demonstrated a clear link between handwashing with soap among child caretakers at critical junctures and the reduction of diarrheal disease,[[10]](#footnote-11) a major cause of child morbidity and mortality in developing countries. A handwashing station is a location where people wash their hands. They are fixed locations or movable devices that can be placed in a convenient spot for use. During data collection, the interviewer visits the handwashing facility and observes whether water and soap are present. The soap may be in bar, powder, or liquid form.

[Describe handwashing results in the table.]

Table 3.4.1: Household Water, Sanitation, and Hygiene Characteristics in the ZOI, in Total and by Residence and Gendered Household Type

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Residence** | |  |  | **Gendered household type** | | | |  | |
| **Indicator** | **Total (%)** | **Urban (%)** | **Rural (%)** | **Sig.a** | **Male and female adults (%)** | **Female adults only (%)** | **Male adults only (%)** | **Children only (%)** | | **Sig.a** | |
| Use a regularly available improved water sourceb |  |  |  |  |  |  |  |  |  | |  | |
| Use correct water treatment practice or technologyc |  |  |  |  |  |  |  |  |  | |  | |
| Have soap and water at handwashing station family members used,i |  |  |  |  |  |  |  |  |  | |  | |
| Have basic sanitation (improved sanitation, not shared)e,i |  |  |  |  |  |  |  |  |  | |  | |
| Use improved sanitation, sharedf |  |  |  |  |  |  |  |  |  | |  | |
| Use unimproved sanitationg |  |  |  |  |  |  |  |  |  | |  | |
| Practice open defecationh |  |  |  |  |  |  |  |  |  | |  | |
| **Number of households (*n*)** |  |  |  |  |  |  |  |  |  | |  | |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Improved water sources include *piped water into the dwelling*, *piped water into the yard*, *public tap/standpipe*, *tubewell/borehole*, *protected dug well*, *protected spring*, *rainwater*, *bottled water*, *sachet water*, *tanker-truck*, and *cart with small drum* (UNICEF & WHO, 2018). The proportion of the population using safely managed drinking water services is Sustainable Development Goal (SDG) indicator 6.1.1 (UNSD, n.d.). The indicator presented includes an indication of regularity in access to the water source–namely, that (a) water is available from this source all year round and (b) water from this source was available every day in the two weeks preceding the survey.

c Correct water treatment practice or technology refers to methods that effectively kill or remove pathogens. This includes *boiling the water*, *adding bleach or chlorine*, *using a water filter* (ceramic, sand, composite), and *solar disinfection* (WHO & UNICEF, 2006). Practices such as *straining through a cloth* and *letting it stand and settle* are not considered effective approaches to water treatment. *Other* is also not considered an effective approach.

d A handwashing station is a location where people wash their hands. These can be fixed locations or movable devices that may be placed in a convenient spot for use. The soap may be in bar, powder, or liquid form. The cleansing product must be at the handwashing station or reachable by hand when standing in front of it. The proportion of the population with a basic handwashing facility with soap and water available on premises is SDG indicator 6.2.1b (UNSD, n.d.).

e A basic sanitation service consists of a sanitation facility that hygienically separates human excreta from human contact (i.e., an improved sanitation facility) that is not shared with other households. Having an improved sanitation facility is necessary, but it is not sufficient to define a household as having a basic sanitation service (UNICEF & WHO, 2019). The proportion of the population using safely managed sanitation services is SDG indicator 6.2.1a (UNSD, n.d.).

f Improved sanitation facilities are those that separate human excreta from human contact; they include the categories *flush to piped sewer system*, *flush to septic tank*, *flush/pour flush to pit latrine*, *composting toilet*, *ventilated improved pit latrine* (only if there is also a slab), and *pit latrine with a slab* (UNICEF & WHO, 2018).

g Unimproved sanitation facilities are those that do not adequately separate human excreta from human contact. This includes the following: *flush/pour flush to open drain*, *flush/pour flush to elsewhere*, *pit latrine without a slab/open pit*, *bucket*, and *hanging toilet*. Households that report having no sanitation facility or using the bush or field are considered as using an unimproved sanitation facility (UNICEF & WHO, 2018).

h Households that report having no sanitation facility or using the bush or field are considered as practicing open defecation.

i Feed the Future phase two ZOI-level indicator.

Note: Estimates are based on de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

# Household economic status

This chapter includes a background discussion of monetary poverty in [Country], the poverty indicators, and the wealth index. Appendix A2.2a provides an overview of the methodology used to calculate the poverty indicators, and Appendix A2.2b provides an overview of the methodology used to calculate the wealth index. Additional details are provided in the *Guide to Feed the Future Statistics*.[[11]](#footnote-12)

The Feed the Future poverty ZOI indicators presented in this chapter include the prevalence of poverty, the depth of poverty of the poor, and the prevalence of people who are “near-poor,” or who live between 100 percent and 125 percent of the poverty line. These indicators are presented for the USD $1.90 poverty line at 2011 PPP (Section 4.1), and at [Country]’s national poverty threshold (Section 4.2) and extreme poverty threshold (Section 4.3).

[Include a brief contextual discussion of poverty within [Country] and the ZOI, which could entail documented trends in poverty or major economic shocks in recent years.]

The Household Roster and Household Consumption Expenditure modules of the questionnaire were used to calculate the poverty indicators. The household consumption expenditure module is similar to the Living Standards Measurement Study, in which households’ consumption of various food and non‑food items is measured to infer household income and well-being. Household expenditure totals are used as a proxy for household incomes, based on the assumption that a household’s consumption is closely related to its income. Household consumption and expenditures are often preferred to income when measuring poverty due to the difficulty in accurately measuring income. According to Deaton, expenditure data are less prone to error, easier to recall, and more stable over time than income data.[[12]](#footnote-13) In this approach, a per capita daily consumption aggregate is constructed by converting every purchased and non-purchased item consumed by each household to a daily monetary value, summing across all items to obtain a total daily expenditure in goods and services consumed by a household, and then dividing by the number of household members, to obtain each household’s daily per capita expenditures. Note that in this approach, every household member is assumed to have an equal share of the total consumption, regardless of age and other household member characteristics.[[13]](#footnote-14)

## Measures of poverty in the ZOI

The prevalence of poverty, sometimes called the poverty headcount ratio, is measured by determining the percentage of individuals living below a poverty threshold. Estimates of poverty prevalence are sensitive to the poverty thresholds used to identify the poor. A standardized poverty threshold of USD $1.90 per person per day in adjusted[[14]](#footnote-15) 2011 USD is used to track global changes in poverty across countries. USD $1.90 is in effect the extreme poverty threshold and represents the poverty line typical of the world’s poorest countries.[[15]](#footnote-16) Poverty estimates are also presented for [Country]’s poverty and extreme poverty thresholds.

Although poverty prevalence indicates how *many* individuals are impacted by poverty, it does not speak to how *much* people are impacted by poverty. The depth of poverty of the poor is a useful poverty‑related indicator because it describes the extremity of poverty by estimating the average gap between consumption expenditure levels and the poverty line among the poor.[[16]](#footnote-17) The prevalence and depth of poverty indicators complement each other to present a more complete picture of the poverty situation in the ZOI. A third indicator that provides additional context is the prevalence of people who are “near-poor,” or living on 100 percent to less than 125 percent of the USD $1.90 2011 PPP poverty line. The applicable “near-poor” line is 125 percent of the poverty line, or USD $2.38 per day at 2011 PPP. Many near-poor households find themselves technically above the poverty line but one adverse event away from falling into poverty. A high prevalence of near-poor individuals can make an agri-food or economic system vulnerable.[[17]](#footnote-18) A reduction in the prevalence of near-poor individuals is, therefore, a positive change in the resilience of the system.

### The $1.90 poverty threshold

**Poverty prevalence.** Thirty-three percent of individuals in the ZOI live below the USD $1.90 poverty threshold, with a higher percentage of female adult-only households ([xx]%) living below the poverty line than male and female adult households ([xx]%) and male adult-only households ([xx]%).

**Depth of poverty of the poor.** The depth of poverty of the poor in the ZOI is 30 percent of the poverty line, meaning that the average shortfall of the poor from the poverty line is USD $0.57 2011 PPP. Thus, the average *poor* person in the ZOI lives at 70 percent of the poverty line, and his or her average consumption is USD $1.33 per day (2011 PPP).[[18]](#footnote-19)

Depth of poverty of the poor can provide an indication of the amount of resource transfers that, if *perfectly* targeted to poor households, would be needed to bring everyone in the ZOI up to the poverty line. With a ZOI population of 3.5 million, USD $658,350 per day would need to be transferred to the poor to bring their income or expenditures up to the poverty threshold.[[19]](#footnote-20)

**Near-poor prevalence.** Twenty percent of individuals in the ZOI live at or above the USD $1.90 poverty threshold but below 125 percent of that threshold (USD $2.38 per day) (2011 PPP).

**Table 4.1.1** presents poverty estimates at the USD $1.90 per person per day (2011 PPP) threshold. This table presents poverty estimates for all households in the ZOI, and disaggregated by household characteristics, including gendered household type, household educational attainment, wealth quintile, and severity of shock exposure.

Table 4.1.1: Poverty Indicators at the USD $1.90 (2011 PPP) per Person per Day Threshold in the ZOI, in Total and by Selected Household Characteristics

|  | | **Prevalence of povertya** | | | |  | | **Prevalence of  near-poorc** | | | | **Number of households (*n*)d** | |  | | **Depth of poverty of the poore** | | |  | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Household characteristic** | | **Percent** | | **Sig.b** | |  | | **Percent** | | **Sig.b** | |  | | **Percent of poverty line** | | **Sig.b** | | **Number of households (*n*)d** | |
| **All households** |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| **Gendered household type** | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Male and female adults |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Female adults only |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Male adults only |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Children only (no adults) |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| **Household education** |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| No education |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Less than primary |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Completed primary |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Completed secondary |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Higher |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| **Wealth quintile** |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Highest (wealthiest) |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Fourth |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Middle |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Second |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Lowest (poorest) |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| **Shock exposure index** |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Did not experience any shocks |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Low |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Moderate |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| High |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |

^ Results not statistically reliable, n<30

a The prevalence of poverty is the percentage of individuals living below the $1.90 2011 PPP per person per day poverty threshold.

b Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

c The prevalence of near-poor is the percentage of individuals living at or above the $1.90 per person per day poverty threshold (2011 PPP) but below 125 percent of that threshold, or $2.38 per day.

d Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

e The depth of poverty of the poor measures, on average, how far the consumption of the poor is below the $1.90 (2011 PPP) per person per day poverty threshold.

Note: Estimates are based on de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### The national poverty threshold

[Define the national poverty threshold for [Country]. Include a summary of the estimates at the national poverty line.]

**Poverty prevalence.** [Describe results at national poverty threshold]

**Depth of poverty of the poor.** [Describe results at national poverty threshold]

**Near poor prevalence.** [Describe results at national poverty threshold]

[Interpret results presented in the table in relation to the $1.90 per day threshold presented in the previous table (Table 4.1). Focus on the following key questions: (1) Are poverty rates higher or lower than the national threshold (relative to $1.90 threshold)? (2) Is there anything else notable about poverty estimates using the national threshold?]

**Table 4.1.2** presents poverty estimates at the national poverty threshold for [Country]. Similar to the USD $1.90 per day poverty table, this table presents poverty estimates for all households in the ZOI and disaggregated by household characteristics, including gendered household type, household educational attainment, wealth quintile, and severity of shock exposure.

Table 4.1.2: Poverty Indicators at the National Poverty Threshold of [THRESHOLD] per Person per Day in the ZOI, in Total and by Selected Household Characteristics

|  | **Prevalence of povertya** | | |  | | **Prevalence of  near-poorc** | | | | | | | | |  | | | | |  | | | | | **Depth of poverty of the poore** | | | | | | | |  | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Household characteristic** | **Percent** | **Sig.b** | |  | | | **Percent** | | | | **Sig.b** | | | | | **Number of households (*n*)d** | | | | |  | | | | **Percent of poverty line** | | | | **Sig.b** | | | | | **Number of households (*n*)d** | | | |
| **All households** |  |  | |  | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | | |
| **Gendered household type** | | |  | |  | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | | |
| Male and female adults |  | |  | |  | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | | |
| Female adults only |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| Male adults only |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| Children only (no adults) |  | |  | |  | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | | |
| **Household education** |  | |  | |  | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | | |
| No education |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| Less than primary |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| Completed primary |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| Completed secondary |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| Higher |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| **Wealth quintile** |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| Highest (wealthiest) |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| Fourth |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| Middle |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| Second |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| Lowest (poorest) |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| **Shock exposure index** |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| Did not experience any shocks |  | |  | |  | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | | |
| Low |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| Moderate |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |
| High |  | |  | |  | | | | |  | | | |  | | | | |  | | | | |  | | | |  | | | |  | | | | |  | |

^ Results not statistically reliable, n<30

a The prevalence of poverty is the percentage of individuals living below the [NATIONAL POVERTY THRESHOLD] per person per day poverty threshold.

b Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

c The prevalence of near-poor is the percentage of individuals living at or above the [NATIONAL POVERTY THRESHOLD] per person per day poverty threshold (2011 PPP) but below 125 percent of that threshold, or [125% NATIONAL POVERTY THRESHOLD] per day.

d Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

e The depth of poverty of the poor measures, on average, how far the consumption of the poor is below the [NATIONAL POVERTY THRESHOLD] per person per day poverty threshold.

Notes:

[INSERT DESCRIPTION OF NATIONAL POVERTY THRESHOLD.]

Estimates are based on de jure household members.

Sources: Feed the Future [Country] ZOI Survey [Survey year(s)], [SOURCE OF DATA FOR NATIONAL POVERTY THRESHOLD, SUCH AS NATIONAL STATISTICS OFFICE]

### The national extreme poverty threshold

[Define the national extreme poverty threshold for [Country]. Include a summary of the estimates at the national extreme poverty threshold. Interpret results presented in the table in relation to the $1.90/day threshold presented in Table 4.1.1 as well as the national threshold presented in Table 4.1.2.]

**Poverty prevalence.** [Describe results at national extreme poverty threshold]

**Depth of poverty of the poor.** [Describe results at national extreme poverty threshold]

**Near-poor prevalence.** [Describe results at national extreme poverty threshold]

**Table 4.1.3** presents poverty estimates at the national extreme poverty threshold for [Country]. Similar to the two previous poverty tables, this table presents extreme poverty estimates for all households in the ZOI, as well as disaggregated by household characteristics, including gendered household type, household educational attainment, wealth quintile, and severity of shock exposure.

Table 4.1.3: Poverty Indicators at the National Extreme Poverty Threshold of [THRESHOLD] per Person per Day in the ZOI, in Total and by Selected Household Characteristics

|  | **Prevalence of povertya** | |  | **Prevalence of  near-poorc** | |  |  | | **Depth of poverty of the poore** | |  | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Household characteristic** | **Percent** | **Sig.b** |  | **Percent** | **Sig.b** | **Number of households (*n*)d** | |  | **Percent of poverty line** | **Sig.b** | **Number of households (*n*)d** | |
| **All households** |  |  |  |  |  |  | |  |  |  |  | |
| **Gendered household type** | |  |  |  |  |  | |  |  |  |  |
| Male and female adults |  |  |  |  |  |  | |  |  |  |  | |
| Female adults only |  |  |  |  |  |  | |  |  |  |  | |
| Male adults only |  |  |  |  |  |  | |  |  |  |  | |
| Children only (no adults) |  |  |  |  |  |  | |  |  |  |  |
| **Household education** |  |  |  |  |  |  | |  |  |  |  | |
| No education |  |  |  |  |  |  | |  |  |  |  | |
| Less than primary |  |  |  |  |  |  | |  |  |  |  | |
| Completed primary |  |  |  |  |  |  | |  |  |  |  | |
| Completed secondary |  |  |  |  |  |  | |  |  |  |  | |
| Higher |  |  |  |  |  |  | |  |  |  |  | |
| **Wealth quintile** |  |  |  |  |  |  | |  |  |  |  | |
| Highest (wealthiest) |  |  |  |  |  |  | |  |  |  |  | |
| Fourth |  |  |  |  |  |  | |  |  |  |  | |
| Middle |  |  |  |  |  |  | |  |  |  |  | |
| Second |  |  |  |  |  |  | |  |  |  |  | |
| Lowest (poorest) |  |  |  |  |  |  | |  |  |  |  | |
| **Shock exposure index** |  |  |  |  |  |  | |  |  |  |  | |
| Did not experience any shocks |  |  |  |  |  |  | |  |  |  |  |
| Low |  |  |  |  |  |  | |  |  |  |  | |
| Moderate |  |  |  |  |  |  | |  |  |  |  | |
| High |  |  |  |  |  |  | |  |  |  |  | |

^ Results not statistically reliable, n<30

a The prevalence of poverty is the percentage of individuals living below the [NATIONAL EXTREME POVERTY THRESHOLD] per person per day poverty threshold.

b Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

c The prevalence of near-poor is the percentage of individuals living at or above the [NATIONAL EXTREME POVERTY THRESHOLD] per person per day poverty threshold (2011 PPP) but below 125 percent of that threshold, or [125% NATIONAL EXTREME POVERTY THRESHOLD] per day.

d Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

e The depth of poverty of the poor measures, on average, how far the consumption of the poor is below the [NATIONAL EXTREME POVERTY THRESHOLD] per person per day poverty threshold.

Notes:

[INSERT DESCRIPTION OF NATIONAL EXTREME POVERTY THRESHOLD.]

Estimates are based on de jure household members

Sources: Feed the Future [Country] ZOI Survey [Survey year(s)], [SOURCE OF DATA FOR NATIONAL EXTREME POVERTY THRESHOLD, SUCH AS NATIONAL STATISTICS OFFICE]

## Asset-based wealth index and comparative wealth index

Asset ownership can be used to predict a household’s long-term welfare—its capacity to earn income and withstand shocks in the future. The number and type of assets a household owns is associated with household resilience across national contexts,[[20]](#footnote-21),[[21]](#footnote-22) and asset-based wealth indices have increasingly been used as alternatives to income and consumption expenditure-based measures for several reasons, including the following: (1) they are more stable measures of socioeconomic well-being, (2) they are able to better detect differences in equity, and (3) they are easier to collect and require shorter interviews.[[22]](#footnote-23),[[23]](#footnote-24),[[24]](#footnote-25)

The asset-based wealth index was calculated using data on household characteristics from Module 2, *Dwelling characteristics*,in the Feed the Future [Country] ZOI Survey [Survey year(s)] questionnaire. The index comprises the following variables: presence of domestic servants in the household; agricultural land ownership and amount of land; number of people per sleeping room; house ownership; drinking water source; type of sanitation facility; floor material; roof material; wall material; cooking fuel; type and number of farm animals; household possessions, including large and small durable goods; and whether any member of the household holds a bank account. A wealth score is generated for each surveyed household, and then households are grouped into quintiles based on their relative distribution. Appendix 2.2b contains additional information about the methodology used to calculate the wealth index.

**Table 4.2.1** presents the wealth quintiles for the population living in the [Country] ZOI. Estimates in Table 4.2.1 are shown for the de jure household population as well as disaggregated by household characteristics, including gendered household type, household educational attainment, poverty status, and severity of shock exposure. [Insert specific description regarding the estimates in the table.]

Table 4.2.1: Percent Distribution of Households in the ZOI by Quintile According to the [Country] Asset-based Wealth Index, in Total and by Selected Household Characteristics

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Household characteristic** | **Wealth quintile** | | | | |  | **High/low ratio** | **Number of households (*n*)b** |
| **Lowest** | **Second** | **Middle** | **Fourth** | **Highest** | **Sig.a** |
| **All households** |  |  |  |  |  |  |  |  |
| **Gendered household type** |  |  |  |  |  |  |  |  |
| Male and female adults |  |  |  |  |  |  |  |  |
| Female adults only |  |  |  |  |  |  |  |  |
| Male adults only |  |  |  |  |  |  |  |  |
| Children only (no adults) |  |  |  |  |  |  |  |  |
| **Household education** |  |  |  |  |  |  |  |  |
| No education |  |  |  |  |  |  |  |  |
| Less than primary |  |  |  |  |  |  |  |  |
| Completed primary |  |  |  |  |  |  |  |  |
| Completed secondary |  |  |  |  |  |  |  |  |
| Higher |  |  |  |  |  |  |  |  |
| **Poverty status** |  |  |  |  |  |  |  |  |
| Poor |  |  |  |  |  |  |  |  |
| Non-poor |  |  |  |  |  |  |  |  |
| **Shock exposure index** |  |  |  |  |  |  |  |  |
| Did not experience any shocks |  |  |  |  |  |  |  |  |
| Low |  |  |  |  |  |  |  |  |
| Moderate |  |  |  |  |  |  |  |  |
| High |  |  |  |  |  |  |  |  |
| **Number of households (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

Note: Estimates are based on de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Although the wealth index is useful for studying economic inequalities in a particular country at a given time, it cannot be directly compared across countries or over time. Hence, Rutstein and Staveteig (2014) developed a methodology to calculate a comparative wealth index (CWI) that allows for direct comparison of economic status across countries and over time. Feed the Future adopted the CWI methodology to develop its ZOI-level indicator: the percent of households below the threshold of the poorest quintile of the asset-based comparative wealth index.

This indicator reflects the percentage of households in the Feed the Future ZOI whose ownership (or lack thereof) of selected assets places the household below a fixed threshold that defines the poorest quintile (bottom 20 percent) in the comparative baseline wealth index that was used to create a cross‑nationally, cross-temporally comparable asset-based wealth index. The use of a fixed threshold across ZOIs is possible because the CWI indicator is calculated relative to the reference wealth index. This means that the CWI scores can be compared across ZOI Surveys and over time.

Constructing the CWI indicator involves calculating the wealth index for the selected reference survey—the 2017 Senegal DHS—just as was done for the [Country] using ZOI Survey data. It also involves calculating anchoring points—four of which are based on unmet basic needs and four of which are based on asset ownership—for both the reference survey and ZOI Survey.[[25]](#footnote-26) The wealth index scores for the households sampled for the ZOI Survey are then converted into comparable CWI scores using the anchoring points calculated for the ZOI Survey and the reference survey. Finally, the percentage of households below the comparative threshold for the poorest quintile of the reference survey is calculated using the reference survey quintile cutoffs.

**Table 4.2.2** presents the percentage of households by comparative wealth quintile. In particular, the percentage of households that falls below the comparative threshold for the poorest quintile of the asset-based CWI in the ZOI is [X] percent. Estimates in Table 4.5 are shown for all households as well as disaggregated by household characteristics, including gendered household type, household educational attainment, poverty status, and severity of shock exposure.

Table 4.2.2: Percent Distribution of Households in the ZOI by Quintile According to the Comparative Wealth Index, in Total and by Selected Household Characteristics

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Household characteristic** | **Wealth quintile** | | | | |  | **High/low ratio** | **Number of households (*n*)b** |
| **Lowest** | **Second** | **Middle** | **Fourth** | **Highest** | **Sig.a** |
| **All households** |  |  |  |  |  |  |  |  |
| **Gendered household type** |  |  |  |  |  |  |  |  |
| Male and female adults |  |  |  |  |  |  |  |  |
| Female adults only |  |  |  |  |  |  |  |  |
| Male adults only |  |  |  |  |  |  |  |  |
| Children only (no adults) |  |  |  |  |  |  |  |  |
| **Household education** |  |  |  |  |  |  |  |  |
| No education |  |  |  |  |  |  |  |  |
| Less than primary |  |  |  |  |  |  |  |  |
| Completed primary |  |  |  |  |  |  |  |  |
| Completed secondary |  |  |  |  |  |  |  |  |
| Higher |  |  |  |  |  |  |  |  |
| **Poverty status** |  |  |  |  |  |  |  |  |
| Poor |  |  |  |  |  |  |  |  |
| Non-poor |  |  |  |  |  |  |  |  |
| **Shock exposure index** |  |  |  |  |  |  |  |  |
| Did not experience any shocks |  |  |  |  |  |  |  |  |
| Low |  |  |  |  |  |  |  |  |
| Moderate |  |  |  |  |  |  |  |  |
| High |  |  |  |  |  |  |  |  |
| **Number of households (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

Note: Estimates are based on de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

# Resilience

According to the USAID definition, resilience is “the ability of people, households, communities, and systems to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth.”*[[26]](#footnote-27)* Based on this definition, household resilience is the ability of a household to mitigate, adapt to, and recover from shocks and stresses. The shocks and stresses are events and trends that impact well-being outcomes and future resilience capacities.

Resilience measurement comprises measures related to shocks and stressors experienced, coping capacities, and well-being outcomes.[[27]](#footnote-28) No single indicator measures resilience. This chapter presents shock exposure and severity statistics in Section 5.1, followed by findings on four key Feed the Future ZOI-level resilience indicators: (1) the ability to recover from shocks and stresses index; (2) the proportion of households that believe local government will respond effectively to future shocks and stresses; (3) the proportion of households participating in group-based savings, micro-finance, or lending programs; and (4) the index of social capital at the household level.

Although information on shocks and stressors is specific to the resilience chapter, and capacities related to local government response, social capital, and savings are also reflected in this chapter, other capacities and well-being outcomes are captured in other report chapters. For example, decisionmaking capacities are captured in the A-WEAI module, coping strategies used during period of food shortages are captured in the food security module, and well-being outcomes are included in the chapters about poverty, food security, and nutrition.

## Shock exposure and severity

Respondents to the resilience and food security module of the ZOI Survey were asked whether their households experienced 16 shocks or stressors during the 12 months preceding the survey. For any experienced, the respondents were asked to rate the severity of the shock or stressor on the household’s income and food consumption using the same four‑point scale for each. This information is used to calculate the SEI. Because each surveyed household did not experience the same types of shocks and stressors of the same severity, it is necessary to create the SEI as a measure of the household’s ability to recover from the shocks and stressors that it experienced. In other words, SEI is a weighted average of the incidence of each shock, weighted by perceived severity of the shock.

**Table 5.1.1** presents the percentage of households that were exposed to each of the 16 shocks and stressors included in the survey during the year preceding the survey. The table also presents the perceived severity of each shock or stressor on the household’s income and food consumption, among the households that experienced it.

[Describe the results presented in the table.]

Table 5.1.1: Percent of Households in the ZOI Exposed to Each Shock or Stressor and Perceived Severity of Shocks on Household Income and Food Consumption During the 12 Months Preceding the Survey

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Shock or stressor** | **Experienced** | **Perceived impact on income** | | | |  | **Perceived impact on food consumption** | | | | **Number of households (*n*)** |
| **Not severe** | **Somewhat severe** | **Severe** | **Extremely severe** |  | **Not severe** | **Somewhat severe** | **Severe** | **Extremely severe** |
| Too much rain |  |  |  |  |  |  |  |  |  |  |  |
| Too little rain |  |  |  |  |  |  |  |  |  |  |  |
| Erosion of land |  |  |  |  |  |  |  |  |  |  |  |
| Loss of land |  |  |  |  |  |  |  |  |  |  |  |
| Sharp increase in food prices |  |  |  |  |  |  |  |  |  |  |  |
| Belongings stolen or destroyed |  |  |  |  |  |  |  |  |  |  |  |
| Unable to access crop inputs |  |  |  |  |  |  |  |  |  |  |  |
| Disease affecting crops |  |  |  |  |  |  |  |  |  |  |  |
| Pests affecting crops |  |  |  |  |  |  |  |  |  |  |  |
| Theft of crops |  |  |  |  |  |  |  |  |  |  |  |
| Unable to access livestock inputs |  |  |  |  |  |  |  |  |  |  |  |
| Disease affecting livestock |  |  |  |  |  |  |  |  |  |  |  |
| Animals stolen |  |  |  |  |  |  |  |  |  |  |  |
| Unable to sell crops, livestock, etc., at fair price |  |  |  |  |  |  |  |  |  |  |  |
| Severe illness in family |  |  |  |  |  |  |  |  |  |  |  |
| Death in household |  |  |  |  |  |  |  |  |  |  |  |
| **Number of households (*n*)** |  |  |  |  |  |  |  |  |  |  |  |

Note: Estimates are based on de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

The average number of shocks experienced by households in the ZOI is [average number of shocks]. On average, respondents considered the shocks that their households experienced to have a [NOT SEVERE/SOMEWHAT SEVERE/SEVERE/EXTREMELY SEVERE] impact on their household’s food consumption. **Table 5.1.2** categorizes households by their SEI score—that is, the number and severity of shocks and stressors that they experienced during the 12 months preceding the survey. [Describe table contents.]

Table 5.1.2: Percent Distribution of Households in the ZOI by SEI Score, in Total and by Gendered Household Type

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Indicator** | **SEI scores** | **Total** | **Gendered household type** | | | |  |
| **Male and female adults** | **Female adults only** | **Male adults only** | **Children only** | **Sig.a** |
| **Shock severity** |  |  |  |  |  |  |  |
| Did not experience any shocks | 0 |  |  |  |  |  |  |
| Low | [A]-[B] |  |  |  |  |  |  |
| Moderate | [C]-[D] |  |  |  |  |  |  |
| High | [E]-[F] |  |  |  |  |  |  |
| **Number of households (*n*)** |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

## Ability to recover from shocks and stresses index

In cross-sectional surveys, it is challenging to collect information on “actual recovery”; therefore, the ZOI survey collected information on the Ability to Recover from Shocks and Stresses Index (ARSSI), a proxy indicator for “actual recovery” that captures a household’s self-perceived ability to recover from the shocks and stresses that occur in the ZOI. The index comprises two components: (1) a base ability to recover component that captures how households are currently able to meet food needs relative to the past year, and (2) a forward-looking component that captures how households expect to be able to manage shocks and stresses in the future. The ARSSI corrects the ability to recover index for differences in shock exposure among households and is therefore comparable across households.

The ARSSI includes the typical types of shocks and stressors that occur in the ZOI, such as loss of a family member, loss of income, hunger, drought, flood, conflict, or similar events, and is based on data regarding the shocks and stressors that households experienced in the year prior to the survey and their perceived ability to meet food needs the following year.

**Table 5.2.1** presents the mean ARSSI score and households’ self-perceived ability to meet their food needs—at the time of the survey and over the next year— for all households and by household characteristics, including gendered household type, household educational attainment, wealth quintile, and poverty status.

[Describe the results presented in the table.]

Table 5.2.1: Mean ARSSI Scores and Households’ Self-perceived Ability to Meet Their Food Needs—at the Time of the Survey and over the Next Year, Compared to Before Shock Exposure, in Total and by Selected Household Characteristics

| **Household characteristic** | **Mean ARSSI score** |  | **Percent of households able to meet household food needs** | | | | | | | | | **Number of households (*n*)b,c** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **At time of survey** | | | |  | **Over next year** | | | |
| **Sig.a** | **Better** | **Same** | **Worse** | **Sig.a** |  | **Better** | **Same** | **Worse** | **Sig.a** |
| **All households** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Gendered household type** |  |  |  |  |  |  |  |  |  |  |  |  |
| Male and female adults |  |  |  |  |  |  |  |  |  |  |  |  |
| Female adults only |  |  |  |  |  |  |  |  |  |  |  |  |
| Male adults only |  |  |  |  |  |  |  |  |  |  |  |  |
| Children only (no adults) |  |  |  |  |  |  |  |  |  |  |  |  |
| **Household education** |  |  |  |  |  |  |  |  |  |  |  |  |
| No education |  |  |  |  |  |  |  |  |  |  |  |  |
| Less than primary |  |  |  |  |  |  |  |  |  |  |  |  |
| Completed primary |  |  |  |  |  |  |  |  |  |  |  |  |
| Completed secondary |  |  |  |  |  |  |  |  |  |  |  |  |
| Higher |  |  |  |  |  |  |  |  |  |  |  |  |
| **Wealth quintile** |  |  |  |  |  |  |  |  |  |  |  |  |
| Highest (wealthiest) |  |  |  |  |  |  |  |  |  |  |  |  |
| Fourth |  |  |  |  |  |  |  |  |  |  |  |  |
| Middle |  |  |  |  |  |  |  |  |  |  |  |  |
| Second |  |  |  |  |  |  |  |  |  |  |  |  |
| Lowest (poorest) |  |  |  |  |  |  |  |  |  |  |  |  |
| **Poverty status** |  |  |  |  |  |  |  |  |  |  |  |  |
| Poor |  |  |  |  |  |  |  |  |  |  |  |  |
| Non-poor |  |  |  |  |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

c Estimates include only households that experienced at least one shock or stressor during the 12 months preceding the ZOI Survey.

Note: Estimates are based on de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

## Resilience capacities

There are multiple sources of resilience that Feed the Future calls resilience capacities—the four elements of risk reduction strategies (i.e., prevention, mitigation, coping, and recovery) support the absorptive, adaptive, and transformative capacities that are essential to strengthen resilience. Many of these are captured in other parts of this report, such as input into decisionmaking, decisionmaking autonomy, and coping strategies during times of food shortages. This section presents three additional resilience capacities that research has shown to strengthen resilience and improve adaptation and recovery from shocks and stresses:[[28]](#footnote-29),[[29]](#footnote-30),[[30]](#footnote-31),[[31]](#footnote-32),[[32]](#footnote-33) local government response; participation in group-based savings, micro-finance, or lending programs; and social capital.

### Proportion of households that believe local government will respond effectively to future shocks and stresses

Believing in the ability of one’s local government to respond to shocks and stresses is a proxy for trust, legitimacy, and effectiveness of local institutions and leadership. Such belief and trust contribute to transformative resilience capacity, or the enabling environment that supports—or limits—people's ability to prevent or mitigate the impact of, deal with, and recover from shocks and stresses. The indicator reflects the proportion of households in the ZOI that believe their local government will help the community cope with difficult times (illustrated by a shock known to the community, such as drought or flood) in the future. Local government responsiveness can refer to either local leaders or institutions. **Table 5.3.1** presents the indicator results for all households and by household characteristics, including gendered household type, household educational attainment, wealth quintile, poverty status, and severity of shock exposure.

Table 5.3.1: Percent of Households in the ZOI that Believe Local Government Will Help the Community Cope with Future Shocks and Stresses, in Total and by Selected Household Characteristics

| **Household characteristic** | **Percent** | **Sig.a** | **Number of households (*n*)b** |
| --- | --- | --- | --- |
| **All households** |  |  |  |
| **Gendered household type** |  |  |  |
| Male and female adults |  |  |  |
| Female adults only |  |  |  |
| Male adults only |  |  |  |
| Children only (no adults) |  |  |  |
| **Household education** |  |  |  |
| No education |  |  |  |
| Less than primary |  |  |  |
| Completed primary |  |  |  |
| Completed secondary |  |  |  |
| Higher |  |  |  |
| **Wealth quintile** |  |  |  |
| Highest (wealthiest) |  |  |  |
| Fourth |  |  |  |
| Middle |  |  |  |
| Second |  |  |  |
| Lowest (poorest) |  |  |  |
| **Poverty status** |  |  |  |
| Poor |  |  |  |
| Non-poor |  |  |  |
| **Shock exposure index** |  |  |  |
| Did not experience any shocks |  |  |  |
| Low |  |  |  |
| Moderate |  |  |  |
| High |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

Note: Estimates are based on de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### Proportion of households participating in group-based savings, micro-finance, or lending programs

This indicator helps track the financial inclusion of households in the ZOI. Financial inclusion allows for lower day-to-day transaction costs (e.g., Mobile Money), the ability to grow savings to ease the burden of stressors and shocks, and access to credit to invest. Group-based savings programs are formal or informal community programs that serve as a mechanism for people in poor communities, with otherwise limited access to financial services, to pool their savings. The specific composition and function of the savings groups group vary and can include rotating disbursement as well as accumulating savings models. According to the World Bank, microfinance can be defined as approaches to provide financial services to households and micro-enterprises that are excluded from traditional commercial banking services. Typically, participants are low-income, self-employed, or informally employed individuals, with no formalized ownership titles on their assets and with limited formal identification papers.[[33]](#footnote-34),[[34]](#footnote-35),[[35]](#footnote-36)

**Table 5.3.2** presents the percentage of households participating in group-based savings, micro-finance, or lending programs. A household is considered to be participating if any member of the household saved money with or took a loan or borrowed cash or in-kind from a group-based savings, micro‑finance, or lending program in the 12 months preceding the survey. Findings are shown for all households and by household characteristics, including gendered household type, household educational attainment, wealth quintile, poverty status, and severity of shock exposure.

Table 5.3.2: Percent of Households in the ZOI Participating in Group-based Savings, Micro‑finance, or Lending Programs, in Total and by Selected Household Characteristics

|  |  |  |  |
| --- | --- | --- | --- |
| **Household characteristic** | **Percent** | **Sig.a** | **Number of households (*n*)b** |
| **All households** |  |  |  |
| **Gendered household type** | |  |  |
| Male and female adults |  |  |  |
| Female adults only |  |  |  |
| Male adults only |  |  |  |
| Children only (no adults) |  |  |  |
| **Household education** |  |  |  |
| No education |  |  |  |
| Less than primary |  |  |  |
| Completed primary |  |  |  |
| Completed secondary |  |  |  |
| Higher |  |  |  |
| **Wealth quintile** |  |  |  |
| Highest (wealthiest) |  |  |  |
| Fourth |  |  |  |
| Middle |  |  |  |
| Second |  |  |  |
| Lowest (poorest) |  |  |  |
| **Poverty status** | |  |  |
| Poor |  |  |  |
| Non-poor |  |  |  |
| **Shock exposure index** |  |  |  |
| Did not experience any shocks |  |  |  |
| Low |  |  |  |
| Moderate |  |  |  |
| High |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

Note: Estimates are based on de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### Index of social capital

Social capital has been shown to be an important source of resilience across different shocks and stresses, geographies, and populations. *Bonding social capital* relates specifically to the ability of households to provide support to and receive support from other households in the same community, whereas *bridging social capital* relates to the ability of households to provide support to and receive support from other households living outside of their community. The stronger the reciprocal obligation networks, the more likely it is that a household will be able to successfully manage shocks and stresses.

The index of social capital measures the ability of households in the ZOI to draw on social networks to get support to reduce the impact of shocks and stresses on their households. It measures both the degree of bonding among households in their own community and the degree of bridging between households in the area to households outside their own community. If household responses indicate that they have reciprocal, mutually reinforcing relationships through which household members can receive and provide support during times of need, they are considered to have social capital. The indicator is constructed by averaging two sub-indices: one measuring bonding social capital and one measuring bridging social capital.

**Table 5.3.3** presents the index of social capital results overall, and by sub-index (i.e., bonding and bridging social capital) for all households and by household characteristics, including gendered household type, household educational attainment, wealth quintile, poverty status, and severity of shock exposure.

Table 5.3.3: Mean Social Capital Index Scores in the ZOI, in Total and by Selected Household Characteristics

| **Household characteristic** | **Total** | |  | **Bonding** | |  | **Bridging** | | **Number of households (*n*)b** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Score** | **Sig.a** | **Score** | **Sig.a** | **Score** | **Sig.a** |
| **All households** |  |  |  |  |  |  |  |  |  |
| **Gendered household type** |  |  |  |  |  |  |  |  |  |
| Male and female adults |  |  |  |  |  |  |  |  |  |
| Female adults only |  |  |  |  |  |  |  |  |  |
| Male adults only |  |  |  |  |  |  |  |  |  |
| Children only (no adults) |  |  |  |  |  |  |  |  |  |
| **Household education** |  |  |  |  |  |  |  |  |  |
| No education |  |  |  |  |  |  |  |  |  |
| Less than primary |  |  |  |  |  |  |  |  |  |
| Completed primary |  |  |  |  |  |  |  |  |  |
| Completed secondary |  |  |  |  |  |  |  |  |  |
| Higher |  |  |  |  |  |  |  |  |  |
| **Wealth quintile** |  |  |  |  |  |  |  |  |  |
| Highest (wealthiest) |  |  |  |  |  |  |  |  |  |
| Fourth |  |  |  |  |  |  |  |  |  |
| Middle |  |  |  |  |  |  |  |  |  |
| Second |  |  |  |  |  |  |  |  |  |
| Lowest (poorest) |  |  |  |  |  |  |  |  |  |
| **Poverty status** |  |  |  |  |  |  |  |  |  |
| Poor |  |  |  |  |  |  |  |  |  |
| Non-poor |  |  |  |  |  |  |  |  |  |
| **Shock exposure index** |  |  |  |  |  |  |  |  |  |
| Did not experience any  shocks |  |  |  |  |  |  |  |  |  |
| Low |  |  |  |  |  |  |  |  |  |
| Moderate |  |  |  |  |  |  |  |  |  |
| High |  |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

Note: Estimates are based on de jure household members.

Source: Feed the Future [COUNTRY] ZOI Survey [Survey year(s)]

# Women’s empowerment in agriculture

This chapter presents findings related to the A-WEAI. Although women play a prominent role in agriculture, they face persistent economic and social constraints. Closing the gender gap in agriculture is critical to achieving Feed the Future’s objectives of increasing agricultural productivity and efficiency, reducing hunger and malnutrition, and achieving food security.

## 6.1 Overview

The WEAI is the first-ever measure to directly capture women’s empowerment and inclusion in the agriculture sector, and it was originally developed to track changes in women’s empowerment that occur as a direct or indirect result of Feed the Future’s programming.[[36]](#footnote-37) Following its widespread uptake, the WEAI was improved and streamlined to make it less time-consuming and expensive to collect, resulting in the Abbreviated WEAI (A-WEAI).[[37]](#footnote-38) All 5 domains of the original WEAI are retained, but the 10 indicators in the original WEAI are reduced to 6 in the A-WEAI.

The A-WEAI survey module is administered to the primary adult male decisionmaker and the primary adult female decisionmaker (18 years of age or older) in each household so that the relative empowerment of women and men in the same household can be compared. The primary adult male and female decisionmakers self-identify as the man or woman who makes more social and economic decisions than other men or women, respectively, in the household; this information is collected as part of the household roster information.[[38]](#footnote-39) Households are excluded from responding to questions in the A-WEAI modules if there is only a self-identified primary adult male decisionmaker and no self-identified primary adult female decisionmaker, or if there are no adults 18 years of age or older.

The A-WEAI comprises two sub-indices: the 5DE and the GPI. The A-WEAI applies the same weights to the 5DE and the GPI as the original WEAI. The 5DE is weighted 90 percent, and the GPI is weighted 10 percent.

The A-WEAI score is calculated as: *A-WEAI score = 0.9(5DE) + 0.1(GPI)*

The 5DE score captures two elements: (1) the percentage of women who are empowered and (2) the average percentage of indicators that compose the 5DE in which disempowered women have adequate achievements.

The formula to calculate the 5DE score is as follows:[[39]](#footnote-40) *5DE score = He + Hn (Aa)*

Where:

*He* = percentage of women who are empowered

*Hn*= percentage of disempowered women

*Aa* = is the average percentage of indicators in which disempowered women have adequate achievements

The 5DE score can be improved by increasing the percentage of empowered women or, for those women who are disempowered, by increasing percentage of women among the disempowered who achieve adequacy in the indicators that compose the 5DE.

The 5DE is composed of five domains: (1) productive decisions, (2) resources, (3) income, (4) group membership, and (5) time allocation; and six corresponding indicators. Each domain of the 5DE is equally weighted at one-fifth. The productive decisions, income, group membership, and time allocation domains are composed of a single indicator, and thus these domains and the corresponding indicator carry the same weight of one-fifth. The resources domain is also weighted at one-fifth but is composed of two indicators: ownership of assets with the corresponding weight of two-fifteenths, and access to and decisions on credit with the corresponding weight of one-fifteenth.

The indicators that compose the 5DE measure whether an individual reaches a certain threshold for that indicator, defined as achieving adequacy. An individual who has adequate achievements in 80 percent of the indicators that compose the 5DE is identified as empowered (equivalent to four of the five A-WEAI domains).[[40]](#footnote-41) These indicators are also used to compute an inadequacy score for each individual, which is the weighted average of the indicators (0=adequate; 1=inadequate), and is used in the GPI calculation. Table 6.1.1 presents the 5DE domains, indicators, and adequacy cut-offs. Appendix 2.3 presents more information, including the survey questions and criteria used to determine adequacy for each 5DE indicator.

Table 6.1.1: A-WEAI Domains, Indicators, and Definitions of Adequacy

| **Domain** | **Indicator** | **Definition of indicator adequacy** |
| --- | --- | --- |
| **Production** | Input in productive decisions | Adequate if, for at least one activity, an individual decides alone; OR participates and has input into some, or most or all decisions regarding the activity; OR someone else decides but feels she/he could decide to a medium or high extent if she/he wanted to |
| **Resources** | Ownership of assets | Adequate if individual owns—alone or jointly—at least one large asset or at least two small asset types |
| Access to and input into decisions on credit | Adequate if individual—alone or jointly—makes decisions about at least one source of credit accessed by her householda |
| **Income** | Control over use of income | Adequate if individual participates in and has input in some, most, or all decisions about income generated from an activity; OR she/he makes decisions, has input in decisions, or feels she/he could make decisions (if desired) about employment or major household expenditures (excluding minor expenditures) |
| **Leadership** | Group membership | Adequate if individual is an active member of at least one groupb |
| **Time** | Workload | Adequate if individual worked less than 10.5 hours during the previous dayc |

a Respondents who live in households that did not access credit are considered inadequate on access to credit and decisions on credit.

b Respondents who report that no groups exist in their communities or who are not aware of any groups in their community are considered adequate in group membership.

c Respondents who reported the 24 hours preceding the survey as being an atypical workday are excluded.

Source: Adapted from Malapit, et al., 2015.

The A-WEAI survey questions that are administered to the primary female decisionmaker and used to determine empowerment status and calculate the inadequacy score are also administered to the primary male decisionmaker in the same household and used to determine his empowerment status and inadequacy score. The GPI is the second sub-index of the A-WEAI and is calculated using these data for the primary female and male decisionmakers in households that have both.

The GPI measures the extent of inequality in empowerment in a household between the primary male decisionmaker and the primary female decisionmaker. The GPI excludes households that lack both a primary male decisionmaker and a primary female decisionmaker. A household is considered to lack gender parity if the primary female decisionmaker is disempowered and her inadequacy score is higher than that of the primary male decisionmaker. The GPI comprises two components: (1) proportion of gender parity-inadequate households; and (2) the average empowerment gap, which is the average normalized percentage gap in the censored inadequacy score of women and men in households that do not have gender parity.

The average normalized empowerment gap (*IGPI )* is calculated as:

*IGPI = (inadequacy scorewoman – inadequacy scoreman)/(1 – inadequacy scoreman)*

Note the empowerment gap is normalized because each household has a different threshold for gender parity that is based on the man’s inadequacy score in each household. The average empowerment gap is normalized by dividing each difference in inadequacy scores by the maximum possible gap for women, which is 1 (i.e. complete inadequacy) minus the male’s inadequacy score.

The GPI score is calculated as: *GPI = 1 – (HGPI x IGPI)*

Where:

*HGPI* = percentage of women without gender parity

*IGPI* = average normalized empowerment gap

The GPI score can be improved by increasing the percentage of women who have gender parity or, for those women who are less empowered than men, by reducing the empowerment gap between the primary male and female decisionmakers in the same household.

This chapter presents findings on the A-WEAI, and the indices and indicators that compose the index. For additional details on calculating the A-WEAI, please refer to the *Feed the Future Guide to Statistics*.[[41]](#footnote-42)

## 6.2 Summary of A-WEAI results

This section presents the following A-WEAI results for women and men: (1) A-WEAI scores, disaggregated by age group and region/subzone, if applicable; (2) 5DE scores, representing the percentage of individuals achieving empowerment; (3) GPI scores, including percentage of women achieving gender parity; and (4) average empowerment gap.

**Table 6.2.1** presents an overview of the A-WEAI, 5DE, and GPI scores, disaggregated by age group and region. **Figure 6.1** illustrates the percentage that each of the six A-WEAI indicators contributes to empowerment. **Table 6.2.2** presents the percentage of females and males achieving empowerment disaggregated by age, education, poverty status, region, and whether a woman’s child is being fed according to recommendations.[[42]](#footnote-43)

[DESCRIBE THE RESULTS IN THE TABLE.]

Table 6.2.1: A-WEAI, 5DE, and GPI Scores, and Average Empowerment Gap

| **Statistic** | **Female** | **Male** | **Sig.a** |
| --- | --- | --- | --- |
| **A-WEAI score** |  |  |  |
| **Age category** |  |  |  |
| 18-29 |  |  |  |
| 30+ |  |  |  |
| **[Region]** |  |  |  |
| [Region 1] |  |  |  |
| [Region 2] |  |  |  |
| [Region 3] |  |  |  |
| [Region 4] |  |  |  |
| **5DE score** |  |  |  |
| Percent of individuals achieving empowerment |  |  |  |
| Percent of weighted indicators in which disempowered individuals have adequate achievements (i.e., average adequacy score) |  |  |  |
| **Number of individuals** |  |  |  |
| **GPI score** |  |  |  |
| Percent achieving gender parity |  |  |  |
| **Age category** |  |  |  |
| 18-29 |  |  |  |
| 30+ |  |  |  |
| Average empowerment gap |  |  |  |
| **Number of dual-adult households** |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and primary adult decisionmakers' sex. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on primary adult decisionmakers who are de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Table 6.2.2: Empowerment by Sex, Age, Poverty Status, Region, and Child Feeding Behavior

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Characteristic** | **Female** | |  | **Male** | |  | |
| **Percent** | **n** | **Percent** | **n** | | **Sig.a** |
| **Age category** |  |  |  |  |  | |  |
| 18-29 |  |  |  |  |  | |  |
| 30+ |  |  |  |  |  | |  |
| **Education** |  |  |  |  |  | |  |
| No education |  |  |  |  |  | |  |
| Less than primary |  |  |  |  |  | |  |
| Completed primary |  |  |  |  |  | |  |
| Completed secondary |  |  |  |  |  | |  |
| Higher |  |  |  |  |  | |  |
| **Poverty status** |  |  |  |  |  | |  |
| Poor |  |  |  |  |  | |  |
| Non-poor |  |  |  |  |  | |  |
| **[Region]** |  |  |  |  |  | |  |
| [Region 1] |  |  |  |  |  | |  |
| [Region 2] |  |  |  |  |  | |  |
| [Region 3] |  |  |  |  |  | |  |
| [Region 4] |  |  |  |  |  | |  |
| **0-5 month old exclusively breastfed** |  |  |  |  |  | |  |
| Yes |  |  |  |  |  | |  |
| No |  |  |  |  |  | |  |
| **6-23 month old with minimum acceptable diet** |  |  |  |  |  | |  |
| Yes |  |  |  |  |  | |  |
| No |  |  |  |  |  | |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and primary adult decisionmakers' sex. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on primary adult decisionmakers who are de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

## 6.3. A-WEAI domain and indicator results

Empowerment is a complex and multidimensional concept. Aggregating the different dimensions of empowerment into a single index to generate the A-WEAI score provides a simple way to communicate the status of women’s empowerment in agriculture, to compare those scores across countries and over time, and to analyze the relationship of women’s empowerment in agriculture to other outcome of interest, such as hunger and malnutrition. A-WEAI scores also provide incentives for decisionmakers to reduce the prevalence and intensity of disempowerment.

Based on the A-WEAI methodology, empowerment in agriculture occurs when a woman has adequate achievements across the five domains that compose the index. Therefore, decomposing the A-WEAI and examining the individual indicators in each domain is critical for identifying the greatest constraints to empowerment, designing policies and programs to reduce those constraints, and understanding how and why those constraints change over time.

This section presents A-WEAI results disaggregated by age and decomposed by: (1) average percentage of individuals achieving adequacy across the six A-WEAI indicators; (2) contribution of each indicator to empowerment; and (3) percentage of individuals with adequate achievements in each A-WEAI indicator, using censored headcount ratios. Examining censored headcount ratios help focus attention on those indicators that are the biggest constraints to empowerment *among the* disempowered. Uncensored headcount ratios present indicator results *regardless of empowerment status* by identifying those indicators that report the lowest percentages achieving adequacy. [[43]](#footnote-44)

Table 6.3.1 presents the average percentage of women and men achieving adequacy in the six A-WEAI indicators. The purpose of reporting on the average percentage of women achieving adequacy across the six A-WEAI indicators overall, which is a Feed the Future context indicator, and for the individual indicators is two-fold: to bring greater attention to the composition of empowerment and disempowerment, and to identify the individual indicators that present the greatest constraints to empowerment for women and men.

Table 6.3.1: Average Percent of Primary Adult Decisionmakers Achieving Adequacy in the Six A-WEAI Indicators, by Sex and Age

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **A-WEAI indicator** | **Female** | |  | **Male** | |  |
| **Percent** | **n** | **Percent** | **n** | **Sig.a** |
| Average percentage (censored headcount ratio) |  |  |  |  |  |  |
| **Age category** |  |  |  |  |  |  |
| 18-29 |  |  |  |  |  |  |
| 30+ |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and primary adult decisionmakers' sex. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Notes:

Estimates are based on primary adult decisionmakers who are de jure household members.

The Feed the Future ZOI context indicator, “Average percent of women achieving adequacy across the six indicators of the A-WEAI,” is calculated as the sum of the censored headcount ratios for primary adult female decisionmakers for each of the six A-WEAI indicators, divided by six (the number of indicators.) It shows the average across the six indicators of proportion of primary adult female decisionmakers in the ZOI population who are disempowered but still achieved adequacy in an individual A-WEAI indicator.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

**Figure 6.1** presents the comparison of the contribution of each indicator to the empowerment of women and men using censored headcount ratios.

[DESCRIBE THE RESULTS IN THE FIGURE.]

Figure 6.1: Percent Contribution of the Six A-WEAI Indicators to Empowerment, by Sex (Censored Headcount Ratio)

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

**Table 6.3.2** presents the censored headcount ratios of individuals achieving adequacy in each indicator, disaggregated by sex and age.

[DESCRIBE THE RESULTS IN THE TABLE.]

Table 6.3.2: Percent of Primary Adult Decisionmakers with Adequate Achievement in Each A-WEAI Indicator Using Censored Headcount Ratios, by Sex and Age

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **A-WEAI indicator** | **Female** | |  | **Male** | |  |
| **Percent** | **n** | **Percent** | **n** | **Sig.a** |
| Input in productive decisions |  |  |  |  |  |  |
| 18-29 |  |  |  |  |  |  |
| 30+ |  |  |  |  |  |  |
| Ownership of assets |  |  |  |  |  |  |
| 18-29 |  |  |  |  |  |  |
| 30+ |  |  |  |  |  |  |
| Access to and decisions on credit |  |  |  |  |  |  |
| 18-29 |  |  |  |  |  |  |
| 30+ |  |  |  |  |  |  |
| Control over income |  |  |  |  |  |  |
| 18-29 |  |  |  |  |  |  |
| 30+ |  |  |  |  |  |  |
| Group membership |  |  |  |  |  |  |
| 18-29 |  |  |  |  |  |  |
| 30+ |  |  |  |  |  |  |
| Workload |  |  |  |  |  |  |
| 18-29 |  |  |  |  |  |  |
| 30+ |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and primary adult decisionmakers' sex. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on primary adult decisionmakers who are de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

## 6.4 Descriptive statistics for A-WEAI domains and indicators

The following section presents more granular information and statistics on data collected in the A-WEAI module. The sub-sections are organized by A-WEAI domains.

### 6.4.1 Production

Adequacy in *production* is measured by input into decisions about agricultural activities in which an individual participates. Respondents are considered adequate in production if they make decisions alone, have input into most or all decisions, or feel that they could make decisions if they wanted to for at least one agricultural activity.

**Table 6.4.1** presents the percentages of women and men who are involved in agriculture-related activities (i.e., food crop farming, cash crop farming, livestock raising, or fishing), non-farm economic activities, and wage or salaried employment to capture the breadth of economic activities in which individuals are engaged. The table also presents the percentages of women and men who have input into the decisions made about specific activities.

[DESCRIBE THE RESULTS IN THE TABLE.]

Table 6.4.1: Participation in Economic Activities and Input in Decisionmaking on Production, by Sex

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Economic activity** | **Participates in activity** | | |  | **Has input into decisions about activitya** | | | | | |
| **Femaleb** | **Malec** |  |  | **Femaleb,d** | |  | **Malec,d** | |  |
| **(%)** | **(%)** | **Sig.d** |  | **%** | **n** |  | **%** | **n** | **Sig.e** |
| **Any economic activity** |  |  |  |  |  |  |  |  |  |  |
| Food crop farming |  |  |  |  |  |  |  |  |  |  |
| Cash crop farming |  |  |  |  |  |  |  |  |  |  |
| Livestock raising |  |  |  |  |  |  |  |  |  |  |
| Fishing or fishpond culture |  |  |  |  |  |  |  |  |  |  |
| Non-farm economic activities |  |  |  |  |  |  |  |  |  |  |
| Wage or salaried employment |  |  |  |  |  |  |  |  |  |  |
| **Number of individuals (*n*)** |  |  |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Having input means that the individual reported having input into most or all decisions regarding the activity.

b Estimates exclude households that do not have a primary adult female decisionmaker or that have missing or incomplete indicator data.

c Estimates exclude households that do not have a primary adult male decisionmaker or that have missing or incomplete indicator data.

d Estimates exclude individuals who do not participate in an activity or report that no decision was made.

e Significance tests were performed to determine whether an association exists between the outcome indicator and primary adult decisionmakers' sex. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on primary adult decisionmakers who are de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### 6.4.2 Resources

Adequacy in *resources* is measured by two indicators: (1) ownership of assets, and (2) access to and decisions related to credit. Respondents are considered adequate in asset ownership if they own, alone or jointly, at least two small asset types or one large asset. Respondents are considered adequate to access to credit if they decide alone or jointly whether to borrow cash or in-kind or what to do with the money or item borrowed. **Table 6.4.2** presents the findings for ownership of assets.

[DESCRIBE THE RESULTS IN THE TABLE.]

Table 6.4.2: Ownership of Productive Resources, Any Household Member and by Sex of Primary Adult Decisionmaker

| **Productive resource** | **Someone in the household owns itema (%)** | **Female owns solely or jointlya,b (%)** | **Male owns solely or jointlya,c (%)** | **Sig.d** |
| --- | --- | --- | --- | --- |
| Agricultural land |  |  |  |  |
| Large livestock |  |  |  |  |
| Small livestock |  |  |  |  |
| Chickens, ducks, turkeys, and pigeons |  |  |  |  |
| Fishpond or fishing equipment |  |  |  |  |
| Non-mechanized farm equipment |  |  |  |  |
| Mechanized farm equipment |  |  |  |  |
| Non-farm business equipment |  |  |  |  |
| House or other structures |  |  |  |  |
| Large consumer durables |  |  |  |  |
| Small consumer durables |  |  |  |  |
| Cell phone |  |  |  |  |
| Non-agricultural land |  |  |  |  |
| Means of transportation |  |  |  |  |
| **Number of households (*n*)** |  |  |  |  |

^ Results not statistically reliable, n<30

a Estimates exclude households that have no primary adult decisionmaker or that have missing or incomplete indicator data. Respondents who indicated “not applicable” are also excluded.

b Estimates exclude households that do not have a primary adult female decisionmaker or that have missing or incomplete indicator data.

c Estimates exclude households that do not have a primary adult male decisionmaker or that have missing or incomplete indicator data.

d Significance tests were performed to determine whether an association exists between the outcome indicator and primary adult decisionmakers' sex. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on primary adult decisionmakers who are de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

**Table 6.4.3** and **Table 6.4.4** show the second indicator of the *resources* domain—access to and decisionmaking on credit. Table 6.3.3 presents the percentage of women who report that a member of their household received any loan in the 12 months preceding the survey—overall and disaggregated by source. The percentages of households with primary adult female decisionmakers who received an in‑kind loan or credit (e.g., food items or raw materials) or a cash loan are also presented. The in-kind and cash loan categories are not mutually exclusive; a household could have received both types of loans. For women living in households that received a loan, the table also presents the percentages who report having contributed to the decision to take the loan or the decisions on how to use the loan. Table 6.3.4 presents the same information for men.

[DESCRIBE THE RESULTS IN THESE TABLES]

Table 6.4.3: Credit Access among Women, by Source

| **Characteristic** |  | | **Credit sourcea** | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Any source (%)** | | **NGO (%)** | | **Informal lender (%)** | | **Formal lender (%)** | | **Friends or relatives (%)** | | **Group-based micro-finance (%)** | | **Informal credit/ savings groups (%)** | **No credit needed (%)** |
| **Household received a loan** | |  | |  | |  | |  | |  | |  | |  |
| Any loan |  | |  | |  | |  | |  | |  | |  |  |
| In-kind loan |  | |  | |  | |  | |  | |  | |  |  |
| Cash loan |  | |  | |  | |  | |  | |  | |  |  |
| **Number of households (*n*)b** |  | |  | |  | |  | |  | |  | |  |  |
| **Woman contributed to credit decision** | | | | | | | | | | | | | | |
| Any decision |  | |  | |  | |  | |  | |  | |  |  |
| On whether to borrow |  | |  | |  | |  | |  | |  | |  |  |
| On how to use loan |  | |  | |  | |  | |  | |  | |  |  |
| **Number of households that received a loan (*n*)c** |  | |  | |  | |  | |  | |  | |  |  |

^ Results not statistically reliable, n<30

NGO=nongovernmental organization

a Percentages sum to more than 100 percent because loans may have been received from more than one source.

b Estimates exclude households that do not have a primary adult female decisionmaker or that have missing or incomplete indicator data.

c Estimates exclude households that do not have a primary adult female decisionmaker, that did not receive a loan, or that have missing or incomplete indicator data.

Note: Estimates are based on primary adult female decisionmakers who are de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Table 6.4.4: Credit Access among Men, by Source

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Characteristic** |  | **Credit sourcea** | | | | | | | |
| **Any source (%)** | **NGO (%)** | | **Informal lender (%)** | **Formal lender (%)** | **Friends or relatives (%)** | **Group-based micro-finance (%)** | **Informal credit/ savings groups (%)** | **No credit needed (%)** |
| **Household received a loan** | | |  |  |  |  |  |  |  |
| Any loan |  |  | |  |  |  |  |  |  |
| In-kind loan |  |  | |  |  |  |  |  |  |
| Cash loan |  |  | |  |  |  |  |  |  |
| **Number of households (*n*)b** |  |  | |  |  |  |  |  |  |
| **Man contributed to credit decision** | | | | | | | | | |
| Any decision |  |  | |  |  |  |  |  |  |
| On whether to borrow |  |  | |  |  |  |  |  |  |
| On how to use loan |  |  | |  |  |  |  |  |  |
| **Number of households that received a loan (*n*)c** |  |  | |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

NGO=non-governmental organization

a Percentages sum to more than 100 percent because loans may have been received from more than one source.

b Estimates exclude households that do not have a primary adult male decisionmaker or that have missing or incomplete indicator data.

c Estimates exclude households that do not have a primary adult male decisionmaker, that did not receive a loan, or that have missing or incomplete indicator data.

Note: Estimates are based on primary adult male decisionmakers who are de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### 6.4.3 Income

Adequacy in *income* is measured by input into decisions related to income and expenditures. Respondents are considered adequate if they have substantial input into most or all decisions or feel that they can make a decision for at least one economic activity or major household expenditures. **Table 6.4.5** shows the percentages of women and men who have input into the decisions made regarding the use of income derived from an activity.

[DESCRIBE THE RESULTS IN THE TABLE.]

Table 6.4.5: Input into Decisionmaking on Use of Income and Major Household Expenditures, by Sex

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Economic activity** | **Femalea** | |  | **Maleb** | |  |
| **Percent** | **n** | **Percent** | **n** | **Sig.c** |
| **Any economic activity** |  |  |  |  |  |  |
| Food crop farming |  |  |  |  |  |  |
| Cash crop farming |  |  |  |  |  |  |
| Livestock raising |  |  |  |  |  |  |
| Fishing or fishpond culture |  |  |  |  |  |  |
| Non-farm economic activities |  |  |  |  |  |  |
| Wage or salaried employment |  |  |  |  |  |  |
| Major household expenditures |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Estimates exclude households that do not have a primary adult female decisionmaker or that have missing or incomplete data. Estimates also exclude respondents who do not participate in the activity or who report that no decision was made regarding the activity.

b Estimates exclude households that do not have a primary adult male decisionmaker or that have missing or incomplete data. Estimates also exclude respondents who do not participate in the activity or who report that no decision was made regarding the activity.

c Significance tests were performed to determine whether an association exists between the outcome indicator and primary adult decisionmakers' sex. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Notes:

Estimates are based on primary adult decisionmakers who are de jure household members.

Having input means that the individual reported having input into most or all decisions regarding the use of income generated from the activity.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### 6.4.4 Leadership

Adequacy in *leadership* is measured through anindividual’s active involvement with community groups. Respondents are considered adequate if they are active members of at least one community group. **Table 6.4.6** shows the percentages of women and men who are active members of groups in their community.

[DESCRIBE THE RESULTS IN THE TABLE.]

Table 6.4.6: Group Membership, by Sex

|  |  |  |  |
| --- | --- | --- | --- |
| **Type of group** | **Is an active group member** | | |
| **Femalea,b (%)** | **Malea,c (%)** | **Sig.d** |
| **Any group** |  |  |  |
| Agricultural producer’s group |  |  |  |
| Water users’ group |  |  |  |
| Forest users’ group |  |  |  |
| Credit or micro-finance group |  |  |  |
| Mutual help or insurance group |  |  |  |
| Trade and business association |  |  |  |
| Civic or charitable group |  |  |  |
| Local government |  |  |  |
| Religious group |  |  |  |
| Other women’s group |  |  |  |
| Other |  |  |  |
| **Number of individuals (*n*)** |  |  |  |

^ Results not statistically reliable, n<30

a The denominator for these percentages includes all interviewed individuals, even those who reported that no group exists or that they are unaware of the existence of a group in their community. These individuals, who report that none of the groups exist or who are unaware of any groups, are counted as having inadequate achievement of this empowerment indicator.

b Estimates exclude households that do not have a primary adult female decisionmaker or that have missing or incomplete data.

c Estimates exclude households that do not have a primary adult male decisionmaker or that have missing or incomplete data.

d Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on primary adult decisionmakers who are de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### 6.4.5 Time

Adequacy in the last domain, *time*, assesses the workloads of women and men, as measured using a time allocation log. Respondents are considered adequate if they spend 10.5 hours or less performing work activities in a 24-hour period. **Table 6.4.7** shows the percentages of women and men who performed the listed activities the day prior to the survey and the average number of hours that they spent performing each activity. The percentages indicate those individuals who reported performing the activity, irrespective of the length of time that they spent performing the activity. The average hours spent performing an activity is the average across all individuals, assigning zero hours to individuals who did not perform an activity. Note that individuals who reported that the hours worked the day prior to the ZOI Survey were not normal are excluded from the results.

[DESCRIBE THE RESULTS IN THESE TABLES.]

Table 6.4.7: Time Allocation, by Sex

| **Activity** | **Female** | |  | **Male** | | **Sig.a** |
| --- | --- | --- | --- | --- | --- | --- |
| **Percent** | **Mean hours devoted** |  | **Percent** | **Mean hours devoted** |
| Sleeping and resting |  |  |  |  |  |  |
| Eating and drinking |  |  |  |  |  |  |
| Personal care |  |  |  |  |  |  |
| School and homework |  |  |  |  |  |  |
| Work as employed |  |  |  |  |  |  |
| Own business work |  |  |  |  |  |  |
| Farming, livestock, fishing |  |  |  |  |  |  |
| Shopping, getting services |  |  |  |  |  |  |
| Weaving, sewing, textile care |  |  |  |  |  |  |
| Cooking |  |  |  |  |  |  |
| Domestic work (fetching food and water) |  |  |  |  |  |  |
| Care for children, adults, elderly |  |  |  |  |  |  |
| Travel and commuting |  |  |  |  |  |  |
| Watching TV, listening to radio, reading |  |  |  |  |  |  |
| Exercising |  |  |  |  |  |  |
| Social activities and hobbies |  |  |  |  |  |  |
| Religious activities |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |
| **Number of individuals (*n*)** |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on primary adult decisionmakers who are de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

# Targeted agriculture value chains

This chapter presents the results for the targeted value chains—maize, fishpond aquaculture, and dairy farming—included in the Feed the Future ZOI Survey in [Country], including background information about each value chain and its farmers, the use of agriculture technologies and management practices, and the yield. Individuals responsible for making management decisions about one or more maize plot, one or more fishpond, or one or more herd of dairy cows during the year preceding the ZOI Survey were eligible to respond to the corresponding survey modules. Throughout this chapter, these interviewed individuals are referred to as farmers. There may be more than one farmer of a specific value chain in the same household if the farmers were responsible for different plots of maize, different fishponds, or different herds of dairy cows. Multiple farmers in the same household, therefore, may have been interviewed about the same value chains. In addition, the same farmer may have been responsible for more than one targeted value chain; in which case, the same farmer may have been interviewed about multiple value chains.

Results for each targeted value chain are presented across all farmers of that value chain and disaggregated by sex and age (15-29 years and 30 years or older). Group-wise tests of differences were run to compare the use of practices and technologies between male and female farmers and youth and non-youth farmers. Statistically significant results are indicated in the tables and discussed in the narrative.

Knowing what management practices and technologies farmers use to cultivate their crops and raise their fish or livestock fosters a better understanding of what farmers are already doing well and what they could do better to increase their productivity. Collecting information about management practices and technologies that farmers use through the ZOI Survey enables an examination of practices and technologies beyond those who have directly participated in Feed the Future programming. Promoted improved management practices or technologies are those supported through Feed the Future as a way to increase agriculture productivity or support stronger and better-functioning systems. Although the Feed the Future team in [Country] had not identified any improved management practices or technologies to promote in the ZOI at the time of the ZOI Survey, the ZOI Survey results will help identify practices and technologies that it may promote in the future. In all tables in this chapter, improved technologies promoted by Feed the Future in [Country] are indicated with a superscript (‡).

Yields of products from targeted agricultural value chains are a key driver of agricultural productivity. Yield can serve as a proxy for the productivity of these value chains and the impacts of interventions when its trend is evaluated over time. Improving smallholders’[[44]](#footnote-45) yield of agricultural commodities contributes to increasing agricultural gross domestic product, can increase income when other components of agricultural productivity (e.g., post-harvest storage, value addition and processing, markets) are in place, and can therefore contribute to increasing sustainable productivity and reducing poverty. Collecting information about yield through the ZOI Survey enables an examination of outcomes that have scaled beyond those who have directly participated in Feed the Future programming to have an effect at the ZOI level.

Not only did the ZOI Survey enable the collection of information about management practices, technologies, and yields in the ZOI, it also enabled the collection of information about the land that farmers used to cultivate targeted value chain crops in the ZOI. Assessment of the soil in agricultural plots can provide information about the land’s potential. Land potential is the long-term potential of the land to sustainably generate ecosystem services, which fall into four general categories: (1) provisioning, such as the production of food and water; (2) regulating, such as the control of climate and disease; (3) supporting, such as nutrient cycles and crop pollination; and (4) cultural, such as spiritual and recreational benefits. Soil characteristics, along with topography and climate, feed into land potential. Understanding land potential is important for human uses, such as agriculture and livestock keeping, and also for conserving biodiversity and natural resources. Understanding land potential is also important for land-use planning; it can help farming households decide what activities are best suited for a piece of land. For example, with information about land potential, a farmer can choose to plant one part of the farm with drought-tolerant crops and leave another plot with lower-potential soil fallow for livestock grazing.

Farmers’ understanding of their land’s potential can increase the household’s resilience by providing information about which land is at risk of irreversible degradation and where crop failure risk due to drought is high. A household’s economic well-being can be better managed by matching the household’s land use with the sustainable potential of that land. In the ZOI Survey, survey field teams collected information to identify the soil type and soil characteristics of all agricultural plots where farmers in surveyed households cultivated targeted value chain crops during the year preceding the survey. This information is important because map-based soil prediction varies widely, and soil maps are often not very accurate at predicting the soil type at a specific point.

## Maize cultivation

### Cultivation of maize in [Country]

Feed the Future targets the maize value chain in [Country]. [Insert maize background information according to instructions.]

### Farmers’ background

**Table 7.1.1** presents the age and education characteristics of maize farmers in the ZOI. [Discuss findings. Compare the percentage of male to female farmers by age and education.]

Table 7.1.1: Age and Education of Maize Farmers in the ZOI, in Total and by Farmers’ Sex

| **Background characteristic** | **Total (%)** | **Sex** | | | **Number of maize farmers (*n*)** |
| --- | --- | --- | --- | --- | --- |
| **Male (%)** | **Female (%)** | **Sig.a** |
| **Total** | 100 |  |  |  |  |
| **Age** |  |  |  |  |  |
| 15-19 |  |  |  |  |  |
| 20-24 |  |  |  |  |  |
| 25-29 |  |  |  |  |  |
| 30-34 |  |  |  |  |  |
| 35-39 |  |  |  |  |  |
| 40-44 |  |  |  |  |  |
| 45-49 |  |  |  |  |  |
| 50-54 |  |  |  |  |  |
| 55-59 |  |  |  |  |  |
| 60+ |  |  |  |  |  |
| **Education** |  |  |  |  |  |
| No education |  |  |  |  |  |
| Less than primary |  |  |  |  |  |
| Completed primary |  |  |  |  |  |
| Completed secondary |  |  |  |  |  |
| Higher |  |  |  |  |  |
| **Number of maize farmers (*n*)** |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

[Discuss relevant findings from other studies, if available.]

**Table 7.1.2** presents information about why farmers cultivated maize—that is, for consumption, for market, or for both. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.1.2: Reasons for Cultivating Maize in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Reason for maize cultivation** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Reason** |  |  |  |  |  |  |  |  |
| Consumption only |  |  |  |  |  |  |  |  |
| Market only |  |  |  |  |  |  |  |  |
| Consumption and market |  |  |  |  |  |  |  |  |
| **Number of maize farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### Application of management practices and technologies by maize farmers

This section examines the management practices and technologies that farmers used to grow maize. In all tables, Feed the Future-promoted improved management practices and technologies are indicated with a double dagger (‡).

#### Land preparation and management practices

Proper land preparation practices are important to provide the necessary conditions for improved soil health and successful crop growth. Land preparation includes the approaches that farmers take to prepare their plots for planting, including plowing or zero tillage practices. Improved land management practices increase soil fertility and enhance water-use efficiency to improve overall plot productivity. Land management includes crop rotation practices and approaches farmers take to soil and water management and irrigation of their plots. Globally, water-use efficiency in irrigation of crop plots is low. Raised-bed planting with trench irrigation, as well as bunding or terracing can significantly increase water-use efficiency.[[45]](#footnote-46),[[46]](#footnote-47) Using appropriate irrigation techniques, minimizing soil disturbances, using surface mulch, and crop rotation help boost crop yields.[[47]](#footnote-48) Maize farmers may choose to grow complementary crops, such as legumes, alongside maize. Such intercropping enhances soil nutrition and fertility by adding much-needed nitrogen to the soil, increases resource-use efficiency, and discourages weeds, pests, and other crop diseases.[[48]](#footnote-49)

**Table 7.1.3** shows the land preparation practices, planting practices, and cropping practices that maize farmers used in the ZOI. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.1.3: Land Preparation, Planting Practices, and Management Practices Used by Maize Farmers in the ZOI, in Total and by Farmers’ Sex and Age

| **Practice** | **Total (%)** | **Sex** | | |  | **Age (years)** | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** | **Sig.a** |  | **15-29** | | **30+** | **Sig.a** |
| **(%)** | **(%)** |  | **(%)** | **(%)** | |
| **Land preparationb** | |  |  |  |  |  |  | |  |
| Hand weeding |  |  |  |  |  |  |  | |  |
| Plowingb |  |  |  |  |  |  |  | |  |
| Hand tillage |  |  |  |  |  |  |  | |  |
| Animal traction |  |  |  |  |  |  |  | |  |
| Motorized tiller |  |  |  |  |  |  |  | |  |
| Tractor |  |  |  |  |  |  |  | |  |
| Zero tillageb |  |  |  |  |  |  |  | |  |
| Slash and plant |  |  |  |  |  |  |  | |  |
| Burn and plant |  |  |  |  |  |  |  | |  |
| Herbicide and plant |  |  |  |  |  |  |  | |  |
| None |  |  |  |  |  |  |  | |  |
| **Crop rotated** |  |  |  |  |  |  |  | |  |
| Yes, rotated |  |  |  |  |  |  |  | |  |
| No, did not rotate |  |  |  |  |  |  |  | |  |
| No, left plot fallow |  |  |  |  |  |  |  | |  |
| **Soil and water managementb** | | |  |  |  |  |  | |  |
| Terracing |  |  |  |  |  |  |  | |  |
| Mulching |  |  |  |  |  |  |  | |  |
| Soil bands, trenches |  |  |  |  |  |  |  | |  |
| Adding lime to soil |  |  |  |  |  |  |  | |  |
| None |  |  |  |  |  |  |  | |  |
| **Irrigationb** |  |  |  |  |  |  |  | |  |
| Drip irrigation |  |  |  |  |  |  |  | |  |
| Gravity system |  |  |  |  |  |  |  | |  |
| Aspiration |  |  |  |  |  |  |  | |  |
| Pump system |  |  |  |  |  |  |  | |  |
| By hand |  |  |  |  |  |  |  | |  |
| None |  |  |  |  |  |  |  | |  |
| **Number of maize farmers (*n*)** |  |  |  |  |  |  |  | |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

#### Use of inputs

This section presents information on maize farmers’ inputs, including seed, fertilizer, manure, training, information, and decisionmaking for growing maize.

Certain hybrids of maize seed are more drought- and heat-tolerant than traditional maize and will produce greater yields when grown in very warm or drought-prone climates.[[49]](#footnote-50) **Table 7.1.4** shows where farmers obtained their maize seeds and the type of maize seeds they used by maize farmers. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.1.4: Seed Types and Seed Sources Used by Maize Farmers in the ZOI, in Total and by Farmers’ Sex and Age

| **Characteristic or practice** | **Total (%)** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Seed typeb** |  |  |  |  |  |  |  |  |
| Unimproved or local open-pollinated varieties (traditional) |  |  |  |  |  |  |  |  |
| Improved open-pollinated varieties (modern) |  |  |  |  |  |  |  |  |
| Hybrid |  |  |  |  |  |  |  |  |
| **Main seed source** |  |  |  |  |  |  |  |  |
| Own saved/friend or relative (not purchased) |  |  |  |  |  |  |  |  |
| Friend or relative (purchased) |  |  |  |  |  |  |  |  |
| Ag dealer (cash) |  |  |  |  |  |  |  |  |
| Ag dealer (voucher) |  |  |  |  |  |  |  |  |
| Market or non-ag dealer |  |  |  |  |  |  |  |  |
| Aid distribution |  |  |  |  |  |  |  |  |
| **Number of maize farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Application of inorganic or organic fertilizers, such as manure and crop residues, plays an important role in soil health. Fertilizers help correct soil macro- and micro-nutrient deficiencies in many regions and promote crop growth.[[50]](#footnote-51) Inorganic, or mineral, fertilizers are often too expensive for smallholder farmers and are frequently locally unavailable. Organic inputs can be used in place of or alongside mineral fertilizers, through improved waste recycling, crop residue composting, animal manure, and intercropping or crop rotation with legumes, trees, and shrubs.[[51]](#footnote-52),[[52]](#footnote-53) **Table 7.1.5** presents information related to maize farmers’ fertilizer practices. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.1.5: Maize Farmers' Fertilizer Use, Types of Fertilizer, and Timing of Application in the ZOI, in Total and by Farmers’ Sex and Age

| **Characteristic or practice** | **Total (%)** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Applied fertilizer** |  |  |  |  |  |  |  |  |
| **Number of maize farmers** |  |  |  |  |  |  |  |  |
| **Typeb** |  |  |  |  |  |  |  |  |
| Soil-based organic |  |  |  |  |  |  |  |  |
| Soil-based inorganic |  |  |  |  |  |  |  |  |
| Organic foliar feeds |  |  |  |  |  |  |  |  |
| Inorganic foliar feeds |  |  |  |  |  |  |  |  |
| **Timing of applicationb** |  |  | |  |  |  |  |  |
| Planting |  |  |  |  |  |  |  |  |
| Early growth stage |  |  |  |  |  |  |  |  |
| Mid-crop |  |  |  |  |  |  |  |  |
| **Number of maize farmers who applied fertilizer (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Animal manure supplies beneficial nutrients to growing maize plants and improves soil fertility. In many countries, adequate quantities of animal manure for agricultural use may not be locally available and must be purchased elsewhere. **Table 7.1.6** presents information related to maize farmers’ use of manure, including the percentage who use animal manure, how the manure was applied to fields, and the manure’s source. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.1.6: Manure Sources and Application Practices Used by Maize Farmers in the ZOI, in Total and by Farmers’ Sex and Age

| **Characteristic or practice** | **Total (%)** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Applied animal manure** |  |  |  |  |  |  |  |  |
| **Number of maize farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Method of application** | |  |  |  |  |  |  |  |
| Left on field after animals grazed |  |  |  |  |  |  |  |  |
| By hand |  |  |  |  |  |  |  |  |
| By machine |  |  |  |  |  |  |  |  |
| **Source** |  |  |  |  |  |  |  |  |
| Own animals |  |  |  |  |  |  |  |  |
| Given, did not purchase |  |  |  |  |  |  |  |  |
| Purchased |  |  |  |  |  |  |  |  |
| **Number of maize farmers who applied manure (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Crop loss due to pests, weeds, and diseases can be substantial for smallholder farmers, with an estimated 31–50 percent loss of maize crops worldwide from these factors.[[53]](#footnote-54) [Discuss specific pests/weeds/diseases common in the ZOI.] Crop losses may be prevented or minimized through adequate prevention and management measures. Herbicides and manual removal may be used to control weeds, and pesticides, insecticides, and fungicides may be used to manage pests and crop diseases. There are also several favorable and effective non-chemical approaches to maize pest control[[54]](#footnote-55). Integrated pest management is an encouraged “problem-avoiding” approach to pest management that seeks to minimize pesticide use and control pests through cultural, manual, and biological means.[[55]](#footnote-56) Intercropping and crop rotation is a particularly effective non-chemical measure for pest and weed management in African maize fields.[[56]](#footnote-57) **Table 7.1.7** presents maize farmers’ pest and weed management practices. [Discuss findings. Were any differences found between disaggregate categories? In addition to the information in the table: Did they have any insect, rodent, or disease attacks on maize in the last year? Did fall armyworm attack? Were chemicals used to control these attacks on maize? How many times did they control weeds among maize crops in the past year?]

Table 7.1.7: Pest and Weed Management Practices Used by Maize Farmers in the ZOI, in Total and by Farmers’ Sex and Age

| **Management practice** | **Total (%)** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Chemical pest management** |  |  |  |  |  |  |  |  |
| Preventative (routine) |  |  |  |  |  |  |  |  |
| Response to attack |  |  |  |  |  |  |  |  |
| None |  |  |  |  |  |  |  |  |
| **Weed managementb** |  |  |  |  |  |  |  |  |
| Herbicide applied |  |  |  |  |  |  |  |  |
| Weeding with hoe |  |  |  |  |  |  |  |  |
| Intercropping |  |  |  |  |  |  |  |  |
| Mulching |  |  |  |  |  |  |  |  |
| Slashing |  |  |  |  |  |  |  |  |
| Pull by hand |  |  |  |  |  |  |  |  |
| None |  |  |  |  |  |  |  |  |
| **Number of maize farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

#### Harvesting and waste reuse practices

This section presents information on the harvesting, drying, and shucking techniques used by maize farmers. Waste reuse practices, that is, how farmers use the leftover maize husks, stalks, and cobs after harvesting, are also presented.

Harvesting is done when the maize has reached maturity and can be accomplished mechanically or manually by hand. Maize cobs may be shucked or left in the husk before transport and drying. After harvest, maize must be dried to reduce moisture content, prevent deterioration of the grain, and allow for safe storage.[[57]](#footnote-58) Proper drying techniques are important to protect the maize from rodents and pests, prevent uneven drying, and prevent slow rates of drying, which may result in mold growth.[[58]](#footnote-59) **Table 7.1.8** presents the harvesting techniques used by maize farmers in the ZOI. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.1.8: Harvesting, Drying, and Shucking Methods Used by Maize Farmers in the ZOI, in Total and by Farmers’ Sex and Age

| **Method** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Harvesting method** |  |  |  |  |  |  |  |  |
| By hand |  |  |  |  |  |  |  |  |
| By machine |  |  |  |  |  |  |  |  |
| Some by hand, some by machine |  |  |  |  |  |  |  |  |
| Not yet harvested |  |  |  |  |  |  |  |  |
| **Drying methodb** |  |  |  |  |  |  |  |  |
| Laid on bare ground |  |  |  |  |  |  |  |  |
| Laid on ground covered with cow dung |  |  |  |  |  |  |  |  |
| Laid on ground covered with straw |  |  |  |  |  |  |  |  |
| Left to dry on plant |  |  |  |  |  |  |  |  |
| Laid on tarpaulins |  |  |  |  |  |  |  |  |
| Used drying yard with cemented ground |  |  |  |  |  |  |  |  |
| Used drying racks |  |  |  |  |  |  |  |  |
| Used solar dryers |  |  |  |  |  |  |  |  |
| Used mechanized dryers |  |  |  |  |  |  |  |  |
| Did not dry |  |  |  |  |  |  |  |  |
| **Shucking methodb** |  |  |  |  |  |  |  |  |
| By hand |  |  |  |  |  |  |  |  |
| With sticks |  |  |  |  |  |  |  |  |
| With a machine |  |  |  |  |  |  |  |  |
| Did not shuck |  |  |  |  |  |  |  |  |
| **Number of maize farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Maize residues have many valuable uses. Stalks, husks, and cobs that are unable to be sold or consumed can be used directly in the field as organic fertilizer or mulch, in food preparation, as animal feed, and as a source of energy or fuel.[[59]](#footnote-60) **Table 7.1.9** presents information on how maize crop residues are used by maize farmers in the ZOI. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.1.9: Use of Crop Residues by Maize Farmers in the ZOI, in Total and by Farmers’ Sex and Age

| **Waste reuse practice** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Maize stalks useb** |  |  |  |  |  |  |  |  |
| Burned in the field |  |  |  |  |  |  |  |  |
| Incorporated back into soil |  |  |  |  |  |  |  |  |
| Used as bedding for own livestock |  |  |  |  |  |  |  |  |
| Used as fuel for fire |  |  |  |  |  |  |  |  |
| Left in field for grazing animals |  |  |  |  |  |  |  |  |
| Harvested and fed to own animals |  |  |  |  |  |  |  |  |
| Harvested and sold to others |  |  |  |  |  |  |  |  |
| **Maize husks useb** |  |  |  |  |  |  |  |  |
| Used for own food preparation |  |  |  |  |  |  |  |  |
| Sold or traded for food preparation |  |  |  |  |  |  |  |  |
| Used as fuel for fire |  |  |  |  |  |  |  |  |
| Fed to own animals |  |  |  |  |  |  |  |  |
| Sold or traded with others as animal feed |  |  |  |  |  |  |  |  |
| Did not use |  |  |  |  |  |  |  |  |
| **Maize cobs useb** |  |  |  |  |  |  |  |  |
| Used as fuel for fire |  |  |  |  |  |  |  |  |
| Fed to own animals |  |  |  |  |  |  |  |  |
| Sold or traded with others as animal feed |  |  |  |  |  |  |  |  |
| Did not use |  |  |  |  |  |  |  |  |
| **Number of maize farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

#### Storage practices

This section presents information on maize storage practices, including the use of various containers and storage locations.

Storage serves several purposes in the maize post-harvest process. It protects against excessive heat, ground- and rainwater, insects, rodents, birds, and harmful micro-organisms, and helps ensure that the maize retains its nutritional value.[[60]](#footnote-61) **Table 7.1.10** presents information on how farmers store and transport their harvested maize in the ZOI. [Discuss findings. Were any differences found between disaggregate categories? In addition to the information in the table, discuss: Was maize attacked by insects, rodents, or disease while in storage?]

Table 7.1.10: Methods of Storing and Transporting Maize in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Storage or transport method** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Storage or transport containers** | |  |  |  |  |  |  |  |
| Buckets |  |  |  |  |  |  |  |  |
| Drums |  |  |  |  |  |  |  |  |
| Bagsb |  |  |  |  |  |  |  |  |
| Single-layer woven bags |  |  |  |  |  |  |  |  |
| Two- or three-layer woven bags |  |  |  |  |  |  |  |  |
| Hermetic bags |  |  |  |  |  |  |  |  |
| Did not put in containers |  |  |  |  |  |  |  |  |
| **Storage locationb** |  |  |  |  |  |  |  |  |
| Residential house |  |  |  |  |  |  |  |  |
| Cribs |  |  |  |  |  |  |  |  |
| Granaries |  |  |  |  |  |  |  |  |
| Warehouses |  |  |  |  |  |  |  |  |
| Storage silos |  |  |  |  |  |  |  |  |
| Other constructed stores |  |  |  |  |  |  |  |  |
| **Number of maize farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

#### Training, record keeping, information sources, and decisionmaking

Farmers may receive training on agricultural production, markets, and inputs, the use of fertilizers, pesticides, and herbicides, and integrated pest management. Farmers may also receive agricultural information from many sources both within and outside their communities. **Table 7.1.11** presents the percentages of maize farmers who received training on the use of inorganic fertilizers, pesticides, and herbicides, and farmers’ main sources of information for how to grow their crops well. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.1.11: Record Keeping, Training Received, and Main Information Sources among Maize Farmers in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Topic or source** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Keeps written records** |  |  |  |  |  |  |  |  |
| **Trainingb** |  |  |  |  |  |  |  |  |
| Use and application of inorganic fertilizer |  |  |  |  |  |  |  |  |
| Use and application of pesticides |  |  |  |  |  |  |  |  |
| Use and application of herbicides |  |  |  |  |  |  |  |  |
| **Main information source** |  |  |  |  |  |  |  |  |
| Friend or neighbor |  |  |  |  |  |  |  |  |
| Agro-input dealer |  |  |  |  |  |  |  |  |
| Agriculture extension worker |  |  |  |  |  |  |  |  |
| School |  |  |  |  |  |  |  |  |
| Radio program |  |  |  |  |  |  |  |  |
| Television |  |  |  |  |  |  |  |  |
| Mobile phone messaging |  |  |  |  |  |  |  |  |
| Internet |  |  |  |  |  |  |  |  |
| **Number of maize famers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

In households with multiple household members, farming decisions may be made by one person or two or more individuals jointly. **Table 7.1.12** presents the percent distribution of maize farmers by who made key production decisions—that is, the type of seed to plant, whether to use fertilizer, and whether to irrigate. [Discuss findings. Were any differences found between male and female farmers? Among the three production decisions?]

Table 7.1.12: Percent Distribution of Who Made Key Maize Production Decisions in the ZOI, by Farmers’ Sex

| **Decisionmakers** | **Type of seed to plant** | |  | **Whether to use fertilizer** | |  | **Whether to  irrigate** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Percent** | **Sig.a** | **Percent** | **Sig.a** | **Percent** | **Sig.a** |
| **Female farmers** |  |  |  |  |  |  |  |  |
| Self alone |  |  |  |  |  |  |  |  |
| Partner/spouse alone |  |  |  |  |  |  |  |  |
| Self and partner together |  |  |  |  |  |  |  |  |
| Self and other (could also include partner) |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Number of female maize farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Male farmers** |  |  |  |  |  |  |  |  |
| Self alone |  |  |  |  |  |  |  |  |
| Partner/spouse alone |  |  |  |  |  |  |  |  |
| Self and partner together |  |  |  |  |  |  |  |  |
| Self and other (could also include partner) |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Number of male maize farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and farmers’ sex. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### Use of improved management practices and technologies

This section examines maize farmers’ use of improved management practices and technologies promoted by Feed the Future in the [Country] ZOI.

**Table 7.1.13** shows the percentage of maize farmers in the ZOI who applied one or more improved management practices or technologies promoted by the [COUNTRY] mission during the 12 months preceding the ZOI Survey. The table also includes the percentage of maize farmers in the ZOI who used promoted improved management practices and technologies by category. [Discuss findings. What were the most common types of improved management practices and technologies used? Were any differences found between disaggregate categories?]

Table 7.1.13: Percentage of Maize Farmers in the ZOI Who Applied One or More Promoted Improved Management Practices and Technologies by Category, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Category** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Across all categories** |  |  |  |  |  |  |  |  |
| Crop geneticsb |  |  |  |  |  |  |  |  |
| Cultural practicesc |  |  |  |  |  |  |  |  |
| Natural resource or ecosystem managementd |  |  |  |  |  |  |  |  |
| Pest and disease managemente |  |  |  |  |  |  |  |  |
| Soil-related fertility and conservationf |  |  |  |  |  |  |  |  |
| Irrigationg |  |  |  |  |  |  |  |  |
| Water management, non‑irrigation-basedh |  |  |  |  |  |  |  |  |
| Climate adaptation or climate risk managementi |  |  |  |  |  |  |  |  |
| Post-harvest, handling and storagej |  |  |  |  |  |  |  |  |
| Marketing and distributionk |  |  |  |  |  |  |  |  |
| Value-added processingl |  |  |  |  |  |  |  |  |
| Otherm |  |  |  |  |  |  |  |  |
| **Number of maize farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

1. [Insert description of response options that are promoted, improved practices.]
2. [Insert description of response options that are promoted, improved practices.]
3. [Insert description of response options that are promoted, improved practices.]
4. [Insert description of response options that are promoted, improved practices.]
5. [Insert description of response options that are promoted, improved practices.]
6. [Insert description of response options that are promoted, improved practices.]
7. [Insert description of response options that are promoted, improved practices.]
8. [Insert description of response options that are promoted, improved practices.]
9. [Insert description of response options that are promoted, improved practices.]
10. [Insert description of response options that are promoted, improved practices.]
11. [Insert description of response options that are promoted, improved practices.]
12. [Insert description of response options that are promoted, improved practices.]

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [COUNTRY] ZOI Survey [Survey year(s)]

**Table 7.1.14** shows the percent distribution of maize farmers in the ZOI who used promoted improved management practices and technologies by the number used. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.1.14: Percent Distribution of Maize Farmers by Number of Promoted Improved Management Practices and Technologies Used in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Promoted improved practice or technology** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Number used** |  |  |  |  |  |  |  |  |
| 1 |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |
| 8+ |  |  |  |  |  |  |  |  |
| **Number of maize farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [COUNTRY] ZOI Survey [Survey year(s)]

### Maize yields

Yield is a measure of total production per unit of area planted. For maize, yield is the weight of maize, in kilograms, harvested in the season preceding the survey divided by the area, in hectares, planted in the season preceding the survey. Total production is the amount that is produced, regardless of how it was ultimately used. It also includes any post-harvest loss (i.e., post-harvest loss is not subtracted from total production.)

**Table 7.1.15** presents the number of maize farmers, the total production in metric tons (mt), total production units in hectares (ha), and the total and average yields of maize in metric tons per hectare (mt/ha) for the season preceding the ZOI Survey. The results are disaggregated by farm size—smallholder and non-smallholder—and then further by sex and age. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.1.15: Maize Yield in the ZOI during the Season Preceding the Survey, by Farm Size and Farmers’ Sex and Age

| **Background characteristic** | **Total production** | **Total units of production** | **Total yield** | **Average yield** | | **Number of** |
| --- | --- | --- | --- | --- | --- | --- |
| **(mt)** | **(ha)** | **(mt/ha)** | **(mt/ha)** | **Sig.a** | **farmers** |
| **Total** |  |  |  |  |  |  |
| **Sex** |  |  |  |  |  |  |
| Female |  |  |  |  |  |  |
| Male |  |  |  |  |  |  |
| **Age** |  |  |  |  |  |  |
| 15-29 years |  |  |  |  |  |  |
| 30+ years |  |  |  |  |  |  |
| **Total number of maize farmers (*n*)** |  |  |  |  |  |  |
| **Farm size** |  |  |  |  |  |  |
| **Smallholder** |  |  |  |  |  |  |
| **Sex** |  |  |  |  |  |  |
| Female |  |  |  |  |  |  |
| Male |  |  |  |  |  |  |
| **Age** |  |  |  |  |  |  |
| 15-29 years |  |  |  |  |  |  |
| 30+ years |  |  |  |  |  |  |
| **Number of smallholder maize farmers (*n*)** |  |  |  |  |  |  |
| **Non-smallholder** |  |  |  |  |  |  |
| **Sex** |  |  |  |  |  |  |
| Female |  |  |  |  |  |  |
| Male |  |  |  |  |  |  |
| **Age** |  |  |  |  |  |  |
| 15-29 years |  |  |  |  |  |  |
| 30+ years |  |  |  |  |  |  |
| **Number of non-smallholder maize farmers (*n*)** |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [COUNTRY] ZOI Survey [Survey year(s)]

**Table 7.1.16** presents the average amount of harvested maize, in kilograms, consumed by farmers’ own households and also sold by farmers. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.1.16: Average Amount of Maize in Kilograms Consumed by Farmers’ Own Households and Sold by Farmers in the ZOI by Farm Size, in Total and by Farmers’ Sex and Age

| **Use of maize** | **Consumed by household** | **Sold** |  | **Number of maize farmers (*n*)** |
| --- | --- | --- | --- | --- |
|
| **(kg)** | **(kg)** | **Sig.a** |
| **Total** |  |  |  |  |
| **Sex** |  |  |  |  |
| Female |  |  |  |  |
| Male |  |  |  |  |
| **Age** |  |  |  |  |
| 15-29 years |  |  |  |  |
| 30+ years |  |  |  |  |
| **Farm size** |  |  |  |  |
| **Smallholder** |  |  |  |  |
| **Sex** |  |  |  |  |
| Female |  |  |  |  |
| Male |  |  |  |  |
| **Age** |  |  |  |  |
| 15-29 years |  |  |  |  |
| 30+ years |  |  |  |  |
| **Non-smallholder** |  |  |  |  |
| **Sex** |  |  |  |  |
| Female |  |  |  |  |
| Male |  |  |  |  |
| **Age** |  |  |  |  |
| 15-29 years |  |  |  |  |
| 30+ years |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [COUNTRY] ZOI Survey [Survey year(s)]

**Table 7.1.17** presents the main buyers of harvested maize in the ZOI Survey. [Discuss findings. Who are the main buyers? Were any results statistically different comparing males to females, young to old?]

Table 7.1.17: Main Buyers of Maize Produced in the ZOI by Farm Size, in Total and by Farmers’ Sex and Age

| **Main buyer of maize** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Total** |  |  |  |  |  |  |  |  |
| Relative or friend |  |  |  |  |  |  |  |  |
| Local market |  |  |  |  |  |  |  |  |
| Private trader |  |  |  |  |  |  |  |  |
| Agriculture co-op |  |  |  |  |  |  |  |  |
| **Total number of maize farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Farm size** |  |  |  |  |  |  |  |  |
| **Smallholder** |  |  |  |  |  |  |  |  |
| Relative or friend |  |  |  |  |  |  |  |  |
| Local market |  |  |  |  |  |  |  |  |
| Private trader |  |  |  |  |  |  |  |  |
| Agriculture co-op |  |  |  |  |  |  |  |  |
| **Number of smallholder maize farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Non-smallholder** |  |  |  |  |  |  |  |  |
| Relative or friend |  |  |  |  |  |  |  |  |
| Local market |  |  |  |  |  |  |  |  |
| Private trader |  |  |  |  |  |  |  |  |
| Agriculture co-op |  |  |  |  |  |  |  |  |
| **Number of non‑smallholder maize farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [COUNTRY] ZOI Survey [Survey year(s)]

### Soil characteristics

This section presents soil characteristics, including texture, rock fragment percentage, land capability classification (LCC), and soil limitations of plots used to grow maize in the ZOI.

Texture is an important soil property that affects crop production, land use, and land management. A soil’s ability to retain nutrients and also drain is directly related to its texture.[[61]](#footnote-62) Soil can be classified into 1 of 12 textural classes, as shown in **Table 7.1.18,** depending on the percentages of sand, silt, and clay that it contains.[[62]](#footnote-63) **Table 7.1.18** presents percent distribution of soil textures in maize plots in the ZOI by depth, or soil horizon. [Discuss findings.]

Table 7.1.18: Soil Texture by Soil Horizon in Maize Plots in the ZOI

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Depth (cm)** | **Soil texture (%)** | | | | | | | | | | **Number of plots (*n*)** |
| **Clay** | **Clay loam** | **Loam** | **Loamy sand** | **Sand** | **Sandy clay** | **Sandy clay loam** | **Sandy loam** | **Silty clay** | **Silty clay loam** |
| 0 to <1 |  |  |  |  |  |  |  |  |  |  |  |
| 1 to <10 |  |  |  |  |  |  |  |  |  |  |  |
| 10 to <20 |  |  |  |  |  |  |  |  |  |  |  |
| 20 to <50 |  |  |  |  |  |  |  |  |  |  |  |
| 50 to <70 |  |  |  |  |  |  |  |  |  |  |  |

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [COUNTRY] ZOI Survey [Survey year(s)]

Rock fragments are unattached pieces of rock 2 mm in diameter or larger. Rock fragments are characterized by their size and shape and, in some cases, the type of rock; rock fragments classes include pebbles, cobbles, channers, flagstones, stones, and boulders.[[63]](#footnote-64) **Table 7.1.19** presents the percent distribution of rock fragments in maize plots in the ZOI by soil horizon. [Discuss findings.]

Table 7.1.19: Rock Fragment Percentage by Soil Horizon in Maize Plots in the ZOI

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Depth (cm)** | **Rock fragment percentage (%)** | | | | | **Number of plots (*n*)** |
| **0 to <1%** | **1 to <15%** | **15 to <35%** | **35 to <60%** | **≥60%** |
| 0 to <1 |  |  |  |  |  |  |
| 1 to <10 |  |  |  |  |  |  |
| 10 to <20 |  |  |  |  |  |  |
| 20 to <50 |  |  |  |  |  |  |
| 50 to <70 |  |  |  |  |  |  |

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

LCC is a system of grouping soils based on their capability to produce crops without deteriorating over time.[[64]](#footnote-65) The eight capability classes, which indicate to farmers how limited their soil is for producing crops, are described in **Table 7.1.20.** This table also presents the percentage of maize plots and average maize yield by land capability classification. [Discuss findings.]

Table 7.1.20: Percentage of Maize Plots and Average Maize Yield in the ZOI by Land Capability Classification

| **LCC** | **Description** | | **Percent of maize plots (%)** | **Average maize  yield**  **(mt/ha)** | **Number of maize farmers (*n*)a** |
| --- | --- | --- | --- | --- | --- |
| 1 (best) | Slight limitations that restrict soil use | |  |  |  |
| II | Moderate limitations that reduce the choice of plants or require moderate conservation practices | |  |  |  |
| III | Severe limitations that reduce the choice of plants or require special conservation practices, or both | |  |  |  |
| IV | Very severe limitations that restrict the choice of plants or require very careful management, or both | |  |  |  |
| V | Little or no hazard of erosion, but with other limitations; impractical to remove; limits soil use to mainly pasture, rangeland, forestland, or wildlife habitat | |  |  |  |
| VI | Severe limitations that make soils generally unsuited to cultivation and limit their use mainly to pasture, rangeland, forestland, or wildlife habitat | |  |  |  |
| VII | Very severe limitations that make the soils unsuited to cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat | |  |  |  |
| VIII (worst) | Limitations that prevent use for commercial plant production and limit use mainly to recreation, wildlife habitat, water supply, or esthetic purposes | |  |  |  |
| Unclassified |  | |  |  |  |
| **Number of plots** | |  | |  |  |

a Estimates include only maize farmers who cultivated maize on one plot or who cultivated maize on multiple plots that all had the same LCC score. Farmers who cultivated maize on multiple plots that did not all have the same LCC score or without a value for maize yield were excluded.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Sources: Feed the Future [Country] ZOI Survey [Survey year(s)], United States Department of Agriculture. 2018. National Soil Survey Handbook, Part 622

The LCC designation is accompanied by a sub-class designation. The sub-class designation indicates to farmers the main limitation of their plot’s soil, such as erosion risk and low soil depth. A plot can have multiple sub-class designations if it has more than one notable limitation. The 10 sub-classes, which are indicated by letters, are described in **Table 7.1.21.** This tablealsopresents the percentages of maize farmers in the ZOI who have plots with soil in each LCC subclass. [Discuss findings.]

Table 7.1.21: Percentage of Maize Farmers in the ZOI with One or More Plots that Meet Each Land Capability Classification Criteria

| **LCC criteria** | **Description** | **Reason for assessment** | **Classification** | **Percent** |
| --- | --- | --- | --- | --- |
| Erosion risk (e) | Risk of surface soil wearing away due to moving water, depending on the soil texture and land slope. | Erosion is a major factor limiting future agricultural production. If the productive soil erodes away, the yields will significantly decline. | Plot is at risk of soil erosion. |  |
| Soil depth (s-d) | Depth of soil to bedrock or other root-limiting layer. | Soil depth can limit crop root growth if not deep enough. | Plot soil depth is low. |  |
| Surface soil texture (s-t) | Soil texture near the surface is important for seedling establishment. | Poor surface soil texture can prevent seedling establishment. | Plot surface soil texture is poor. |  |
| Salinity (s-k) | Salt on the soil surface is an indicator of high soil salinity. | High soil salinity can limit crop growth. | Plot soil has high salinity. |  |
| Surface stoniness (s-r) | Percentage of soil covered by stones and boulders (larger than 25 cm). | Soil covered by stones and boulders can impede the use of tractors and animal-pulled plows. | Plot surface too stony. |  |
| Soil water storage capacity (s-a) | The amount of water that the soil can store that is usable by plants. | A lower ability to store water means there is less water available for plants to grow. Farmers should plant drought-resistant crops. | Plot soil has poor ability to store water. |  |
| Lime requirement (s‑l) | Soil with a low soil pH (high acidity) requires lime to raise the pH to the ideal range for growing crops. | Soil with a low pH (high acidity) can limit crop production. | Plot soil has high acidity. |  |
| Flooding during growing season (w-f) | Frequency of flooding during the growing season. | Flooding can damage crops and influence crop selection. | Plot subject to flooding during growing season. |  |
| Water table depth (w-d) | Typical water table depth during the growing season. | A water table that is too high can create an environment not conducive to root growth. | Plot water table depth is too high. |  |
| Permeability (w-p) | The ability of water to move through the soil. | Low permeability can limit root growth during wet periods due to waterlogging. | Plot soil permeability is low. |  |
| **Number of maize farmers** | |  |  |  |

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize.

Sources: Feed the Future [Country] ZOI Survey [Survey year(s)], United States Department of Agriculture. 2018. National Soil Survey Handbook, Part 622

### Agrometeorological context

Understanding the agrometeorological context (specifically, rainfall, temperature, and greenness during the main growing season) allows a better understanding of the agricultural data collected in the ZOI Surveys. For example, when analyzing combined temperature and precipitation data with Normalized Difference Vegetation Index (NDVI) data, the reasons for measured yield levels and the degree of change in crop productivity that Feed the Future interventions may have contributed to can be more clearly understood. Farmer decisionmaking about area planted and input use is also influenced by and can be better understood with information about the agrometeorological context.

*Rainfall (Standardized Precipitation Index)*

Rainfall is one of the primary factors affecting crop productivity, especially for rainfed agriculture. Lower or less than optimum crop yields are usually associated with lower than normal (or higher than normal) rainfall conditions. The rainfall indicator presented here measures by how much the total amount of rainfall during the main growing season within the Feed the Future ZOI deviated from the 30-year climatological average – also known as the Standardized Precipitation Index (SPI). The following categories obtained from The National Drought Mitigation Center[[65]](#footnote-66) illustrate how the amount of rainfall and its relevance to context can be interpreted:

**Standardized Precipitation Index Values**

2.00 and above Extremely wet

1.50 to 1.99 Very wet

1.00 to 1.49 Moderately wet

-0.99 to 0.99 Near normal

-1.00 to -1.49 Moderately dry

-1.50 to -1.99 Severely dry

-2.00 and below Extremely dry

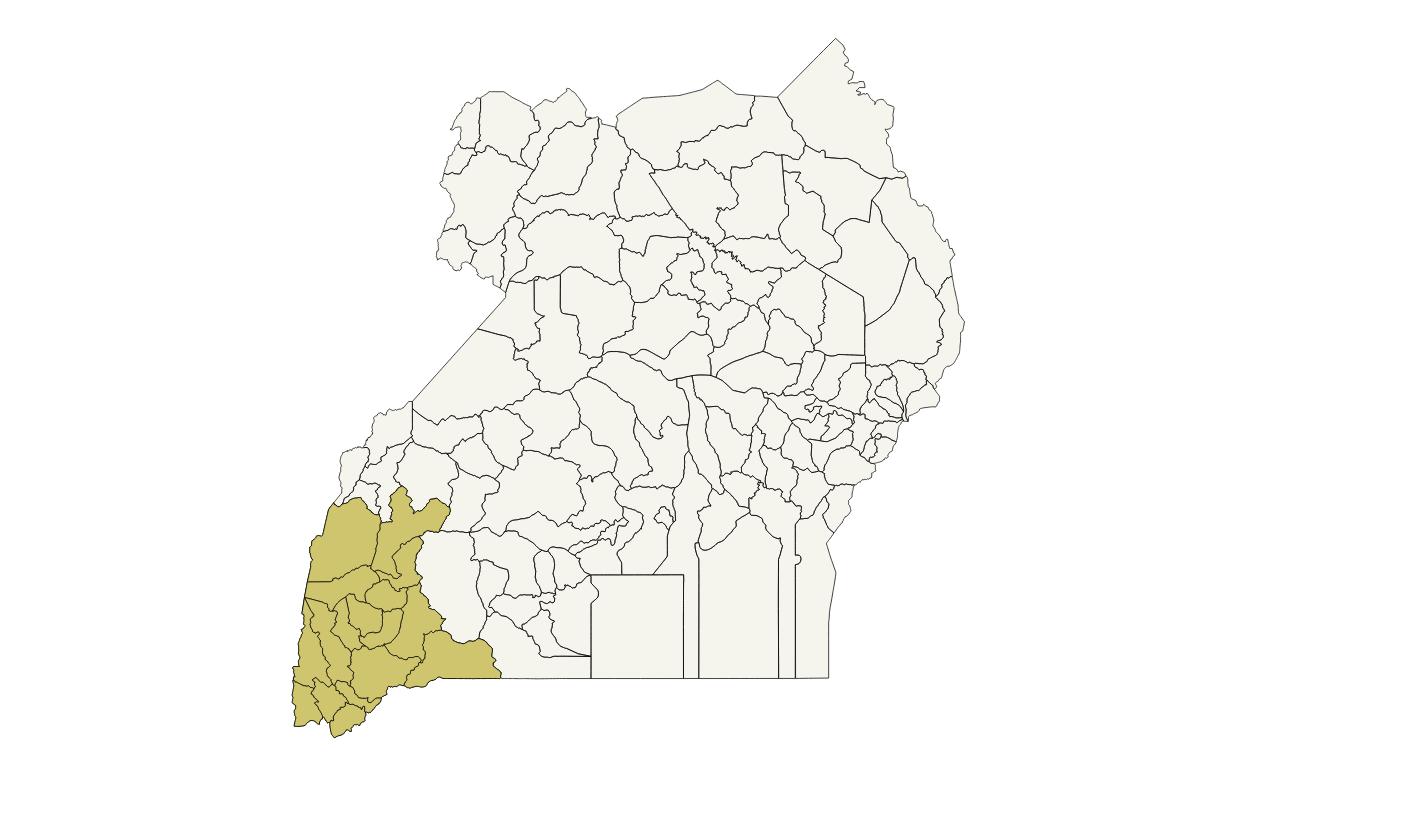
*Temperature (Total number of heat stress days above 30°C)*

Air temperature influences plant growth through photosynthesis and respiration, affects soil temperature, and impacts the amount of available water in the soil. When temperatures exceed 30°C, especially during certain growth phases (e.g. flowering and seed development), crop yields can be negatively impacted. Assessing the number of days on which temperatures exceed 30°C during the main growing season in conjunction with precipitation data can help determine if temperature was a factor affecting crop yield. This indicator measures the total number of heat stress days where air temperatures exceeded 30°C during the main growing season within the Feed the Future ZOI. The total number of days above 30°C during the main growing season is compared to the prior 10-year average number of days that exceeded 30°C during the main growing season.

*Greenness (Normalized Differential Vegetation Index)*

NDVI represents the greenness of plants covering a landscape or field, and serves as a proxy for photosynthetic activity in plants. Photosynthesis is the process that captures solar energy and converts it to biomass, driving primary productivity of the entire food chain. The indicator of greenness used by Feed the Future measures by how much the normal Normalized Difference Vegetation Index (NDVI) values during the main growing season within the Feed the Future ZOI deviated from a rolling 10-year average NDVI during that season.

Data from vegetated areas will yield positive values for NDVI. As the amount of green vegetation increases in a pixel[[66]](#footnote-67), NDVI increases in value up to nearly 1.0. In contrast, bare soil and rocks typically produce lower NDVI values close to 0. Water, clouds, and snow produce negative NDVIs.

**NDVI Range Type of land cover**

-1.00 to 0.00 Barren surfaces (rock, soil) and

water, snow, ice and clouds

0.01 to 0.49 Vegetation cover

0.50 to 0.69 Dense vegetation

0.70 to 0.99 Very dense and green vegetation

*Map of the [COUNTRY] Zone of Influence*

In [COUNTRY], the main growing season for [TARGET VALUE CHAIN COMMODITY] in [YEAR] was [MONTH]-[MONTH].

1. The SPI value indicates a cropping season in the Zone of Influence that was [very dry/dry/average/wet /very wet/], with a value of [xx]; this means that [xx].
2. There were [very few/many/an average number of] days above 30oC (heat stress days) relative to the 10-year record ([xx] days); this means that [xx].
3. The Zone of Influence shows [above/below] average NDVI for the main cropping season, with a value of [xx]; this means that [xx].

The graphs presented in Figure 7.1 below show the trends in rainfall, temperature and greenness indicators for the [COUNTRY] Zone of Influence in [YEAR]. [xx]

Figure 7.1: Trends in rainfall, temperature and greenness indicators for the [COUNTRY] Zone of Influence in [YEAR] A screenshot of a cell phone

Description automatically generated

The data sources for Feed the Future agrometeorological metrics are UMD GLAM system for NDVI, CHIRPS for SPI and NOAA CPC for number of heat days.

## Fishpond aquaculture

### Fishpond aquaculture in [Country]

Feed the Future [Country] focuses on the fishpond aquaculture value chain. [Insert fishpond aquaculture background information according to instructions].

### Farmers’ background

**Table 7.2.1** presents the age and education characteristics of fishpond farmers in the ZOI. [Discuss findings. Compare the percentages of male to female farmers by age and education.]

Table 7.2.1: Age and Education of Fishpond Farmers in the ZOI, in Total and by Farmers’ Sex

| **Background characteristic** |  | **Sex** | | | **Number of fishpond farmers (*n*)** |
| --- | --- | --- | --- | --- | --- |
| **Total (%)** | **Male (%)** | **Female (%)** | **Sig.a** |
| **Total** | 100 |  |  |  |  |
| **Age** |  |  |  |  |  |
| 15-19 |  |  |  |  |  |  |
| 20-24 |  |  |  |  |  |
| 25-29 |  |  |  |  |  |
| 30-34 |  |  |  |  |  |
| 35-39 |  |  |  |  |  |
| 40-44 |  |  |  |  |  |
| 45-49 |  |  |  |  |  |
| 50-59 |  |  |  |  |  |
| 60+ |  |  |  |  |  |
| **Education** |  |  |  |  |  |
| No education |  |  |  |  |  |
| Less than primary |  |  |  |  |  |
| Completed primary |  |  |  |  |  |
| Completed secondary |  |  |  |  |  |
| Higher |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)].

[Discuss relevant findings from other studies, if available.]

In general, fishpond farmers raise fish for consumption by their household, to sell for income, or for both household consumption and sale. **Table 7.2.2** presents information about why farmers raise fish in ponds. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.2.2: Reasons for Raising Fish in Fishponds in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Reason for raising fish** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Reason** |  |  |  |  |  |  |  |  |
| Consumption |  |  |  |  |  |  |  |  |
| Market |  |  |  |  |  |  |  |  |
| Consumption and market |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice.

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### Application of management practices and technologies by farmers

This section examines the management practices and technologies that farmers used to raise fish in fishponds. In all tables, Feed the Future-promoted improved management practices and technologies are indicated with a double dagger (‡).

#### Fish and pond characteristics

Globally, the top fish species that are farmed are carp, tilapia, salmon, and catfish.[[67]](#footnote-68) The number of fish stocked by fishpond farmers can vary widely, depending on farmers’ resources, including the ability to acquire fish and land on which to raise them. **Table 7.2.3** presents the average number of fish stocked, the type of fish, the main source of fish, and the type of pond that fishpond farmers in the ZOI used during the 12 months preceding the survey. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.2.3: Average Number of Fish, Type of Fish, Main Source of Fish, and Type of Ponds Used by Fishpond Farmers in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Characteristic** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **Average number of fish** |  |  |  |  |  |  |  |  |
| **Type of fishb (%)** |  |  |  |  |  |  |  |  |
| Carp |  |  |  |  |  |  |  |  |
| Tilapia |  |  |  |  |  |  |  |  |
| Catfish |  |  |  |  |  |  |  |  |
| **Main source of fish (%)** |  |  |  |  |  |  |  |  |
| Raised own or received (not purchased) |  |  |  |  |  |  |  |  |
| Purchased from friend or relative |  |  |  |  |  |  |  |  |
| Purchased from local hatchery |  |  |  |  |  |  |  |  |
| Certified |  |  |  |  |  |  |  |  |
| Non-certified |  |  |  |  |  |  |  |  |
| Purchased from non-local hatchery |  |  |  |  |  |  |  |  |
| Certified |  |  |  |  |  |  |  |  |
| Non-certified |  |  |  |  |  |  |  |  |
| Aid distribution |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Type of pondb (%)** |  |  |  |  |  |  |  |  |
| Man-made earthen pond |  |  |  |  |  |  |  |  |
| Natural pond or lake |  |  |  |  |  |  |  |  |
| Raceway |  |  |  |  |  |  |  |  |
| Stream |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

#### Use of inputs

This section presents information on fishpond farmers’ inputs, including supplemental feed, manure use, hormone application, and techniques to improve fish production.

Although fish eat foods that occur naturally in ponds, such as algae and plankton, some farmers also give their fish supplemental feed so that the fish grow faster. Supplemental feed can be made from items such as rice bran, cassava flour, soy meal, leaves from crops, and fish meal. **Table 7.2.4** presents information about whether fishpond farmers in the ZOI used supplemental feed, and the source of supplemental feed among those who did. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.2.4: Supplemental Feed Use and Sources in the ZOI, in Total and by Fishpond Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Supplemental feed use and source** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Used supplemental feed** |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Source of supplemental feed** |  |  |  |  |  |  |  |  |
| Mostly made |  |  |  |  |  |  |  |  |
| Mostly purchased |  |  |  |  |  |  |  |  |
| Half made, half purchased |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers who used supplemental feed (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

As noted in the FAO training materials, manure can be added to fishponds as an organic fertilizer to increase the natural food supply for fish and to improve fish production. Not only is manure a food source for fish, it is also a food source for zooplankton. It also increases the amount of bacteria in the water, which speeds up the decomposition of organic matter, and adds carbon dioxide to the water, which enables efficient use of nutrients in the water. Manure does have disadvantages, however. For example, it has low nitrogen, phosphorus, and potassium content, which are primary fertilizer nutrients; negatively affects the dissolved oxygen content in ponds; and can result in fish loss if too much is applied at one time.[[68]](#footnote-69) **Table 7.2.5** presents information about whether fishpond farmers in the ZOI added manure to their fishponds and the source of the manure among those who did. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.2.5: Manure Use and Sources in the ZOI, in Total and by Fishpond Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Manure use and source** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Used manure** |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Main source of manure** |  |  |  |  |  |  |  |  |
| Own animals |  |  |  |  |  |  |  |  |
| Family, friends, or neighbor farm |  |  |  |  |  |  |  |  |
| Purchase |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers who used manure (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Hormones are a controlled substance and should not be used because of the potential for misuse. Nevertheless, some fishpond farmers do use hormones in an effort to modify their production systems. **Table 7.2.6** presents information about whether fishpond farmers in the ZOI used hormones and, if they used hormones, when they applied them. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.2.6: Hormone Practices Used by Fishpond Farmers in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Hormone use, training, and timing of use** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Used hormones** |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Received training in hormone use** |  |  |  |  |  |  |  |  |
| **Timing of hormone applicationb** |  |  |  |  |  |  |  |  |
| Initial growth phase (first 4 weeks) |  |  |  |  |  |  |  |  |
| Development phase |  |  |  |  |  |  |  |  |
| Other time |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers who used hormones (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

As noted in FAO training materials, fish diseases can result in large losses for fishpond farmers. Fish diseases can, for example, reduce growth and production, increase vulnerability to predators, increase susceptibility to low water quality, or result in death. The three main causes of fish diseases include improper feeding, stress introduced by extreme or toxic conditions, and attacks by disease organisms.[[69]](#footnote-70) Preventing disease in fish is more efficient and effective than controlling diseases after they occur. **Table 7.2.7** presents information about whether fishpond farmers in the ZOI observed disease in their fish, and if they did, what they used to control the disease. It is important to note that substances including formalin, malachite green and methyl blue should not be used on fish intended for human consumption; formalin can only be safely used on fish eggs. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.2.7: Disease Control Methods Used by Fishpond Farmers in the ZOI, in Total and by Farmers’ Sex and Age

| **Disease control** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Observed disease among fish** |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Method of disease control usedb** |  |  |  |  |  |  |  |  |
| Salt |  |  |  |  |  |  |  |  |
| Formalin |  |  |  |  |  |  |  |  |
| Malachite green |  |  |  |  |  |  |  |  |
| Methyl blue |  |  |  |  |  |  |  |  |
| Antibiotics/antibiotic feed |  |  |  |  |  |  |  |  |
| None |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers who observed disease among their fish (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent. Formalin, malachite green and methyl blue should not be used on fish intended for human consumption; formalin can only be safely used on fish eggs.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Parasites that affect fish are organisms that live in or on the fish—their host—and obtain nutrients from the fish at the fish’s expense. Parasites that commonly live on fish include protozoa, flukes, leeches, copepods, fish lice, and water fungi, and although sometimes parasites can be controlled by making changes to the fish’s environment, other times chemical treatment may be warranted.[[70]](#footnote-71) **Table 7.2.8** presents information about whether fishpond farmers in the ZOI observed parasite cases among their fish, and if they did, what they used to control the parasites. It is important to note that substances including formalin, malachite green and methyl blue should not be used on fish intended for human consumption; formalin can only be safely used on fish eggs. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.2.8: Parasite Control Methods Used by Fishpond Farmers in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parasite control** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Observed parasite cases among fish** |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Method of parasite control usedb** |  |  |  |  |  |  |  |  |
| Salt |  |  |  |  |  |  |  |  |
| Formalin |  |  |  |  |  |  |  |  |
| Malachite green |  |  |  |  |  |  |  |  |
| Methyl blue |  |  |  |  |  |  |  |  |
| None |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers who observed parasite cases among their fish (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent. Substances including formalin, malachite green and methyl blue should not be used on fish intended for human consumption; formalin can only be safely used on fish eggs.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

As noted in the FAO training materials, maintaining good water quality is critical to obtaining high fish production. Maintaining good water quality can be achieved by controlling the composition of the pond water to create the best conditions for raising fish. Three water characteristics that are particularly important to water quality are the pH, turbidity, and dissolved oxygen content. The pH of pond water is a measure of its acidity or alkalinity. In general, pond water that is neutral—not too acidic or alkaline—is best for raising fish. Pond water pH can be measured using a number of methods, including pH indicator paper, a water-testing kit, or a pH meter. Pond water turbidity is the cloudiness or haziness of its water caused by suspended solids that are usually so small that they are invisible to the naked eye. Pond water with high turbidity does not allow sunlight to penetrate deep into the pond and limits the amount of oxygen that is produced. FAO indicates that although mineral turbidity must be assessed using laboratory tests, plankton turbidity can be assessed by fishpond farmers using their own arms or a Secchi disc. Fish need dissolved oxygen in the pond water to survive; it is also necessary to decompose organic material in fishponds.[[71]](#footnote-72) The dissolved oxygen content in fishponds can be measured using chemical testing kits or an oxygen meter. Fishpond farmers can also look for “piping” behavior among their fish—that is, fish gasping for air at the water surface, and although “piping” behavior is not a measurement of the oxygen content, it signals to farmers that the dissolved oxygen content in their pond is low.[[72]](#footnote-73)

There are a variety of methods that fishpond farmers can use to maintain good water quality in addition to adjusting the pH, turbidity, and dissolved oxygen content of their ponds. A few such methods include screening the water coming into the pond to ensure that wild fish, dirt, and debris do not enter; removing some of the suspended organic materials such as plant debris; and draining the pond to clean it. **Table 7.2.9** presents information about methods that fishpond farmers in the ZOI used to monitor and maintain good water quality. [Discuss findings. Were any differences found between disaggregate categories? Include information about the number/percentage of fishpond farmers who drained their ponds and allowed the bottom of the pond to dry, and the average number of times they did so during the 12 months preceding the survey.]

Table 7.2.9: Methods Used by Fishpond Farmers in the ZOI to Monitor and Maintain Good Water Quality, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Method** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Method used to monitor water qualityb** |  |  |  |  |  |  |  |  |
| Used hand to assess turbidity |  |  |  |  |  |  |  |  |
| Used Secchi disk to assess turbidity |  |  |  |  |  |  |  |  |
| Tested water pH |  |  |  |  |  |  |  |  |
| Observed fish for “piping” behavior |  |  |  |  |  |  |  |  |
| Did not monitor |  |  |  |  |  |  |  |  |
| **Method used to maintain good water qualityb** | |  |  |  |  |  |  |  |
| Screened water coming into pond |  |  |  |  |  |  |  |  |
| Cut grass around pond |  |  |  |  |  |  |  |  |
| Drained pond to clean it |  |  |  |  |  |  |  |  |
| Added ash to stabilize water pH |  |  |  |  |  |  |  |  |
| Added dissolved oxygen |  |  |  |  |  |  |  |  |
| Did nothing |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

There are several techniques that can be used to improve fish production, including sex or age separation, feed variation, and stocking methods. Table **7.2.10** presents information about techniques that fishpond farmers in the ZOI used to improve the production of their fish. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.2.10: Techniques Used by Fishpond Farmers in the ZOI to Improve Fish Production, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Techniquea** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.b** |  | **15-29** | **30+** | **Sig.b** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| Sex separation |  |  |  |  |  |  |  |  |
| Age separation |  |  |  |  |  |  |  |  |
| Feed variation |  |  |  |  |  |  |  |  |
| Stocking method |  |  |  |  |  |  |  |  |
| None |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

b Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

#### Harvesting practices

Fish can be harvested all at once or in multiple partial harvests, and they can be harvested without draining the pond, by partially draining the pond, or by completely draining the pond. If draining the pond completely, a catch basin can be used inside the pond to catch the fish; outside the pond at the end of an outlet structure, woven baskets, netting, a harvest box, or a permanent harvesting basin can be used.[[73]](#footnote-74) Seine nets, cast nets, or pull-up cages can be used to harvest fish if the pond is not drained or is partially drained.[[74]](#footnote-75)

**Table 7.2.11** presents information about the timing and method of harvesting fish among fishpond farmers in the ZOI. [Discuss findings. Were any differences found between disaggregate categories? Also discuss the average number of cages and the average volume of cages among fishpond farmers who use pull-up cages to harvest their fish. If it makes sense to disaggregate the cage information by farmers’ age and sex, the information can be added to the table.]

Table 7.2.11: Timing and Methods Used to Harvest Fish among Fishpond Farmers in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Harvesting characteristic** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Timing of fish harvesting** | | | | | | | | |
| All at once |  |  |  |  |  |  |  |  |
| Multiple partial harvests |  |  |  |  |  |  |  |  |
| **Method of fish harvesting** |  |  |  |  |  |  |  |  |
| Cast net |  |  |  |  |  |  |  |  |
| Seine net |  |  |  |  |  |  |  |  |
| Pull-up cages |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

#### Post-harvest processing

After fish are harvested, they must be prepared for home consumption or sale. There are a number of methods that can be used to prepare fish, including drying, gutting, leaving whole, pickling, salting, and smoking. **Table 7.2.12** presents information about the usual methods that fishpond farmers in the ZOI used to prepare their fish for home consumption and for sale or trade. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.2.12: Usual Fish Preparation Methods, in Total and by Farmers’ Sex and Age

| **Preparation method** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Home consumption** | | | | | | | | |
| Dry |  |  |  |  |  |  |  |  |
| Gut only |  |  |  |  |  |  |  |  |
| Leave whole round |  |  |  |  |  |  |  |  |
| Pickle |  |  |  |  |  |  |  |  |
| Salt |  |  |  |  |  |  |  |  |
| Smoke |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers whose household consumed their fish (*n*)** |  |  |  |  |  |  |  |  |
| **Sale or trade** |  |  |  |  |  |  |  |  |
| Dry |  |  |  |  |  |  |  |  |
| Gut only |  |  |  |  |  |  |  |  |
| Leave whole round |  |  |  |  |  |  |  |  |
| Pickle |  |  |  |  |  |  |  |  |
| Salt |  |  |  |  |  |  |  |  |
| Smoke |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers who sold their fish (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Fish waste, including guts, scales, and skins, can be valuable if it is used as compost or animal feed. **Table 7.2.13** presents information about the waste reuse methods that fishpond farmers in the ZOI used. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.2.13: Waste Reuse Methods, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Waste reuse practice** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** |  | **(%)** | **(%)** |
| **Fish gutsb** | | | | | | | | |
| Compost |  |  |  |  |  |  |  |  |
| Use as animal feed |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Scales and skinsb** |  |  |  |  |  |  |  |  |
| Compost |  |  |  |  |  |  |  |  |
| Use as animal feed |  |  |  |  |  |  |  |  |
| Sell |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

#### Training, record-keeping, and access to services and information

Fishpond farming requires that farmers know how to choose suitable fish, how to build a good pond for raising fish, how to ensure good water quality, how to ensure the fish have sufficient food, and how to harvest and market the fish. Advances in aquaculture are continuously being made, which results in techniques that fishpond farmers can learn to employ to increase production. **Table 7.2.14** presents information about whether fishpond farmers in the ZOI have been trained in aquaculture, and if they received formal training, when they were last trained. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.2.14: Training in Aquaculture and Time Since Last Formal Training, in Total and by Farmers’ Sex and Age

| **Training characteristic** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** | **Sig.a** | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** | **(%)** | **(%)** |
| **Training in aquaculture** | | | | | | | | |
| Formal |  |  |  |  |  |  |  |  |
| Informal |  |  |  |  |  |  |  |  |
| None |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Time since last formal training** | |  |  |  |  |  |  |  |
| Within past 1 year |  |  |  |  |  |  |  |  |
| Within past 2 years |  |  |  |  |  |  |  |  |
| Within past 3 years |  |  |  |  |  |  |  |  |
| 3 or more years ago |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers who received formal training (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Not only is training important to fishpond farmers, but information obtained through other sources and the ability to access to extension services for fish are also important. Furthermore, keeping regular written records about fishpond management practices and issues encountered is a good practice that can help fishpond farmers learn from their experiences over time. **Table 7.2.15** presents information about whether fishpond farmers in the ZOI keep regular written records about their fish, whether they can access extension services for their fish, and what their primary source of information is for raising their fish. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.2.15: Record Keeping, Access to Extension Services, and Main Information Sources among Fishpond Farmers in the ZOI, in Total and by Farmers’ Sex and Age

| **Practice or source** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** | **Sig.a** | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** | **(%)** | **(%)** |
| **Keep regular written records** |  |  |  |  |  |  |  |  |
| **Can access extension services for fish** |  |  |  |  |  |  |  |  |
| **Main information source** |  |  |  |  |  |  |  |  |
| Agriculture extension worker |  |  |  |  |  |  |  |  |
| Family, friend, or neighbor |  |  |  |  |  |  |  |  |
| Internet |  |  |  |  |  |  |  |  |
| Mobile phone messaging |  |  |  |  |  |  |  |  |
| Radio program |  |  |  |  |  |  |  |  |
| School |  |  |  |  |  |  |  |  |
| Television |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### Use of improved management practices and technologies

This section examines farmers’ use of improved technologies and management practices promoted by Feed the Future in the [Country] ZOI.

**Table 7.2.16** shows the percentage of fishpond farmers in the ZOI who applied one or more improved management practices or technologies promoted by the [COUNTRY] mission during the 12 months preceding the ZOI Survey. The table also includes the percentage of fishpond farmers in the ZOI who used promoted improved management practices and technologies by aquaculture sub-category. [Discuss findings. What were the most common types of improved practices or technologies used? Were any differences found between disaggregate categories?]

Table 7.2.16: Percentages of Fishpond Farmers in the ZOI Who Applied One or More Promoted Improved Management Practices and Technologies by Sub-category, in Total and by Farmers’ Sex and Age

| **Sub-category** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** | **Sig.a** | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** | **(%)** | **(%)** |
| **Across all sub-categories** |  |  |  |  |  |  |  |  |
| Improved fingerlingsb |  |  |  |  |  |  |  |  |
| Improved feed and feeding practicesc |  |  |  |  |  |  |  |  |
| Fish health and disease controld |  |  |  |  |  |  |  |  |
| Improved cage culturee |  |  |  |  |  |  |  |  |
| Improved pond culturef |  |  |  |  |  |  |  |  |
| Pond preparationg |  |  |  |  |  |  |  |  |
| Sampling and harvestingh |  |  |  |  |  |  |  |  |
| Management of carrying capacityi |  |  |  |  |  |  |  |  |
| Otherj |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

1. [Insert description of response options that are promoted, improved practices.]
2. [Insert description of response options that are promoted, improved practices.]
3. [Insert description of response options that are promoted, improved practices.]
4. [Insert description of response options that are promoted, improved practices.]
5. [Insert description of response options that are promoted, improved practices.]
6. [Insert description of response options that are promoted, improved practices.]
7. [Insert description of response options that are promoted, improved practices.]
8. [Insert description of response options that are promoted, improved practices.]
9. [Insert description of response options that are promoted, improved practices.]

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

**Table 7.2.17** shows the percent distribution of fishpond farmers who used promoted improved management practices and technologies by the number used. [Discuss findings. Were any differences found between disaggregate sub-categories?]

Table 7.2.17: Percent Distribution of Fishpond Farmers in the ZOI by the Number of Promoted Improved Management Practices and Technologies Used, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Promoted improved practice or technology** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** | **15-29** | **30+** | **Sig.a** |
| **(%)** | **(%)** | **(%)** | **(%)** | **(%)** |
| **Number used** |  |  |  |  |  |  |  |  |
| 1 |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |
| 8+ |  |  |  |  |  |  |  |  |
| **Number of fishpond farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### Yield of targeted agricultural commodities

Yield is a measure of total production per unit of production. For fish raised in fishponds, yield is the weight of fish, in kilograms, harvested in the 30 days preceding the survey divided by the total surface area, in hectares, of the ponds in which fish were raised.

**Table 7.2.18** presents the number of fishpond farmers, the total production in kilograms (kg), total production units in hectares (ha), and the total and average yields of fishponds in kilograms per hectare (kg/ha) for the 30 days preceding the ZOI Survey. The results are disaggregated by farmers’ sex and age. [Discuss findings. Were any results statistically different between disaggregate categories?]

Table 7.2.18: Yield from Fishponds in the ZOI during the 30 Days Preceding the Survey, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Background characteristic** | **Total production** | **Total units of production** | **Total yield** |  | | **Number of fishpond farmers (*n*)** |
| **Average yield** | |
| **(kg)** | **(ha)** | **(kg/ha)** | **(kg/ha)** | **Sig.a** |
| **Total** |  |  |  |  |  |  |
| **Sex** |  |  |  |  |  |  |
| Female |  |  |  |  |  |  |
| Male |  |  |  |  |  |  |
| **Age** |  |  |  |  |  |  |
| 15-29 years |  |  |  |  |  |  |
| 30+ years |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

**Table 7.2.19** presents the average number of fish harvested, weight of fish harvested in kilograms, and average yield in kilograms per hectare for the 30 days preceding the ZOI Survey . The average surface area of fishponds in the ZOI is also presented. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.2.19: Average Fishpond Yield Information during the 30 Days Preceding the Survey, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Average number of fish harvested** | **Average weight harvested  (kg)** |  |  | **Average area of fishponds (ha)** | **Number of fishpond farmers (*n*)** |
|  | **Average yield** | |
| **(kg/ha)** | **Sig.a** |
| **Total** |  |  |  |  |  |  |
| **Sex** |  |  |  |  |  |  |
| Female |  |  |  |  |  |  |
| Male |  |  |  |  |  |  |
| **Age** |  |  |  |  |  |  |
| 15-29 years |  |  |  |  |  |  |
| 30+ years |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising fish in ponds.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

## Dairy farming

### Production of dairy cows in [Country]

Dairy farming is a value chain that the Feed the Future program in [Country] targets. [Insert dairy farming background information according to instructions].

### Farmers’ background

**Table 7.3.1** presents the age and education characteristics of dairy farmers in the ZOI. [Discuss findings. Compare the percentage of male to female farmers by age and education.]

Table 7.3.1: Age and Education of Dairy Farmers in the ZOI, in Total and by Farmers’ Sex

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Background characteristic** |  | **Sex** | | | **Number of dairy farmers (*n*)** |
| **Total (%)** | **Male (%)** | **Female (%)** | **Sig.a** |
| **Age** |  |  |  |  |  |
| 15-19 |  |  |  |  |  |
| 20-24 |  |  |  |  |  |
| 25-29 |  |  |  |  |  |
| 30-34 |  |  |  |  |  |
| 35-39 |  |  |  |  |  |
| 40-44 |  |  |  |  |  |
| 45-49 |  |  |  |  |  |
| 20-54 |  |  |  |  |  |
| 55-59 |  |  |  |  |  |
| 60+ |  |  |  |  |  |
| **Education** |  |  |  |  |  |
| No education |  |  |  |  |  |
| Less than primary |  |  |  |  |  |
| Completed primary |  |  |  |  |  |
| Completed secondary |  |  |  |  |  |
| Higher |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

**Table 7.3.2** shows the mean number of dairy cattle owned by farmers in the ZOI. The numbers are shown by type of dairy cattle. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.2: Dairy Herd Structure: Mean Number of Dairy Cattle Owned by Dairy Farmers in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Type of dairy cattle** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| Milking dairy cows |  |  |  |  |  |  |  |  |
| Non-milking dairy cows |  |  |  |  |  |  |  |  |
| Bulls 1 year old or older |  |  |  |  |  |  |  |  |
| Calves less than 1 year old |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### Application of management practices and technologies

This section examines the management practices and technologies that farmers used to raise dairy cows. In all tables, Feed the Future-promoted improved management practices and technologies are indicated with a double dagger (‡).

#### Acquisition and breeding practices

Dairy cows and bulls can be purchased, bred, or obtained as in-kind credit. Dairy farmers can improve the productivity of their cows through selective breeding and control of reproduction. In developing countries, cattle are primarily bred through natural mating; artificial insemination is generally only used by larger-scale dairy farms.[[75]](#footnote-76) Artificial insemination is beneficial in dairy farming when the services are available, accessible, and affordable because it ensures that the genes from good bulls are passed to more offspring. For the improved genetic potential to be realized, inputs need to be intensified and good dairy production practices must be in place. Using natural breeding, one bull can serve about 30 dairy cows each year, but using artificial insemination, one bull can serve more than 200 dairy cows each year.[[76]](#footnote-77) **Table 7.3.3** presents information on breeding practices used by dairy farmers in the ZOI. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.3: Types of Dairy Cows Owned and Methods of Dairy Cow Acquisition in the ZOI, in Total and by Farmers’ Sex and Age

| **Type or method** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Type of dairy cows** | | |  |  |  |  |  |  |
| Mostly local, traditional breeds |  |  |  |  |  |  |  |  |
| Mostly exotic, modern breeds |  |  |  |  |  |  |  |  |
| Half local, half exotic |  |  |  |  |  |  |  |  |
| Don’t know |  |  |  |  |  |  |  |  |
| **Method of dairy cow acquisitionb** | | |  |  |  |  |  |  |
| Purchased |  |  |  |  |  |  |  |  |
| Bred |  |  |  |  |  |  |  |  |
| Artificial insemination |  |  |  |  |  |  |  |  |
| Natural breeding |  |  |  |  |  |  |  |  |
| Obtained as in-kind credit |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

When breeding dairy cows naturally, in some cases, dairy farmers may not select the bull to mate—whether it is because there is only one bull available or because multiple bulls are available but the farmers do not control their reproduction. In other cases, however, dairy farmers may purposefully select the bull from their own herd, or they may exchange or purchase a bull from another herd. If options are available, dairy farmers may choose a bull to mate because he has good body size or composition, is the son of a high-producing cow, or is known to have high fertility. Table **7.3.4** presents information related to natural breeding practices used by dairy farmers in the ZOI. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.4: Natural Breeding Practices—Methods of Acquiring Bull Services and Reasons for Bull Selection in the ZOI, in Total and by Farmers’ Sex and Age

| **Method or reason** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Method of acquiring bull servicesb** | | | | | | | | |
| Selected from own herd |  |  |  |  |  |  |  |  |
| Exchanged with other herd |  |  |  |  |  |  |  |  |
| Purchased from other herd |  |  |  |  |  |  |  |  |
| **Reason for bull selection** |  |  |  |  |  |  |  |  |
| No selection, only one bull |  |  |  |  |  |  |  |  |
| No selection, multiple bulls in herd |  |  |  |  |  |  |  |  |
| Has good body size, composition |  |  |  |  |  |  |  |  |
| Is son of high-producing cow |  |  |  |  |  |  |  |  |
| Is known to have good fertility |  |  |  |  |  |  |  |  |
| **Number of dairy farmers who breed their dairy cows (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Farmers who use artificial insemination to breed their dairy cows must obtain artificial insemination services from a provider. **Table 7.3.5** presents information related to artificial insemination practices used by dairy farmers in the ZOI. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.5: Primary Providers of Dairy Cow Artificial Insemination Services in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Artificial insemination provider** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Primary provider** |  |  |  |  |  |  |  |  |
| Cooperative |  |  |  |  |  |  |  |  |
| Private services provider |  |  |  |  |  |  |  |  |
| Community animal health worker |  |  |  |  |  |  |  |  |
| Private veterinary pharmacy |  |  |  |  |  |  |  |  |
| Government extension agent |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Number of dairy farmers who use artificial insemination to breed their dairy cows (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

#### Use of inputs

The inputs discussed in this section include dairy cow housing, water supply, feed, and health services, including vaccinations and mastitis prevention. Housing for dairy cows can range from no housing to improved housing that has a roof, sides, and a concrete floor. Dairy cows consume large amounts of water. Dairy cows may be brought to a water source (e.g., a pond, pool, creek, or stream), or water might be brought to the dairy cows (e.g., in buckets or by pipe). **Table 7.3.6** presents the type of housing and water supply methods that farmers in the ZOI use for their dairy cows. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.6: Type of Housing and Water Supply Method Used for Dairy Cows in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Characteristic** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Type of housing** |  |  |  |  |  |  |  |  |
| Family housing |  |  |  |  |  |  |  |  |
| No housing |  |  |  |  |  |  |  |  |
| Open corral only |  |  |  |  |  |  |  |  |
| Roof only, no sides |  |  |  |  |  |  |  |  |
| Roof and sides, dirt floor |  |  |  |  |  |  |  |  |
| Roof and sides, concrete floor |  |  |  |  |  |  |  |  |
| **Water supply** |  |  |  |  |  |  |  |  |
| Cows drink from pond or pool |  |  |  |  |  |  |  |  |
| Cows drink from creek or stream |  |  |  |  |  |  |  |  |
| Water brought to cows in buckets |  |  |  |  |  |  |  |  |
| Water piped to cows |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Allowing dairy cows to graze is allowing them to directly consume the growing forage: grasses and legumes in a pasture or rangeland.[[77]](#footnote-78) Grazing is a main feeding method used in developing countries, but overgrazing is a concern among farmers because it can result in the degradation of the land that is grazed.[[78]](#footnote-79) The nutrients that dairy cows consume contribute to their ability to produce milk, and different types of forages have different nutrient content. Forages include crop residues and cultivated fodders. **Table 7.3.7** presents information about grazing and forages fed to dairy cows in the ZOI, including the types and sources of forage that dairy farmers feed their dairy cows. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.7: Dairy Cow Grazing and Characteristics of Forages Used in the ZOI, in Total and by Farmers’ Sex and Age

| **Practice or characteristic** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Dairy cows graze** |  |  |  |  |  |  |  |  |
| **Forages fed to dairy cowsb** |  |  |  |  |  |  |  |  |
| Conserved rice straw |  |  |  |  |  |  |  |  |
| Conserved maize stover |  |  |  |  |  |  |  |  |
| Legume haulms or stovers |  |  |  |  |  |  |  |  |
| Forage legumes |  |  |  |  |  |  |  |  |
| Napier grass |  |  |  |  |  |  |  |  |
| Guinea grass |  |  |  |  |  |  |  |  |
| Fresh-cut grass |  |  |  |  |  |  |  |  |
| Tree fodder |  |  |  |  |  |  |  |  |
| **Forage sourceb** |  |  |  |  |  |  |  |  |
| Gathered from roadside |  |  |  |  |  |  |  |  |
| Pulled from cropland |  |  |  |  |  |  |  |  |
| Grew it themselves |  |  |  |  |  |  |  |  |
| Bought from neighbor |  |  |  |  |  |  |  |  |
| Bought from market |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Crop by-products are supplemental feeds that are made from plant parts, such as stems and seed pods, that are left over after the main crop is harvested. **Table 7.3.8** presents information about crop by‑product use among dairy farmers in the ZOI, including the frequency of feeding and the type and source of the crop by-products. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.8: Characteristics of Crop By-product Use by Dairy Farmers in the ZOI, in Total and by Farmers’ Sex and Age

| **Crop by-product use or characteristic** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Fed to dairy cows** |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Frequency of feeding** |  |  |  |  |  |  |  |  |
| Daily |  |  |  |  |  |  |  |  |
| Weekly |  |  |  |  |  |  |  |  |
| Monthly |  |  |  |  |  |  |  |  |
| Whenever available |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Typeb** |  |  |  |  |  |  |  |  |
| Maize bran |  |  |  |  |  |  |  |  |
| Wheat bran |  |  |  |  |  |  |  |  |
| Molasses |  |  |  |  |  |  |  |  |
| Fruit or vegetable processing waste |  |  |  |  |  |  |  |  |
| Oilseed cake |  |  |  |  |  |  |  |  |
| Brewer’s grain |  |  |  |  |  |  |  |  |
| Cottonseed meal or cake |  |  |  |  |  |  |  |  |
| **Sourceb** |  |  |  |  |  |  |  |  |
| Own food preparation |  |  |  |  |  |  |  |  |
| Local brewer |  |  |  |  |  |  |  |  |
| Market |  |  |  |  |  |  |  |  |
| Dairy cooperative |  |  |  |  |  |  |  |  |
| Other cooperative |  |  |  |  |  |  |  |  |
| Milk producer (not co-op) |  |  |  |  |  |  |  |  |
| Local agrovet supplier |  |  |  |  |  |  |  |  |
| **Number of dairy farmers who feed crop by-products to their dairy cows (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Mixed concentrates are nutrient-rich feeds that are fed to dairy cows to increase milk production. They are usually a mixture of grains and cereals, and can include other nutrient-dense ingredients, such as brans, pomaces, or oilseed cake and are typically formulated into a meal or pelletized. **Table 7.3.9** presents information about the use of mixed concentrates by dairy farmers in the ZOI, including the frequency of feeding and the sources of the feeds. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.9: Characteristics of Mixed Concentrate Feed Use by Dairy Farmers in the ZOI, by Farmers’ Sex and Age

| **Mixed concentrate feed use and characteristic** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Fed to dairy cows** |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Frequency of feeding** |  |  |  |  |  |  |  |  |
| Daily |  |  |  |  |  |  |  |  |
| Weekly |  |  |  |  |  |  |  |  |
| Monthly |  |  |  |  |  |  |  |  |
| Whenever available |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Sourceb** |  |  |  |  |  |  |  |  |
| Market |  |  |  |  |  |  |  |  |
| Dairy cooperative |  |  |  |  |  |  |  |  |
| Other cooperative |  |  |  |  |  |  |  |  |
| Local agrovet supplier |  |  |  |  |  |  |  |  |
| Milk producer (not co-op) |  |  |  |  |  |  |  |  |
| **Number of dairy farmers who fed mixed concentrates to their dairy cows (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

**Table 7.3.10** presents the frequency with which dairy farmers in the ZOI feed vitamins and minerals to their dairy cows. Note that in the better formulations of compounded concentrate feed, vitamins and minerals are incorporated into the mix; it is therefore possible that the figures presented here miss some farmers who do not add vitamin and mineral supplements separately. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.10: Frequency with which Farmers Feed Their Dairy Cows Vitamins or Minerals in the ZOI, by Farmers’ Sex and Age

| **Vitamin and mineral use and feeding frequency** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Fed to dairy cows** |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Frequency of feeding** |  |  |  |  |  |  |  |  |
| Daily |  |  |  |  |  |  |  |  |
| Weekly |  |  |  |  |  |  |  |  |
| Monthly |  |  |  |  |  |  |  |  |
| Whenever available |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Number of dairy cows who fed vitamins or minerals to their dairy cows (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

When dairy cows contract diseases, dairy farmers are subject to potentially large economic losses. Disease can result in the death of dairy cows or in reduced productivity. Access to trained health service providers and medicines, therefore, is important in dairy farming. Dairy farmers in developing countries, however, have limited knowledge of disease prevention, management, and control. In addition, disease prevalence is high, and dairy cow health services can be unavailable or unaffordable.[[79]](#footnote-80) **Table 7.3.11** presents information on where farmers obtain health services and medicines for their dairy cows in the ZOI. Dairy farmers were specifically asked about obtaining health services, such as vaccinations, treatment for sick animals, and assistance with the delivery of calves, from trained providers. [Discuss findings. Were any differences found between disaggregate categories? What percentage of farmers treat their own dairy cows? Also discuss how long it takes for dairy farmers to obtain emergency animal health services when needed. Are there respondents who reported that emergency health services for animals are not available?]

Table 7.3.11: Trained Health Service Providers and Sources of Medicines Used by Dairy Farmers in the ZOI, in Total and by Farmers’ Sex and Age

| **Provider or source** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Trained health service providerb** | | | | | | | | |
| Self |  |  |  |  |  |  |  |  |
| Community animal health worker |  |  |  |  |  |  |  |  |
| Government extension services |  |  |  |  |  |  |  |  |
| Public veterinarian |  |  |  |  |  |  |  |  |
| Private veterinarian |  |  |  |  |  |  |  |  |
| Private veterinary pharmacy |  |  |  |  |  |  |  |  |
| Did not use health services |  |  |  |  |  |  |  |  |
| **Source of medicinesb** |  |  |  |  |  |  |  |  |
| Trader |  |  |  |  |  |  |  |  |
| Dairy cooperative |  |  |  |  |  |  |  |  |
| Milk purchaser (not co-op) |  |  |  |  |  |  |  |  |
| Community animal health worker |  |  |  |  |  |  |  |  |
| Local agrovet supplier |  |  |  |  |  |  |  |  |
| Private veterinary pharmacy |  |  |  |  |  |  |  |  |
| Government |  |  |  |  |  |  |  |  |
| Did not give medicines |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Vaccinating dairy cows will help keep them healthy. Rift Valley fever outbreaks, for example, can be prevented if animals are vaccinated before an outbreak begins, ideally through a continuous vaccination program.[[80]](#footnote-81) Foot-and-mouth disease and contagious bovine pleuropneumonia are two other highly contagious diseases that can also be controlled by routine vaccination. **Table 7.3.12** presents information on dairy cow vaccination practices among farmers in the ZOI. This includes information on whether farmers vaccinate their dairy cows and the types of vaccines they give them. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.12: Vaccination Practices among Dairy Farmers in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Vaccination characteristic** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Dairy cows vaccinated** |  |  |  |  |  |  |  |  |
| None |  |  |  |  |  |  |  |  |
| Some |  |  |  |  |  |  |  |  |
| All |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Type of vaccination givenb** |  |  |  |  |  |  |  |  |
| Foot and mouth disease |  |  |  |  |  |  |  |  |
| Contagious bovine pleuropneumonia |  |  |  |  |  |  |  |  |
| Rift Valley fever |  |  |  |  |  |  |  |  |
| **Number of dairy farmers who vaccinated their dairy cows (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Mastitis is inflammation of a dairy cow’s udder that usually caused by bacterial infection. Mastitis reduces milk yields and increases production costs. Mastitis cannot be eliminated, but it can be reduced to low levels through good cow management practices, such as cleaning milking equipment thoroughly, keeping dairy cow housing clean, washing and drying udders before milking, and dipping or spraying all teats with disinfectant teat dip after each milking.[[81]](#footnote-82) Somatic cell count tests can be used to diagnose mastitis in a single dairy cow or in a herd, particularly when visible symptoms of mastitis are not present.[[82]](#footnote-83)

**Table 7.3.13** presents information on mastitis awareness and prevention among dairy farmers in the ZOI. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.13: Mastitis Prevention Methods Used by Dairy Farmers in the ZOI, in Total and by Farmers’ Sex and Age

| **Prevention methoda** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.b** |  | **(%)** | **(%)** | **Sig.b** |
| Wash and dry udder |  |  |  |  |  |  |  |  |
| Teat dip |  |  |  |  |  |  |  |  |
| Somatic cell counts |  |  |  |  |  |  |  |  |
| None, no prevention used |  |  |  |  |  |  |  |  |
| None, never heard of mastitis |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

b Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

#### Production practices

In this section, dairy cow manure use, milk processing and sale, record keeping, and information sources are explored.

Lactating dairy cows have been estimated to produce between 56 and 82 kilograms of manure (including urine) per day based on milk yield, with dry cows and heifers both estimated to produce less.[[83]](#footnote-84) That manure can be a valuable resource—whether it is used as fertilizer or fuel or sold. **Table 7.3.14** presents information on whether dairy farmers in the ZOI collect their cows’ manure, and if they do collect it, how they store and use it. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.14: Cow Manure Practices among Dairy Farmers in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Manure collection and use characteristic** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Collect cows’ manure** |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Manure storage** |  |  |  |  |  |  |  |  |
| In a heap, uncovered area |  |  |  |  |  |  |  |  |
| In a heap, covered area |  |  |  |  |  |  |  |  |
| In a pit or lagoon |  |  |  |  |  |  |  |  |
| In a tank |  |  |  |  |  |  |  |  |
| In a biogas-producing digester |  |  |  |  |  |  |  |  |
| **Manure use** |  |  |  |  |  |  |  |  |
| Use for fuel |  |  |  |  |  |  |  |  |
| Put on field as fertilizer |  |  |  |  |  |  |  |  |
| Give to friends or neighbors |  |  |  |  |  |  |  |  |
| Sell to friends or neighbors |  |  |  |  |  |  |  |  |
| Sell at market |  |  |  |  |  |  |  |  |
| Nothing |  |  |  |  |  |  |  |  |
| **Number of dairy farmers who collect their dairy cows' manure (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Farmers may process the milk that their dairy cows produce into other products, such as yogurt or cheese. They may also sell some or all of the milk that their dairy cows produce. **Table 7.3.15** presents information on dairy farmers’ practices related to processing and selling their cows’ milk. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.15: Milk Processing and Selling Practices of Dairy Farmers in the ZOI, in Total and by Farmers’ Sex and Age

| **Practice or characteristic** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Process milk into other products** |  |  |  |  |  |  |  |  |
| **Sell milk** |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Where milk is soldb** |  |  |  |  |  |  |  |  |
| To friends or neighbors |  |  |  |  |  |  |  |  |
| At market |  |  |  |  |  |  |  |  |
| To a school |  |  |  |  |  |  |  |  |
| To a milk-marketing cooperative |  |  |  |  |  |  |  |  |
| To an aggregator or off-taker |  |  |  |  |  |  |  |  |
| **Which milk is sold** |  |  |  |  |  |  |  |  |
| Morning milk only |  |  |  |  |  |  |  |  |
| Evening milk only |  |  |  |  |  |  |  |  |
| Both morning and evening milk |  |  |  |  |  |  |  |  |
| **Number of dairy farmers who sell their dairy cows' milk (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Milk-marketing cooperatives may provide dairy farmers with a variety of services, including information about the amount and composition of the milk, extension and animal health services, and loans. Milk marketing cooperatives may also offer multiple methods of payment, including cash, store credit, mobile money, or direct deposit to a bank account. **Table 7.3.16** presents the services that dairy farmers report their milk marketing cooperatives offer. [Discuss findings.]

Table 7.3.16: Services Provided and Methods of Payment Used by Dairy Farmers’ Milk Marketing Cooperatives in the ZOI

| **Service or method** | **Percent** |
| --- | --- |
| **Service provideda** |  |
| Amount of milk |  |
| Fat content of milk |  |
| Acidity of milk |  |
| Extension services |  |
| Animal health services |  |
| Loans |  |
| **Payment methoda** |  |
| Cash |  |
| Store credit |  |
| MPESA/mobile money |  |
| Direct deposit to bank account |  |
| **Number of dairy farmers who use a milk marketing cooperative (*n*)** |  |

^ Results not statistically reliable, n<30

a Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

There are several reasons why farmers may sell their dairy cows. **Table 7.3.17** presents reasons why farmers sell their dairy cows in the ZOI. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.17: Reasons Farmers Sell their Dairy Cows in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Reasona** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.b** |  | **(%)** | **(%)** | **Sig.b** |
| Need cash |  |  |  |  |  |  |  |  |
| Dam is poor-performing |  |  |  |  |  |  |  |  |
| Low milk production |  |  |  |  |  |  |  |  |
| Will not re-breed |  |  |  |  |  |  |  |  |
| Too old |  |  |  |  |  |  |  |  |
| When heifers expected to produce more milk enter herd |  |  |  |  |  |  |  |  |
| Herd size not manageable |  |  |  |  |  |  |  |  |
| Not enough food for all animals |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Farmers were allowed to give more than one response, so the percentages may not add up to 100 percent.

b Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

**Table 7.3.18** presents the mean number dairy cows and bulls that were sold or died per dairy farmer in the ZOI in the 12 months preceding the survey. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.18: Mean Number of Dairy Cows and Bulls that Were Sold or Died per Dairy Farmer in the ZOI during the 12 Months Preceding the Survey, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Type of dairy cattle** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** | **Sig.a** |  | **15-29** | **30+** | **Sig.a** |
| **Sold** |  |  |  |  |  |  |  |  |
| Dairy cows |  |  |  |  |  |  |  |  |
| Bulls |  |  |  |  |  |  |  |  |
| **Died** |  |  |  |  |  |  |  |  |
| Dairy cows |  |  |  |  |  |  |  |  |
| Bulls |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Dairy farmers who keep written records can track milk yields and milk composition and use the information to make decisions about feeding, selecting calves with a higher capacity to produce, culling animals that are no long producing, and improving production.[[84]](#footnote-85) In addition to keeping written records, it is also important for farmers to access information to help them raise their dairy cows well so that they are able to obtain high milk yields. **Table 7.3.19** presents the main information sources that dairy farmers in the ZOI use to obtain extension and other production performance information about how to raise their animals well and also presents the percentage of dairy farmers who keep written records. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.3.19: Record-keeping Practices and Main Information Sources among Dairy farmers in the ZOI, in Total and by Farmers’ Age and Sex

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Practice or source** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Keeps written records** |  |  |  |  |  |  |  |  |
| **Main production performance information source** |  |  |  |  |  |  |  |  |
| Friend/neighbor |  |  |  |  |  |  |  |  |
| Community animal health worker |  |  |  |  |  |  |  |  |
| Local agrovet supplier |  |  |  |  |  |  |  |  |
| Private veterinary pharmacy |  |  |  |  |  |  |  |  |
| Government veterinary officer |  |  |  |  |  |  |  |  |
| Ag extension worker |  |  |  |  |  |  |  |  |
| School |  |  |  |  |  |  |  |  |
| Radio program |  |  |  |  |  |  |  |  |
| Television |  |  |  |  |  |  |  |  |
| Mobile phone messaging |  |  |  |  |  |  |  |  |
| Internet |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Dairy farmers may make key production decisions alone, together with their partner or spouse, or together with others. However, they may instead rely on their partner or spouse or others to make such decisions. **Table 7.3.20** presents the percent distribution of dairy farmers by who made key production decisions—that is, which bulls to breed with dairy cows, which vaccinations to give dairy cows, and when to sell dairy cows. [Discuss findings. Were any differences found between male and female farmers? Among the three production decisions?]

Table 7.3.20: Percent Distribution of Who Made Key Dairy Cow Production Decisions in the ZOI, by Farmers’ Sex

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Decisionmakers** | **Which bulls to  breed** | |  | **Which vaccinations to give** | |  | **When to sell dairy cows** | |
| **Percent** | **Sig.a** | **Percent** | **Sig.a** | **Percent** | **Sig.a** |
| **Female farmers** |  |  |  |  |  |  |  |  |
| Self alone |  |  |  |  |  |  |  |  |
| Partner/spouse alone |  |  |  |  |  |  |  |  |
| Self and partner together |  |  |  |  |  |  |  |  |
| Self and other (could also include partner) |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Number of female dairy farmers (*n*)** |  |  |  |  |  |  |  |  |
| **Male farmers** |  |  |  |  |  |  |  |  |
| Self alone |  |  |  |  |  |  |  |  |
| Partner/spouse alone |  |  |  |  |  |  |  |  |
| Self and partner together |  |  |  |  |  |  |  |  |
| Self and other (could also include partner) |  |  |  |  |  |  |  |  |
| Other |  |  |  |  |  |  |  |  |
| **Number of male dairy farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

‡ Promoted improved technology or management practice

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### Use of improved management practices and technologies

This section examines dairy farmers’ use of improved technologies and management practices promoted by Feed the Future in the [Country] ZOI to raise dairy cows and produce milk.

**Table 7.3.21** shows the percentage of dairy farmers in the ZOI who applied one or more improved management practices or technologies promoted by the [COUNTRY] mission during the 12 months preceding the ZOI Survey. The table also includes the percentage of dairy farmers in the ZOI who used promoted improved management practices and technologies by livestock production and management sub-category. [Discuss findings. What were the most common types of improved management practices and technologies used? Were any differences found between disaggregate categories?]

Table 7.3.21: Percentage of Dairy Farmers in the ZOI Who Used One or More Improved Management Practices and Technologies by Sub-category, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sub-category** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Across all sub-categories** |  |  |  |  |  |  |  |  |
| Improved livestock breedsb |  |  |  |  |  |  |  |  |
| Livestock health services and productsc |  |  |  |  |  |  |  |  |
| Improved livestock handling practices and housingd |  |  |  |  |  |  |  |  |
| Improved feeding practicese |  |  |  |  |  |  |  |  |
| Improved grazing practicesf |  |  |  |  |  |  |  |  |
| Improved waste management practicesg |  |  |  |  |  |  |  |  |
| Improved use of fodder cropsh |  |  |  |  |  |  |  |  |
| Cultivation of dual purpose cropsi |  |  |  |  |  |  |  |  |
| Otherj |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

1. [Insert description of response options that are promoted, improved practices.]
2. [Insert description of response options that are promoted, improved practices.]
3. [Insert description of response options that are promoted, improved practices.]
4. [Insert description of response options that are promoted, improved practices.]
5. [Insert description of response options that are promoted, improved practices.]
6. [Insert description of response options that are promoted, improved practices.]
7. [Insert description of response options that are promoted, improved practices.]
8. [Insert description of response options that are promoted, improved practices.]
9. [Insert description of response options that are promoted, improved practices.]

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

**Table 7.3.22** shows the percent distribution of dairy farmers who used promoted improved management practices and technologies by the number used. [Discuss findings. Were any differences found between disaggregate sub-categories?]

Table 7.3.22: Percent Distribution of Dairy farmers in the ZOI by the Number of Promoted Improved Management Practices and Technologies Used, in Total and by Farmers’ Sex and Age

| **Promoted improved practice or technology** | **Total** | **Sex** | | |  | **Age (years)** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Number used** |  |  |  |  |  |  |  |  |
| 1 |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |
| 8+ |  |  |  |  |  |  |  |  |
| **Number of dairy farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Yield is a measure of total production per unit of production. For dairy cows, yield is the liters of milk produced the day before the survey per milking dairy cow.

**Table 7.3.23** presents the number of dairy cow producers, total milk production, total production units, and total and average yields for dairy cows. Yield results are also presented disaggregated—first by production system and then by sex and age. Note that estimations of milk yields for non-commercial animals are significantly influenced by the season when data are collected; the impact of seasonality on yields is reduced among commercial dairy animals fed concentrates. [Discuss findings. Were any differences found among disaggregate categories?]

Table 7.3.23: Yield from Dairy Cows in the ZOI during the 30 Days Preceding the Survey, in Total and by Farmers’ Sex and Age

| **Background characteristic** | **Total production (liters)** | **Total units of production (number of milking cows)** | **Total yield (liters/ milking cow)** | **Average yield** | | **Number of dairy farmers with milking cows** |
| --- | --- | --- | --- | --- | --- | --- |
| **(liters/ milking cow)** | **Sig.a** |
| **Total** |  |  |  |  |  |  |
| **Sex** |  |  |  |  |  |  |
| Female |  |  |  |  |  |  |
| Male |  |  |  |  |  |  |
| **Age** |  |  |  |  |  |  |
| 15-29 years |  |  |  |  |  |  |
| 30+ years |  |  |  |  |  |  |
| **Total number of dairy farmers (*n*)** |  |  |  |  |  |  |
| **Production system** |  |  |  |  |  |  |
| **Agro-pastoral/ extensive grassland** |  |  |  |  |  |  |
| **Sex** |  |  |  |  |  |  |
| Female |  |  |  |  |  |  |
| Male |  |  |  |  |  |  |
| **Age** |  |  |  |  |  |  |
| 15-29 years |  |  |  |  |  |  |
| 30+ years |  |  |  |  |  |  |
| **Number of agro-pastoral/ extensive grassland dairy farmers (*n*)** |  |  |  |  |  |  |
| **Smallholder mixed livestock-crop** |  |  |  |  |  |  |
| **Sex** |  |  |  |  |  |  |
| Female |  |  |  |  |  |  |
| Male |  |  |  |  |  |  |
| **Age** |  |  |  |  |  |  |
| 15-29 years |  |  |  |  |  |  |
| 30+ years |  |  |  |  |  |  |
| **Number of smallholder mixed livestock crop dairy farmers (*n*)** |  |  |  |  |  |  |
| **Urban/peri-urban** |  |  |  |  |  |  |
| **Sex** |  |  |  |  |  |  |
| Female |  |  |  |  |  |  |
| Male |  |  |  |  |  |  |
| **Age** |  |  |  |  |  |  |
| 15-29 years |  |  |  |  |  |  |
| 30+ years |  |  |  |  |  |  |
| **Number of urban/ peri‑urban crop dairy farmers (*n*)** |  |  |  |  |  |  |
| **Intensive industrial** |  |  |  |  |  |  |
| **Sex** |  |  |  |  |  |  |
| Female |  |  |  |  |  |  |
| Male |  |  |  |  |  |  |
| **Age** |  |  |  |  |  |  |
| 15-29 years |  |  |  |  |  |  |
| 30+ years |  |  |  |  |  |  |
| **Number of intensive industrial dairy farmers (*n*)** |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for raising dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

## Looking across maize, fishponds, and dairy cows

This section examines farmers’ use of improved management practices and technologies promoted by Feed the Future in the [Country] ZOI across all targeted value chains—maize, fishponds, and dairy cows.

**Table 7.4.1** shows the percentage of targeted VCC farmers in the ZOI who applied one or more improved management practice or technology promoted by the [COUNTRY] mission during the 12 months preceding the ZOI Survey. The table also includes the percentage of targeted VCC farmers in the ZOI who used promoted improved management practices and technologies by category. [Discuss findings. What were the most common types of improved management practices and technologies used? Were any differences found between disaggregate categories?]

Table 7.4.1: Percentage of Targeted Value Chain Commodity Farmers in the ZOI Who Applied One or More Promoted Improved Management Practices and Technologies by Category, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Category** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Across all categories** |  |  |  |  |  |  |  |  |
| Crop geneticsb |  |  |  |  |  |  |  |  |
| Cultural practicesc |  |  |  |  |  |  |  |  |
| Natural resource or ecosystem managementd |  |  |  |  |  |  |  |  |
| Pest and disease managemente |  |  |  |  |  |  |  |  |
| Soil-related fertility and conservationf |  |  |  |  |  |  |  |  |
| Irrigationg |  |  |  |  |  |  |  |  |
| Water management, non-irrigation-basedh |  |  |  |  |  |  |  |  |
| Climate adaptation or climate risk managementi |  |  |  |  |  |  |  |  |
| Post-harvest, handling and storagej |  |  |  |  |  |  |  |  |
| Marketing and distributionk |  |  |  |  |  |  |  |  |
| Value-added processingl |  |  |  |  |  |  |  |  |
| Aquaculture managementm |  |  |  |  |  |  |  |  |
| Livestock managementn |  |  |  |  |  |  |  |  |
| Othero |  |  |  |  |  |  |  |  |
| **Number of targeted value chain commodity farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

1. [Insert description of response options considered to be improved.]
2. [Insert description of response options considered to be improved.]
3. [Insert description of response options considered to be improved.]
4. [Insert description of response options considered to be improved.]
5. [Insert description of response options considered to be improved.]
6. [Insert description of response options considered to be improved.]
7. [Insert description of response options considered to be improved.]
8. [Insert description of response options considered to be improved.]
9. [Insert description of response options considered to be improved.]
10. [Insert description of response options considered to be improved.]
11. [Insert description of response options considered to be improved.]
12. [Insert description of response options considered to be improved.]
13. [Insert description of response options considered to be improved.]
14. [Insert description of response options considered to be improved.]

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize or raising fish or dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

**Table 7.4.2** shows the percent distribution of targeted VCC farmers in the ZOI who used promoted improved management practices and technologies by the number used. [Discuss findings. Were any differences found between disaggregate categories?]

Table 7.4.2: Percent Distribution of Targeted Value Chain Commodity Farmers by Number of Promoted Improved Management Practices and Technologies Used in the ZOI, in Total and by Farmers’ Sex and Age

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Promoted improved practice or technology** | **Total** | **Sex** | | |  | **Age (years)** | | |
| **Female** | **Male** |  |  | **15-29** | **30+** |  |
| **(%)** | **(%)** | **(%)** | **Sig.a** |  | **(%)** | **(%)** | **Sig.a** |
| **Number used** |  |  |  |  |  |  |  |  |
| 1 |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |  |  |
| 8+ |  |  |  |  |  |  |  |  |
| **Number of targeted value chain commodity farmers (*n*)** |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de jure household members who are farmers responsible for cultivating maize or raising fish or dairy cows.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

# Food insecurity and dietary intake

This chapter presents findings related to household food insecurity in the ZOI as well as women’s and young children’s dietary intake. The food insecurity and dietary indicators complement each other; when used together, they offer a more comprehensive understanding of causes and consequences of food insecurity in the ZOI.

## Food insecurity

The experience of food insecurity is characterized by uncertainty and anxiety regarding food access and changes in the *quality* of the diet (i.e., less balanced and more monotonous diets). As food insecurity becomes severe, the *quantity* of food consumed by the household decreases as the portion sizes are reduced and meals are skipped, and when food insecurity is most severe, individuals are forced to go without eating. Research shows that the experience of food insecurity appears to be common across cultures.[[85]](#footnote-86)

For the ZOI Surveys, the prevalence of moderate and severe food insecurity indicator is based on the FIES, which measures the percentage of individuals in the population that experienced food insecurity at moderate or severe levels during the 12 months preceding the survey. FIES is a scale established by the United Nations’ Food and Agriculture Organization that is used to estimate the probability that each household (or individual) belongs to a specific category of food insecurity severity.[[86]](#footnote-87),[[87]](#footnote-88),[[88]](#footnote-89) The difficulty in accessing food due to *lack of money or other resources* is measured from answers to a set of eight questions that covers a range of severity of food insecurity in the 12 months preceding the survey.

The dietary intake indicators should be measured when food supplies are still adequate (i.e., approximately up to 4–5 months post-harvest). Data collection for the survey took place in the post-harvest season, and the data collection in [Country] took place from [Duration]. According to the *State of Food Security and Nutrition in the World, 2019,* the food insecurity in [Country] was [INSERT INFORMATION ABOUT FOOD SECURITY IN COUNTRY.]

**Table 8.1.1** presents estimates of food insecurity in the ZOI population, as well as by household characteristics, including gendered household type, educational attainment, wealth quintile, poverty status, and severity of shock exposure.

[Insert description of the values presented in the table.]

Table 8.1.1: Prevalence of Food Insecurity in the ZOI Population by Severity, in Total and by Selected Household Characteristics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Household characteristic** | **Little to no (%)** | **Moderate (%)** | **Severe (%)** | **Moderate or severe** | | **Number of households (*n*)b** |
| **(%)** | **Sig.a** |
| **All households** |  |  |  |  |  |  |
| **Gendered household type** |  |  |  |  |  |  |
| Male and female adults |  |  |  |  |  |  |
| Female adults only |  |  |  |  |  |  |
| Male adults only |  |  |  |  |  |  |
| Children only (no adults) |  |  |  |  |  |  |
| **Household education** |  |  |  |  |  |  |
| No education |  |  |  |  |  |  |
| Less than primary |  |  |  |  |  |  |
| Completed primary |  |  |  |  |  |  |
| Completed secondary |  |  |  |  |  |  |
| Higher |  |  |  |  |  |  |
| **Wealth quintile** |  |  |  |  |  |  |
| Highest (wealthiest) |  |  |  |  |  |  |
| Fourth |  |  |  |  |  |  |
| Middle |  |  |  |  |  |  |
| Second |  |  |  |  |  |  |
| Lowest (poorest) |  |  |  |  |  |  |
| **Poverty status** |  |  |  |  |  |  |
| Poor |  |  |  |  |  |  |
| Non-poor |  |  |  |  |  |  |
| **Shock exposure index** |  |  |  |  |  |  |
| Did not experience any shocks |  |  |  |  |  |  |
| Low |  |  |  |  |  |  |
| Moderate |  |  |  |  |  |  |
| High |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

Note: Estimates are based on de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

**Table 8.1.2** presents estimates of food insecurity in the ZOI population by agriculture-related household characteristics, including household ownership of agricultural land, ownership of livestock, and cultivation of targeted crop commodities.

[Insert description of the values presented in the table.]

Table 8.1.2: Prevalence of Food Insecurity in the ZOI Population by Severity, in Total and by Selected Household Agricultural Characteristics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Household characteristic** | **Little to no (%)** | **Moderate (%)** | **Severe (%)** | **Moderate or severe** | | **Number of households (*n*)b** |
| **(%)** | **Sig.a** |
| **All households** |  |  |  |  |  |  |
| **Household ownership of agricultural land** |  |  |  |  |  |  |
| None |  |  |  |  |  |  |
| Less than 5 hectares |  |  |  |  |  |  |
| 5-9 hectares |  |  |  |  |  |  |
| 10 or more hectares |  |  |  |  |  |  |
| **Household ownership of livestockc** |  |  |  |  |  |  |
| Noned |  |  |  |  |  |  |
| Cows or bulls |  |  |  |  |  |  |
| Goats or sheep |  |  |  |  |  |  |
| Chickens |  |  |  |  |  |  |
| **Household crop VCC productionc** | |  |  |  |  |  |
| None |  |  |  |  |  |  |
| Maize |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

c Sub-categories will not sum to 100 percent because a household may have owned multiple types of livestock or produced multiple VCCs.

d None means that the household does not own any of the livestock animals included in the table—that is, cows or bulls, goats, sheep, or chickens—but may own other livestock animals including other cattle, horses, mules, donkeys, or fish.

Note: Estimates are based on de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

## 8.2 Women’s minimum dietary diversity

This section presents information on the dietary diversity of women of reproductive age in the ZOI.

Women of reproductive age (15-49 years) are at risk of multiple micronutrient deficiencies, which can jeopardize their health and their ability to care for their children and participate in income-generating activities.[[89]](#footnote-90) The Feed the Future women’s dietary diversity indicator is a proxy for the micronutrient adequacy of women’s diets. The dietary diversity indicator reports the mean number of food groups consumed in the previous day by women of reproductive age.

The women’s minimum dietary diversity indicator uses the following 10 food groups: (1) grains, roots, and tubers; (2) legumes and beans; (3) nuts and seeds; (4) dairy products; (5) eggs; (6) flesh foods, including organ meat and miscellaneous small animal protein; (7) vitamin A-rich dark green leafy vegetables; (8) other vitamin A-rich vegetables and fruits; (9) other fruits; and (10) other vegetables. Achievement of women’s minimum dietary diversity is defined as having consumed foods from at least 5 of the 10 food groups in the 24 hours preceding the survey. Thus, this indicator is a dichotomous variable, and the measure is reported as the percentage of women who achieve a minimum dietary diversity.

**Table 8.2.1** shows the percentage of all women of reproductive age in the ZOI who have achieved minimum dietary diversity by individual-level and household-level characteristics. Household-level characteristics include gendered household type, wealth quintile, poverty status, and severity of shock exposure. Individual-level characteristics include women’s age, educational attainment, and pregnancy status.

[Insert analytical description of the values presented in the table.]

Table 8.2.1: Percent of Women of Reproductive Age in the ZOI Achieving Minimum Dietary Diversity, in Total and by Selected Woman and Household Characteristics

| **Characteristic** | **Percent** | **Sig.a** | **Number of women (*n*)b** |
| --- | --- | --- | --- |
| **All women of reproductive age** |  |  |  |
| **Age** |  |  |  |
| 15-19 |  |  |  |
| 20-24 |  |  |  |
| 25-29 |  |  |  |
| 30-34 |  |  |  |
| 35-39 |  |  |  |
| 40-44 |  |  |  |
| 45-49 |  |  |  |
| **Education** |  |  |  |
| No education |  |  |  |
| Less than primary |  |  |  |
| Completed primary |  |  |  |
| Completed secondary |  |  |  |
| Higher |  |  |  |
| **Pregnancy statusc** |  |  |  |
| Pregnant |  |  |  |
| Not pregnant |  |  |  |
| **Gendered household type** |  |  |  |
| Male and female adults |  |  |  |
| Female adults only |  |  |  |
| Male adults only |  |  |  |
| Children only (no adults) |  |  |  |
| **Wealth quintile** |  |  |  |
| Highest (wealthiest) |  |  |  |
| Fourth |  |  |  |
| Middle |  |  |  |
| Second |  |  |  |
| Lowest (poorest) |  |  |  |
| **Poverty status** |  |  |  |
| Poor |  |  |  |
| Non-poor |  |  |  |
| **Shock exposure index** |  |  |  |
| Did not experience any shocks |  |  |  |
| Low |  |  |  |
| Moderate |  |  |  |
| High |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

c Validated cut-offs for adequate dietary diversity for pregnant women do not exist. These estimates reflect the established adequate dietary diversity cut-off for women of reproductive age generally.

Note: Estimates are based on de facto household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

**Table 8.2.2** shows the percentage of all women of reproductive age in the ZOI who have achieved minimum dietary diversity by household-level agricultural characteristics. Household-level agricultural characteristics include ownership of agricultural land, and ownership of livestock, and cultivation of targeted crop commodities.

[Insert analytical description of the values presented in the table.]

Table 8.2.2: Percent of Women of Reproductive Age in the ZOI Achieving Minimum Dietary Diversity, in Total and by Selected Household Agricultural Characteristics

| **Household characteristic** | **Percent** | **Sig.a** | **Number of women (*n*)b** |
| --- | --- | --- | --- |
| **Household ownership of agricultural land** | |  |  |
| None |  |  |  |
| Less than 5 hectares |  |  |  |
| 5-9 hectares |  |  |  |
| 10 or more hectares |  |  |  |
| **Household ownership of livestockc** |  |  |  |
| Noned |  |  |  |
| Cows or bulls |  |  |  |
| Goats or sheep |  |  |  |
| Chickens |  |  |  |
| **Household crop value chain commodity productionc** |  |  |  |
| None |  |  |  |
| Maize |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

c Sub-categories will not sum to 100 percent because a household may have owned multiple types of livestock or produced multiple targeted VCCs.

d None means that the household does not own any of the livestock animals included in the table—that is, cows or bulls, goats, sheep, or chickens—but may own other livestock animals including other cattle, horses, mules, donkeys, or fish.

Note: Estimates are based on de facto household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

**Table 8.2.3** shows the percentage of women 15-49 years of age who consumed each of the 10 food groups overall and by dietary diversity achievement status.

[Insert description of the values presented in the table.]

Table 8.2.3: Percent of Women of Reproductive Age in the ZOI Who Consumed Foods in Each Food Group during the 24 Hours Preceding the Survey, in Total and by Achievement of Minimum Dietary Diversity Status

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Food group** | **Total** | **Dietary diversity achievement status** | | |
| **Achieved** | **Did not achieve** | **Sig.a** |
| Grains, roots, and tubers |  |  |  |  |
| Legumes and beans |  |  |  |  |
| Nuts and seeds |  |  |  |  |
| Dairy products |  |  |  |  |
| Meat and organ meats |  |  |  |  |
| Eggs |  |  |  |  |
| Vitamin A-rich dark green leafy vegetables |  |  |  |  |
| Other vitamin A-rich vegetables and fruits |  |  |  |  |
| Other fruits |  |  |  |  |
| Other vegetables |  |  |  |  |
| **Number of women of reproductive age (*n*)** |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on de facto household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

## Infant and young child feeding

This section presents young children’s dietary intake measures, including the Feed the Future indicators of exclusive breastfeeding among children 0-5 months of age and the minimum acceptable diet among children 6-23 months of age.

### Exclusive breastfeeding

Exclusive breastfeeding provides children with significant health and nutrition benefits, including protection from gastrointestinal infections and reduced risk of mortality due to infectious disease.[[90]](#footnote-91) Exclusive breastfeeding means that the infant received breast milk (including expressed breast milk or breast milk from a wet nurse); the infant may also have received oral rehydration salts, vitamins, minerals, or medicines, but did not receive any other food or liquid. This indicator measures the percentage of children 0-5 months of age who were exclusively breastfed the day preceding the survey.

**Table 8.3.1** shows the prevalence of exclusive breastfeeding among children 0-5 months of age in the ZOI. Estimates are shown for all children, as well as by child’s sex, educational attainment of the child’s primary caregiver, wealth quintile, household poverty status, and severity of shock exposure. Note that the data are collected from the self-identified primary caregiver and not strictly from the biological mother, although it is often the same person.

[Insert description of the values presented in the table.]

Table 8.3.1: Prevalence of Exclusive Breastfeeding among Children 0-5 Months of Age in the ZOI, in Total and by Selected Child, Caregiver, and Household Characteristics

| **Characteristic** | **Percent** | **Sig.a** | **Number of children (*n*)b** |
| --- | --- | --- | --- |
| **All children 0-5 months of age** |  |  |  |
| **Child sex** |  |  |  |
| Male |  |  |  |
| Female |  |  |  |
| **Caregiver educationc** |  |  |  |
| No education |  |  |  |
| Less than primary |  |  |  |
| Completed primary |  |  |  |
| Completed secondary |  |  |  |
| Higher |  |  |  |
| **Wealth quintile** |  |  |  |
| Highest (wealthiest) |  |  |  |
| Fourth |  |  |  |
| Middle |  |  |  |
| Second |  |  |  |
| Lowest (poorest) |  |  |  |
| **Poverty status** |  |  |  |
| Poor |  |  |  |
| Non-poor |  |  |  |
| **Shock exposure index** |  |  |  |
| Did not experience any shocks |  |  |  |
| Low |  |  |  |
| Moderate |  |  |  |
| High |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

c The ZOI Survey identifies the primary caregiver of each age-eligible child. This person is likely, but not necessarily, the child’s biological mother.

Note: Estimates are based on de facto household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### Minimum acceptable diet

Minimum acceptable diet (MAD) is one of the eight core indicators for assessing infant and young child feeding practices among children 6-23 months of age. The MAD indicator captures multiple dimensions of feeding, is calculated separately for breastfed and non-breastfed children, and includes information on two components—minimum dietary diversity (MDD) and minimum meal frequency.

The indicator is calculated by combining the MDD and minimum meal frequency information for breastfed and non-breastfed children 6-23 months of age. Children who meet both the MDD and the minimum meal frequency criteria during the day preceding the survey are considered to meet the MAD criteria. Breastfed children 6-23 months of age must have consumed foods from at least 4 of 7 food groups[[91]](#footnote-92) (MDD) and eaten solid, semi-solid, or soft foods at least 2 times if they were 6-8 months of age or at least 3 times if they were 9-23 months of age (minimum meal frequency). Non-breastfed children 6-23 months of age must have consumed foods from at least 4 of 6 food groups[[92]](#footnote-93) (MDD), received at least 2 milk feedings, and eaten solid, semi-solid, or soft foods at least 4 times (minimum meal frequency). As recommended by WHO, the ZOI Survey disaggregates the indicator for the following age groups: 6-11 months, 12-17 months, and 18-23 months.[[93]](#footnote-94)

**Table 8.3.2** presents the MAD indicator for children 6-23 months in the ZOI. Estimates are shown for all children, as well as by child sex and age categories, primary caregiver’s educational attainment, gendered household type, wealth quintile, poverty status, and severity of shock exposure.

[Insert description of the values presented in the table.]

Table 8.3.2: Percent of Children 6-23 Months of Age in the ZOI Who Received a Minimum Acceptable Diet, in Total and by Selected Child, Caregiver, and Household Characteristics

| **Characteristic** | **Percent** | **Sig.a** | **Number of children (*n*)b** |
| --- | --- | --- | --- |
| **All children 6-23 months of age** |  |  |  |
| **Child sex** |  |  |  |
| Male |  |  |  |
| Female |  |  |  |
| **Child age** |  |  |  |
| 6-11 months |  |  |  |
| 12-17 months |  |  |  |
| 18-23 months |  |  |  |
| **Child breastfeeding status** |  |  |  |
| Breastfed |  |  |  |
| Not breastfed |  |  |  |
| **Caregiver educationb** |  |  |  |
| No education |  |  |  |
| Less than primary |  |  |  |
| Completed primary |  |  |  |
| Completed secondary |  |  |  |
| Higher |  |  |  |
| **Gendered household type** |  |  |  |
| Male and female adults |  |  |  |
| Female adults only |  |  |  |
| Male adults only |  |  |  |
| Children only (no adults) |  |  |  |
| **Wealth quintile** |  |  |  |
| Highest (wealthiest) |  |  |  |
| Fourth |  |  |  |
| Middle |  |  |  |
| Second |  |  |  |
| Lowest (poorest) |  |  |  |
| **Poverty status** |  |  |  |
| Poor |  |  |  |
| Non-poor |  |  |  |
| **Shock exposure index** |  |  |  |
| Did not experience any shocks |  |  |  |
| Low |  |  |  |
| Moderate |  |  |  |
| High |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

c The ZOI Survey identifies the primary caregiver of each age-eligible child. This person is likely, but not necessarily, the child’s biological mother.

Note: Estimates are based on de facto household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

**Table 8.3.3** presents the percentage of children achieving the components of a MAD (i.e., minimum meal frequency and minimum dietary diversity) and consuming each of the food groups included in the minimum dietary diversity indicator. Estimates are shown for all children, as well as by age categories, and are presented separately for breastfed and non-breastfed children.

[Insert more explanation regarding the different requirements for non-breastfed children (regarding milk feeds and four of the six food groups) and description of the values in the table.]

Table 8.3.3: Percent of Children 6-23 Months of Age in the ZOI Achieving Minimum Feeding Frequency, Dietary Diversity, and Consuming Foods from Each of the Food Groups in the Minimum Acceptable Diet Indicator, in Total and by Breastfeeding Status and Age

| **Breastfeeding status and food group consumed** | | **All children** |  | **Child age (months)** | | |
| --- | --- | --- | --- | --- | --- | --- |
| **6-11** | **12-17** | **18-23** | **Sig.a** |
|  | **All children 6-23 months of age** | | | | | |
| Achieving minimum meal frequency | |  |  |  |  |  |
| Achieving minimum dietary diversity | |  |  |  |  |  |
|  | **Consuming:** | | | | | |
| Grains, roots, and tubers | |  |  |  |  |  |
| Legumes and nuts | |  |  |  |  |  |
| Dairy products | |  |  |  |  |  |
| Flesh foodsb | |  |  |  |  |  |
| Eggs | |  |  |  |  |  |
| Vitamin A-rich fruits and vegetables | |  |  |  |  |  |
| Other fruits and vegetables | |  |  |  |  |  |
| **Number of children (*n*)** | |  |  |  |  |  |
|  | **Breastfed children** | | | | | |
| Achieving minimum meal frequency | |  |  |  |  |  |
| Achieving minimum dietary diversity | |  |  |  |  |  |
|  | **Consuming:** | | | | | |
| Grains, roots, and tubers | |  |  |  |  |  |
| Legumes and nuts | |  |  |  |  |  |
| Dairy products | |  |  |  |  |  |
| Flesh foodsb | |  |  |  |  |  |
| Eggs | |  |  |  |  |  |
| Vitamin A-rich fruits and vegetables | |  |  |  |  |  |
| Other fruits and vegetables | |  |  |  |  |  |
| **Number of breastfed children (*n*)** | |  |  |  |  |  |
|  | **Non-breastfed children** | | | | | |
| Achieving minimum meal frequency | |  |  |  |  |  |
| Achieving minimum milk feeding frequency | |  |  |  |  |  |
| Achieving minimum dietary diversity | |  |  |  |  |  |
|  | **Consuming:** | | | | | |
| Grains, roots, and tubers | |  |  |  |  |  |
| Legumes and nuts | |  |  |  |  |  |
| Dairy products | |  |  |  |  |  |
| Flesh foodsa | |  |  |  |  |  |
| Eggs | |  |  |  |  |  |
| Vitamin A-rich fruits and vegetables | |  |  |  |  |  |
| Other fruits and vegetables | |  |  |  |  |  |
| **Number of non-breastfed children (*n*)** | |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b This category may include organ meats and insects.

Note: Estimates are based on de facto household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

# Nutritional status of women and children

This chapter presents findings for the Feed the Future ZOI indicators related to the nutrition of women and children: the percentage of women of reproductive age who are underweight, and the percentages of children under 5 years of age who are stunted or wasted, and who are of healthy weight.

## Body mass index of women age 15-49 years

Body mass index (BMI) is a calculation used to understand nutritional status, particularly of adults. BMI is the weight of the individual in kilograms divided by his or her height in meters squared (weight [kg]/ height [m]2). BMI is an inexpensive and easy-to-perform method of screening for weight category: underweight, normal or healthy weight, overweight, and obese. BMI is interpreted directly using categories with specific cut-off points, which is useful when assessing the nutritional status of adults. A high BMI can be an indicator of high body fat, but BMI is not a diagnostic for body fat or the health of an individual. To determine whether a high BMI is a health risk, a healthcare provider would need to perform further assessments.

**Table 9.1** presents women’s mean BMI and the percentage of women who fall into each BMI category: underweight (BMI<18.5), normal weight (18.5≤BMI<25.0), overweight (25.0≤BMI<30.0), and obese (BMI≥30.0). Estimates are shown for all non-pregnant women of reproductive age (15-49 years of age), as well as disaggregated by individual- and household-level characteristics. Individual characteristics include age and educational attainment. Household characteristics include gendered household type, household educational attainment, wealth quintile, poverty status, and severity of shock exposure.

[Insert description of the values presented in the table.]

Table 9.1: Mean BMI and Prevalence of Underweight, Normal Weight, Overweight, and Obese Women of Reproductive Age in the ZOI, in Total and by Selected Woman and Household Characteristics

| **Characteristic** | **Mean BMI** | **BMI category** | | | | | **Number of women (*n*)b** |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Normal weight (%)** | **Over-weight (%)** | **Obese (%)** |
| **Underweight** | |
| **(%)** | **Sig.a** |
| **All non-pregnant women of reproductive age** |  |  |  |  |  |  |  |
| **Age** |  |  |  |  |  |  |  |
| 15-19 |  |  |  |  |  |  |  |
| 20-24 |  |  |  |  |  |  |  |
| 25-29 |  |  |  |  |  |  |  |
| 30-34 |  |  |  |  |  |  |  |
| 35-39 |  |  |  |  |  |  |  |
| 40-44 |  |  |  |  |  |  |  |
| 45-49 |  |  |  |  |  |  |  |
| **Education** |  |  |  |  |  |  |  |
| No education |  |  |  |  |  |  |  |
| Less than primary |  |  |  |  |  |  |  |
| Completed primary |  |  |  |  |  |  |  |
| Completed secondary |  |  |  |  |  |  |  |
| Higher |  |  |  |  |  |  |  |
| **Gendered household type** |  |  |  |  |  |  |  |
| Male and female adults |  |  |  |  |  |  |  |
| Female adults only |  |  |  |  |  |  |  |
| Male adults only |  |  |  |  |  |  |  |
| Children only (no adults) |  |  |  |  |  |  |  |
| **Wealth quintile** |  |  |  |  |  |  |  |
| Highest (wealthiest) |  |  |  |  |  |  |  |
| Fourth |  |  |  |  |  |  |  |
| Middle |  |  |  |  |  |  |  |
| Second |  |  |  |  |  |  |  |
| Lowest (poorest) |  |  |  |  |  |  |  |
| **Poverty status** |  |  |  |  |  |  |  |
| Poor |  |  |  |  |  |  |  |
| Non-poor |  |  |  |  |  |  |  |
| **Shock exposure index** |  |  |  |  |  |  |  |
| Did not experience any shocks |  |  |  |  |  |  |  |
| Low |  |  |  |  |  |  |  |
| Moderate |  |  |  |  |  |  |  |
| High |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

Note: Estimates are based on de facto household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

## Stunting, wasting, and healthy weight among children under 5 years of age

This section reports on three anthropometric measurements of nutrition among children under 5 years of age in the ZOI: stunting (low height-for-age), wasting (low weight-for-height), and healthy weight (appropriate weight-for-height) children.

### Stunting (low height-for-age)

Stunting, or linear growth retardation, is a consequence of an inadequate growth environment. Reducing the prevalence of stunting among children, particularly children 0–23 months of age, is important because linear growth retardation is causally linked to difficult birth and poor birth outcomes, and is associated with—but may not cause—delayed child development, reduced earnings in adulthood, and chronic diseases.[[94]](#footnote-95) Stunting is a height-for-age measurement that reflects chronic undernutrition. This indicator measures the percentage of children 0-59 months of age with a height-for-age z-score more than two standard deviations (SDs) below the median of the 2006 WHO Child Growth Standard.[[95]](#footnote-96)

**Table 9.2.1** shows the prevalence of severe stunting (<-3 SD) and stunting (<-2 SD) and mean height-for-age z-scores for children under 5 years of age in the ZOI. Estimates are presented for all children and by child, caregiver, and household characteristics. Children’s characteristics include sex and age. Caregivers’ characteristics include educational attainment. Household characteristics include gendered household type, wealth quintile, poverty status, and severity of shock exposure.

[Insert description of the values presented in the table.]

Table 9.2.1: Prevalence of Stunting and Mean Height-for-Age Z-scores among Children under 5 Years of Age in the ZOI, in Total and by Selected Child, Caregiver, and Household Characteristics

| **Characteristic** | **Severely stunted  (<−3 SD) (%)** | **Stunted (<−2 SD)** | | **Mean z-score** | **Number of children (*n*)b** |
| --- | --- | --- | --- | --- | --- |
| **(%)** | **Sig.a** |
| **All children under 5 years of age** |  |  |  |  |  |
| **Child sex** |  |  |  |  |  |
| Male |  |  |  |  |  |
| Female |  |  |  |  |  |
| **Child age** |  |  |  |  |  |
| 0-11 months |  |  |  |  |  |
| 12-23 months |  |  |  |  |  |
| 24-35 months |  |  |  |  |  |
| 36-47 months |  |  |  |  |  |
| 48-59 months |  |  |  |  |  |
| **Caregiver educationc** |  |  |  |  |  |
| No education |  |  |  |  |  |
| Less than primary |  |  |  |  |  |
| Completed primary |  |  |  |  |  |
| Completed secondary |  |  |  |  |  |
| Higher |  |  |  |  |  |
| **Gendered household type** |  |  |  |  |  |
| Male and female adults |  |  |  |  |  |
| Female adults only |  |  |  |  |  |
| Male adults only |  |  |  |  |  |
| Children only (no adults) |  |  |  |  |  |
| **Wealth quintile** |  |  |  |  |  |
| Highest (wealthiest) |  |  |  |  |  |
| Fourth |  |  |  |  |  |
| Middle |  |  |  |  |  |
| Second |  |  |  |  |  |
| Lowest (poorest) |  |  |  |  |  |
| **Poverty status** |  |  |  |  |  |
| Poor |  |  |  |  |  |
| Non-poor |  |  |  |  |  |
| **Shock exposure index** |  |  |  |  |  |
| Did not experience any shocks |  |  |  |  |  |
| Low |  |  |  |  |  |
| Moderate |  |  |  |  |  |
| High |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

c The ZOI Survey identifies the primary caregiver of each age-eligible child. This person is likely, but not necessarily, the child’s biological mother.

Note: Estimates are based on de facto household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

### Wasting (low weight-for-height) and healthy weight

Wasting is an indicator of acute malnutrition. Children who are wasted are too thin for their height and have a much greater risk of dying than children who are not wasted. The wasting ZOI indicator measures the percentage of children 0-59 months of age who are acutely malnourished, as defined by a weight-for-height z-score[[96]](#footnote-97) more than 2 SDs below the median of the 2006 WHO Child Growth Standard, in the ZOI. The z-score indicates how many standard deviations the child is from the median weight-for-height for a child of the same sex and age using the 2006 WHO Child Growth Standards.[[97]](#footnote-98)

A complementary indicator to the wasting indicator is the healthy weight indicator, which measures the percentage of children 0-59 months who are neither wasted nor overweight, as defined by a weight-for-height z-score between 2 SDs below the median and 2 SDs above the median of the 2006 WHO Child Growth Standard. Prevalence of children with a healthy weight is a measure of a well-nourished population, which is essential to enhance human potential, health, and productivity.

**Table 9.2.2** shows the prevalence of severe wasting (<-3 SD), wasting (<-2 SD), healthy weight (≥-2 SD and ≤+2 SD), overweight (>+2 SD), and obesity (>+3 SD), and mean weight-for-height z-scores for children under 5 years of age in the ZOI. Estimates are presented for all children and by child, caregiver, and household characteristics. Children’s characteristics include sex and age. Caregivers’ characteristics include educational attainment. Household characteristics include gendered household type, wealth quintile, poverty status, and severity of shock exposure.

[Insert description of the values presented in the table.]

Table 9.2.2: Prevalence of Wasting and Healthy Weight and Mean Weight-for-Height Z-scores among Children under 5 Years of Age in the ZOI, in Total and by Selected Child, Caregiver, and Household Characteristics

| **Characteristic** | **Severely wasted  (<−3 SD) (%)** | **Wasted (<−2 SD)** | | **Healthy weight  (-2 to +2 SD)** | | **Overweight (> +2SD) (%)** | **Obese  (> +3SD) (%)** | **Mean  z-score** | **Number of children (*n*)b** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **(%)** | **Sig.a** | **(%)** | **Sig.a** |
| **All children under 5 years of age** |  |  |  |  |  |  |  |  |  |
| **Child sex** |  |  |  |  |  |  |  |  |  |
| Male |  |  |  |  |  |  |  |  |  |
| Female |  |  |  |  |  |  |  |  |  |
| **Child age** |  |  |  |  |  |  |  |  |  |
| 0-11 months |  |  |  |  |  |  |  |  |  |
| 12-23 months |  |  |  |  |  |  |  |  |  |
| 24-35 months |  |  |  |  |  |  |  |  |  |
| 36-47 months |  |  |  |  |  |  |  |  |  |
| 48-59 months |  |  |  |  |  |  |  |  |  |
| **Caregiver educationc** |  |  |  |  |  |  |  |  |  |
| No education |  |  |  |  |  |  |  |  |  |
| Less than primary |  |  |  |  |  |  |  |  |  |
| Completed primary |  |  |  |  |  |  |  |  |  |
| Completed secondary |  |  |  |  |  |  |  |  |  |
| Higher |  |  |  |  |  |  |  |  |  |
| **Gendered household type** |  |  |  |  |  |  |  |  |  |
| Male and female adults |  |  |  |  |  |  |  |  |  |
| Female adults only |  |  |  |  |  |  |  |  |  |
| Male adults only |  |  |  |  |  |  |  |  |  |
| Children only (no adults) |  |  |  |  |  |  |  |  |  |
| **Wealth quintile** |  |  |  |  |  |  |  |  |  |
| Highest (wealthiest) |  |  |  |  |  |  |  |  |  |
| Fourth |  |  |  |  |  |  |  |  |  |
| Middle |  |  |  |  |  |  |  |  |  |
| Second |  |  |  |  |  |  |  |  |  |
| Lowest (poorest) |  |  |  |  |  |  |  |  |  |
| **Poverty status** |  |  |  |  |  |  |  |  |  |
| Poor |  |  |  |  |  |  |  |  |  |
| Non-poor |  |  |  |  |  |  |  |  |  |
| **Shock exposure index** |  |  |  |  |  |  |  |  |  |
| Did not experience any shocks |  |  |  |  |  |  |  |  |  |
| Low |  |  |  |  |  |  |  |  |  |
| Moderate |  |  |  |  |  |  |  |  |  |
| High |  |  |  |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

c The ZOI Survey identifies the primary caregiver of each age-eligible child. This person is likely, but not necessarily, the child’s biological mother.

Note: Estimates are based on de facto household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

# [Country-specific module]

[This chapter is reserved for any country-specific modules, as applicable.]

# Summary and conclusions

[This chapter summarizes the key findings and provides some conclusions for the ZOI Survey in [Country]. It will typically reiterate what is stated in the Executive Summary, but should not be identical.]

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# Appendix 1. Supplementary data

## A1.1. Feed the Future ZOI Survey indicator estimates and module response rates

Table A1.1: Feed the Future ZOI Survey Indicator Estimates, by Key Disaggregates, [Country] [Year]

| **Feed the Future indicator** | **Estimate** | **SD** | **95% CI** | **Sig.a** | | **DEFF** | | | **Non-response rateb** | | | **Weighted number** | | **Unweighted numberc** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Prevalence of poverty: Percent of people living on less than $1.90 per day (201I PPP)** | | | | | | | | | | | | | | |
| **All households** |  |  |  |  | |  | | |  | | |  | |  |
| **Gendered household type** |  |  |  |  | |  | | |  | | |  | |  |
| Male and female adults |  |  |  |  | |  | | |  | | |  | |  |
| Female adults only |  |  |  |  | |  | | |  | | |  | |  |
| Male adults only |  |  |  |  | |  | | |  | | |  | |  |
| Children only |  |  |  |  | |  | | |  | | |  | |  |
| **Depth of poverty of the poor: Mean percent shortfall of the poor relative to $1.90 per day (2011 PPP) poverty line** | | | | | | | | | | | | | | |
| **All households** |  |  |  |  | |  | | |  | | |  | |  |
| **Gendered household type** |  |  |  |  | |  | | |  | | |  | |  |
| Male and female adults |  |  |  |  | |  | | |  | | |  | |  |
| Female adults only |  |  |  |  | |  | | |  | | |  | |  |
| Male adults only |  |  |  |  | |  | | |  | | |  | |  |
| Children only |  |  |  |  | |  | | |  | | |  | |  |
| **Percent of people who are near-poor, living on 100% to less than 125% of the $1.90 per day (2011 PPP) poverty line** | | | | | | | | | | | | | | |
| **All households** |  |  |  |  | |  | | |  | | |  | |  |
| **Gendered household type** |  |  |  |  | |  | | |  | | |  | |  |
| Male and female adults |  |  |  |  | |  | | |  | | |  | |  |
| Female adults only |  |  |  |  | |  | | |  | | |  | |  |
| Male adults only |  |  |  |  | |  | | |  | | |  | |  |
| Children only |  |  |  |  | |  | | |  | | |  | |  |
| **Percent of households below the comparative threshold for the poorest quintile of the asset-based comparative wealth index** | | | | | | | | | | | | | | |
| **All households** |  |  |  |  | |  | | |  | | |  | |  |
| **Gendered household type** |  |  |  |  | |  | | |  | | |  | |  |
| Male and female adults |  |  |  |  | |  | | |  | | |  | |  |
| Female adults only |  |  |  |  | |  | | |  | | |  | |  |
| Male adults only |  |  |  |  | |  | | |  | | |  | |  |
| Children only |  |  |  |  | |  | | |  | | |  | |  |
| **Ability to recover from shocks and stresses index** | | | | | | | | | | | | |  | |
| **All households** |  |  |  |  | |  | | |  | | |  | |  |
| **Gendered household type** |  |  |  |  | |  | | |  | | |  | |  |
| Male and female adults |  |  |  |  | |  | | |  | | |  | |  |
| Female adults only |  |  |  |  | |  | | |  | | |  | |  |
| Male adults only |  |  |  |  | |  | | |  | | |  | |  |
| Children only |  |  |  |  | |  | | |  | | |  | |  |
| **Index of social capital at the household level** | | | | |  | | |  | | |  | |  | |
| **Overall index** |  |  |  |  | |  | | |  | | |  | |  |
| **All households** |  |  |  |  | |  | | |  | | |  | |  |
| **Gendered household type** |  |  |  |  | |  | | |  | | |  | |  |
| Male and female adults |  |  |  |  | |  | | |  | | |  | |  |
| Female adults only |  |  |  |  | |  | | |  | | |  | |  |
| Male adults only |  |  |  |  | |  | | |  | | |  | |  |
| Children only |  |  |  |  | |  | | |  | | |  | |  |
| **Bonding sub-index** |  |  |  |  | |  | | |  | | |  | |  |
| **All households** |  |  |  |  | |  | | |  | | |  | |  |
| **Gendered household type** |  |  |  |  | |  | | |  | | |  | |  |
| Male and female adults |  |  |  |  | |  | | |  | | |  | |  |
| Female adults only |  |  |  |  | |  | | |  | | |  | |  |
| Male adults only |  |  |  |  | |  | | |  | | |  | |  |
| Children only |  |  |  |  | |  | | |  | | |  | |  |
| **Bridging sub-index** |  |  |  |  | |  | | |  | | |  | |  |
| **All households** |  |  |  |  | |  | | |  | | |  | |  |
| **Gendered household type** |  |  |  |  | |  | | |  | | |  | |  |
| Male and female adults |  |  |  |  | |  | | |  | | |  | |  |
| Female adults only |  |  |  |  | |  | | |  | | |  | |  |
| Male adults only |  |  |  |  | |  | | |  | | |  | |  |
| Children only |  |  |  |  | |  | | |  | | |  | |  |
| **Percent of households that believe local government will respond effectively to future shocks and stresses** | | | | | | | | | | | | | | |
| **All households** |  |  |  |  | |  | | |  | | |  | |  |
| **Gendered household type** |  |  |  |  | |  | | |  | | |  | |  |
| Male and female adults |  |  |  |  | |  | | |  | | |  | |  |
| Female adults only |  |  |  |  | |  | | |  | | |  | |  |
| Male adults only |  |  |  |  | |  | | |  | | |  | |  |
| Children only |  |  |  |  | |  | | |  | | |  | |  |
| **Percent of households participating in group-based savings, micro-finance, or lending programs** | | | | | | | | | | | | | | |
| **All households** |  |  |  |  | |  | | |  | | |  | |  |
| **Gendered household type** |  |  |  |  | |  | | |  | | |  | |  |
| Male and female adults |  |  |  |  | |  | | |  | | |  | |  |
| Female adults only |  |  |  |  | |  | | |  | | |  | |  |
| Male adults only |  |  |  |  | |  | | |  | | |  | |  |
| Children only |  |  |  |  | |  | | |  | | |  | |  |
| **Abbreviated Women’s Empowerment in Agriculture Index (A-WEAI)** | | | | | | | | | |  | | |  | |
| **All women** |  |  |  |  | |  | | |  | | |  | |  |
| **Women’s age** |  |  |  |  | |  | | |  | | |  | |  |
| 18-29 years |  |  |  |  | |  | | |  | | |  | |  |
| 30 years and older |  |  |  |  | |  | | |  | | |  | |  |
| **Percent of women achieving adequacy in the six indicators of the A-WEAI** | | | | | | |  | | |  | | |  | |
| **All women** |  |  |  |  | |  | | |  | | |  | |  |
| **Women’s age** |  |  |  |  | |  | | |  | | |  | |  |
| 18-29 years |  |  |  |  | |  | | |  | | |  | |  |
| 30 years and older |  |  |  |  | |  | | |  | | |  | |  |
| **Percent of producers who have applied targeted improved management practices or technologies in targeted areas** | | | | | | | | | | | | | | |
| **All producers** |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ sex** |  |  |  |  | |  | | |  | | |  | |  |
| Male |  |  |  |  | |  | | |  | | |  | |  |
| Female |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ age** |  |  |  |  | |  | | |  | | |  | |  |
| 15-29 years |  |  |  |  | |  | | |  | | |  | |  |
| 30 years and older |  |  |  |  | |  | | |  | | |  | |  |
| **Commodity** |  |  |  |  | |  | | |  | | |  | |  |
| Maize |  |  |  |  | |  | | |  | | |  | |  |
| Fishponds |  |  |  |  | |  | | |  | | |  | |  |
| Dairy cows |  |  |  |  | |  | | |  | | |  | |  |
| **Management practice or technology type** |  |  |  |  | |  | | |  | | |  | |  |
| Agriculture water management non-irrigation based |  |  |  |  | |  | | |  | | |  | |  |
| Aquaculture management |  |  |  |  | |  | | |  | | |  | |  |
| Climate adaptation, climate risk management |  |  |  |  | |  | | |  | | |  | |  |
| Crop genetics |  |  |  |  | |  | | |  | | |  | |  |
| Cultural practices |  |  |  |  | |  | | |  | | |  | |  |
| Irrigation |  |  |  |  | |  | | |  | | |  | |  |
| Livestock management |  |  |  |  | |  | | |  | | |  | |  |
| Marketing and distribution |  |  |  |  | |  | | |  | | |  | |  |
| Natural resource or ecosystem management |  |  |  |  | |  | | |  | | |  | |  |
| Pest and disease management |  |  |  |  | |  | | |  | | |  | |  |
| Post-harvest handling and storage |  |  |  |  | |  | | |  | | |  | |  |
| Soil-related fertility and conservation |  |  |  |  | |  | | |  | | |  | |  |
| Value-added processing |  |  |  |  | |  | | |  | | |  | |  |
| Wild-caught fisheries management |  |  |  |  | |  | | |  | | |  | |  |
| Other |  |  |  |  | |  | | |  | | |  | |  |
| **Yield of targeted agricultural commodities within target areas** | | | | | | | | | |  | | |  | |
| **Maize** |  |  |  |  | |  | | |  | | |  | |  |
| **Farm size** |  |  |  |  | |  | | |  | | |  | |  |
| **Smallholder** |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ sex** |  |  |  |  | |  | | |  | | |  | |  |
| Male |  |  |  |  | |  | | |  | | |  | |  |
| Female |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ age** |  |  |  |  | |  | | |  | | |  | |  |
| 15-29 years |  |  |  |  | |  | | |  | | |  | |  |
| 30 years and older |  |  |  |  | |  | | |  | | |  | |  |
| **Non-smallholder** |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ sex** |  |  |  |  | |  | | |  | | |  | |  |
| Male |  |  |  |  | |  | | |  | | |  | |  |
| Female |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ age** |  |  |  |  | |  | | |  | | |  | |  |
| 15-29 years |  |  |  |  | |  | | |  | | |  | |  |
| 30 years and older |  |  |  |  | |  | | |  | | |  | |  |
| **Fishponds** |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ sex** |  |  |  |  | |  | | |  | | |  | |  |
| Male |  |  |  |  | |  | | |  | | |  | |  |
| Female |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ age** |  |  |  |  | |  | | |  | | |  | |  |
| 15-29 years |  |  |  |  | |  | | |  | | |  | |  |
| 30 years and older |  |  |  |  | |  | | |  | | |  | |  |
| **Dairy cows** |  |  |  |  | |  | | |  | | |  | |  |
| **Production system** |  |  |  |  | |  | | |  | | |  | |  |
| **Agro-pastoral/extensive grassland** |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ sex** |  |  |  |  | |  | | |  | | |  | |  |
| Male |  |  |  |  | |  | | |  | | |  | |  |
| Female |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ age** |  |  |  |  | |  | | |  | | |  | |  |
| 15-29 years |  |  |  |  | |  | | |  | | |  | |  |
| 30 years and older |  |  |  |  | |  | | |  | | |  | |  |
| **Smallholder mixed livestock-crop** |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ sex** |  |  |  |  | |  | | |  | | |  | |  |
| Male |  |  |  |  | |  | | |  | | |  | |  |
| Female |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ age** |  |  |  |  | |  | | |  | | |  | |  |
| 15-29 years |  |  |  |  | |  | | |  | | |  | |  |
| 30 years and older |  |  |  |  | |  | | |  | | |  | |  |
| **Urban/peri-urban** |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ sex** |  |  |  |  | |  | | |  | | |  | |  |
| Male |  |  |  |  | |  | | |  | | |  | |  |
| Female |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ age** |  |  |  |  | |  | | |  | | |  | |  |
| 15-29 years |  |  |  |  | |  | | |  | | |  | |  |
| 30 years and older |  |  |  |  | |  | | |  | | |  | |  |
| **Intensive industrial** |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ sex** |  |  |  |  | |  | | |  | | |  | |  |
| Male |  |  |  |  | |  | | |  | | |  | |  |
| Female |  |  |  |  | |  | | |  | | |  | |  |
| **Farmers’ age** |  |  |  |  | |  | | |  | | |  | |  |
| 15-29 years |  |  |  |  | |  | | |  | | |  | |  |
| 30 years and older |  |  |  |  | |  | | |  | | |  | |  |
| **Prevalence of moderate and severe food insecurity in the population, based on the Food Insecurity Experience Scale** | | | | | | | | | | | | | | |
| **All households** |  |  |  |  | |  | | |  | | |  | |  |
| **Gendered household type** |  |  |  |  | |  | | |  | | |  | |  |
| Male and female adults |  |  |  |  | |  | | |  | | |  | |  |
| Female adults only |  |  |  |  | |  | | |  | | |  | |  |
| Male adults only |  |  |  |  | |  | | |  | | |  | |  |
| Children only |  |  |  |  | |  | | |  | | |  | |  |
| **Severity** |  |  |  |  | |  | | |  | | |  | |  |
| Moderate |  |  |  |  | |  | | |  | | |  | |  |
| Severe |  |  |  |  | |  | | |  | | |  | |  |
| **Prevalence of exclusive breastfeeding among children under 6 months of aged** | | | | | | | | | | | | | | |
| **All children** |  |  |  |  | |  | | |  | | |  | |  |
| **Children’s sex** |  |  |  |  | |  | | |  | | |  | |  |
| Male |  |  |  |  | |  | | |  | | |  | |  |
| Female |  |  |  |  | |  | | |  | | |  | |  |
| **Percent of children 6-23 months of age receiving a minimum acceptable dietd** | | | | | | | | | | | | | | |
| **All children** |  |  |  |  | |  | | |  | | |  | |  |
| **Children’s sex** |  |  |  |  | |  | | |  | | |  | |  |
| Male |  |  |  |  | |  | | |  | | |  | |  |
| Female |  |  |  |  | |  | | |  | | |  | |  |
| **Percent of women of reproductive age consuming a diet of minimum diversityd** | | | | | | | | | | | | | | |
| **All women** |  |  |  |  | |  | | |  | | |  | |  |
| **Women’s age** |  |  |  |  | |  | | |  | | |  | |  |
| 15-18 years |  |  |  |  | |  | | |  | | |  | |  |
| 19-49 years |  |  |  |  | |  | | |  | | |  | |  |
| **Prevalence of stunted children under 5 years of aged** | | | | | | | | | | | | | | |
| **All children** |  |  |  |  | |  | | |  | | |  | |  |
| **Children’s sex** |  |  |  |  | |  | | |  | | |  | |  |
| Male |  |  |  |  | |  | | |  | | |  | |  |
| Female |  |  |  |  | |  | | |  | | |  | |  |
| **Children’s age** |  |  |  |  | |  | | |  | | |  | |  |
| 0-23 months |  |  |  |  | |  | | |  | | |  | |  |
| 24-59 months |  |  |  |  | |  | | |  | | |  | |  |
| **Prevalence of wasted children under 5 years of aged** | | | | | | | | | | | | | | |
| **All children** |  |  |  |  | |  | | |  | | |  | |  |
| **Children’s sex** |  |  |  |  | |  | | |  | | |  | |  |
| Male |  |  |  |  | |  | | |  | | |  | |  |
| Female |  |  |  |  | |  | | |  | | |  | |  |
| **Children’s age** |  |  |  |  | |  | | |  | | |  | |  |
| 0-23 months |  |  |  |  | |  | | |  | | |  | |  |
| 24-59 months |  |  |  |  | |  | | |  | | |  | |  |
| **Prevalence of healthy weight children under 5 years of aged** | | | | | | | | | | | | | | |
| **All children** |  |  |  |  | |  | | |  | | |  | |  |
| **Children’s sex** |  |  |  |  | |  | | |  | | |  | |  |
| Male |  |  |  |  | |  | | |  | | |  | |  |
| Female |  |  |  |  | |  | | |  | | |  | |  |
| **Children’s age** |  |  |  |  | |  | | |  | | |  | |  |
| 0-23 months |  |  |  |  | |  | | |  | | |  | |  |
| 24-59 months |  |  |  |  | |  | | |  | | |  | |  |
| **Prevalence of underweight women of reproductive aged** | | | | | | | | | | | | | | |
| **All non-pregnant women 15-49 years** |  |  |  |  | |  | | |  | | |  | |  |
| **Women’s age** |  |  |  |  | |  | | |  | | |  | |  |
| 15-18 years |  |  |  |  | |  | | |  | | |  | |  |
| 19-49 years |  |  |  |  | |  | | |  | | |  | |  |
| **Percent of households with access to basic sanitation service** | | | | | | | | | | | | | | |
| **All households** |  |  |  |  | |  | | |  | | |  | |  |
| **Gendered household type** |  |  |  |  | |  | | |  | | |  | |  |
| Male and female adults |  |  |  |  | |  | | |  | | |  | |  |
| Female adults only |  |  |  |  | |  | | |  | | |  | |  |
| Male adults only |  |  |  |  | |  | | |  | | |  | |  |
| Children only |  |  |  |  | |  | | |  | | |  | |  |
| **Residence** |  |  |  |  | |  | | |  | | |  | |  |
| Urban |  |  |  |  | |  | | |  | | |  | |  |
| Rural |  |  |  |  | |  | | |  | | |  | |  |
| **Percent of households with soap and water at handwashing station family members use** | | | | | | | | | | | | | | |
| **All households** |  |  |  |  | |  | | |  | | |  | |  |
| **Gendered household type** |  |  |  |  | |  | | |  | | |  | |  |
| Male and female adults |  |  |  |  | |  | | |  | | |  | |  |
| Female adults only |  |  |  |  | |  | | |  | | |  | |  |
| Male adults only |  |  |  |  | |  | | |  | | |  | |  |
| Children only |  |  |  |  | |  | | |  | | |  | |  |
| **Residence** |  |  |  |  | |  | | |  | | |  | |  |
| Urban |  |  |  |  | |  | | |  | | |  | |  |
| Rural |  |  |  |  | |  | | |  | | |  | |  |

^ Results not statistically reliable, n<30

SD=standard deviation, CI=confidence interval, DEFF=design effect, PPP=purchasing power parity, n/a=not available

a Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

b Non-response rate is defined as: (Number of eligible individuals or households – Number of individuals or households included in the reported indicator)/Number of eligible individuals or households.

c Number of units (individuals, households) in the sample.

d Estimates are based on de facto household members.

Note: Estimates are based on de jure household members, except where noted.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

Table A1.2: Response Rates by Survey Module, Feed the Future [Country] ZOI Survey [Survey year(s)]

| **Response ratea** | **Value** |
| --- | --- |
| **Module 1: Household roster** | |
| Number of households selected |  |
| Number of households occupied |  |
| Number of households interviewed |  |
| Household response rate (%) |  |
| **Module 2: Dwelling characteristics** | |
| Number of eligible households |  |
| Number of eligible households interviewed |  |
| Module 2 response rate (%) |  |
| **Module 3: Resilience and food security** | |
| Number of eligible households |  |
| Number of eligible households interviewed |  |
| Module 3 response rate (%) |  |
| **Module 4: Women's nutrition** | |
| Number of eligible women (15-49 years of age) |  |
| Number of eligible women interviewed |  |
| Module 4 response rate (%) |  |
| **Module 4A: Women's anthropometryb** | |
| Number of eligible women (15-49 years of age, non-pregnant) |  |
| Number of eligible women interviewed |  |
| Module 4A response rate (%) |  |
| **Module 5: Children's nutrition** | |
| Number of eligible children (0-23 months of age) |  |
| Number of caregivers of eligible children interviewed |  |
| Module 5 response rate (%)b |  |
| **Module 5A: Children's anthropometryc** | |
| Number of eligible children (0-59 months of age) |  |
| Number of caregivers of eligible children interviewed |  |
| Module 5A response rate (%) |  |
| **Module 6A: A-WEAI, women** | |
| Number of eligible women |  |
| Number of eligible women interviewed |  |
| Module 6A response rate (%) |  |
| **Module 6B: A-WEAI, men** | |
| Number of eligible men |  |
| Number of eligible men interviewed |  |
| Module 6B response rate (%) |  |
| **Module 7.1: Maize farmers** | |
| Number of eligible farmers |  |
| Number of eligible farmers interviewed |  |
| Module 7.1 response rate (%) |  |
| **Module 7.50: Dairy farmers** | |
| Number of eligible farmers |  |
| Number of eligible farmers interviewed |  |
| Module 7.50 response rate (%) |  |
| **Module 7.80: Fishpond farmers** | |
| Number of eligible farmers |  |
| Number of eligible farmers interviewed |  |
| Module 7.80 response rate (%) |  |
| **Module 7.91: Plot area** | |
| Number of eligible farmers |  |
| Number of eligible farmers interviewed |  |
| Module 7.91 response rate (%) |  |
| **Module 7.92: Crop yield** | |
| Number of eligible farmers |  |
| Number of eligible farmers interviewed |  |
| Module 7.92 response rate (%) |  |
| **Module 7.96: Pond area** | |
| Number of eligible farmers |  |
| Number of eligible farmers interviewed |  |
| Module 7.96 response rate (%) |  |
| **Module 8: Consumption expenditures** | |
| Number of eligible households |  |
| Number of eligible households interviewed |  |
| Module 8 response rate (%) |  |

a Module response rates are calculated based on the module outcome codes, except where otherwise noted. The response rates are defined as the number of eligible individuals or households interviewed divided by the number of eligible individuals or households. All occupied households are eligible for Modules 1, 2, 3, and 8. Eligibility determination for Modules 4, 4A, 5, 5A, and 6 is initiated in the household roster and confirmed in the respective module. Eligibility determination for sections of Module 7 is initiated in the Module 2 and confirmed in the respective sections of Module 7. Note that for Module 5, the primary caregivers of the children served as the respondents, not the children directly.

b Module 4A does not include an outcome code, so the module is considered to be complete if the currently pregnant field is complete, and the height and weight fields have values less than 999.4.

c Module 5A does not include an outcome code, so the module is considered to be complete if the length or height field is complete, the height field has a value less than 999.4, and the weight field has a value less than 99.94.

Sources: Feed the Future [Country] ZOI Survey [BL survey year(s)]; Feed the Future [Country] ZOI Survey [EL survey year(s)]

## A1.2. Abbreviated Women’s Empowerment in Agriculture Index results for indicators that compose the five domains of empowerment, using uncensored headcount ratios

Table A1.3: Percent of Primary Adult Decisionmakers with Adequate Achievement in Each A-WEAI Indicator Using Uncensored Headcount Ratios, by Sex and Age

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **A-WEAI indicator** | **Female** | |  | **Male** | |  |
| **Percent** | **n** | **Percent** | **n** | **Sig.a** |
| Input in productive decisions |  |  |  |  |  |  |
| 18-29 |  |  |  |  |  |  |
| 30+ |  |  |  |  |  |  |
| Ownership of assets |  |  |  |  |  |  |
| 18-29 |  |  |  |  |  |  |
| 30+ |  |  |  |  |  |  |
| Access to and decisions on credit |  |  |  |  |  |  |
| 18-29 |  |  |  |  |  |  |
| 30+ |  |  |  |  |  |  |
| Control over income |  |  |  |  |  |  |
| 18-29 |  |  |  |  |  |  |
| 30+ |  |  |  |  |  |  |
| Group membership |  |  |  |  |  |  |
| 18-29 |  |  |  |  |  |  |
| 30+ |  |  |  |  |  |  |
| Workload |  |  |  |  |  |  |
| 18-29 |  |  |  |  |  |  |
| 30+ |  |  |  |  |  |  |

^ Results not statistically reliable, n<30

A-WEAI=Abbreviated Women's Empowerment in Agriculture Index

a Significance tests were performed to determine whether an association exists between the outcome indicator and primary adult decisionmakers' sex. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

Note: Estimates are based on primary adult decisionmakers who are de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

## A1.3. Poverty indicators at the USD $1.25 (2005 PPP) per person per day threshold

Table A1.4: Poverty Indicators at the USD $1.25 (2005 PPP) per Person per Day Threshold in the ZOI, in Total and by Selected Household Characteristics

|  | | **Prevalence of povertya** | | | |  | | **Prevalence of  near-poorc** | | | | **Number of households (*n*)d** | |  | | **Depth of poverty of the poore** | | |  | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Household characteristic** | | **Percent** | | **Sig.b** | |  | | **Percent** | | **Sig.b** | |  | | **Percent of poverty line** | | **Sig.b** | | **Number of households (*n*)d** | |
| **All households** |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| **Gendered household type** | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Male and female adults |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Female adults only |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Male adults only |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Children only (no adults) |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| **Household education** |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| No education |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Less than primary |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Completed primary |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Completed secondary |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Higher |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| **Wealth quintile** |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Highest (wealthiest) |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Fourth |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Middle |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Second |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Lowest (poorest) |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| **Shock exposure index** |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Did not experience any shocks |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Low |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| Moderate |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |
| High |  | | |  | |  | |  | |  | |  | |  | |  | |  | |  | |

^ Results not statistically reliable, n<30

a The prevalence of poverty is the percentage of individuals living below the $1.25 2005 PPP per person per day poverty threshold.

b Significance tests were performed to determine whether an association exists between the outcome indicator and the disaggregate variables. Associations found to be statistically significant are indicated by level: \* p<0.05, \*\* p<0.01, \*\*\* p<0.001; n/s=not significant.

c The prevalence of near-poor is the percentage of individuals living at or above the $1.25 per person per day poverty threshold (2005 PPP) but below 125 percent of that threshold.

d Records missing information for the disaggregate variables have been excluded from the disaggregated estimates. The unweighted sample size reflects this loss in observations; therefore, the sum of disaggregate sample sizes may not equal the overall sample size.

e The depth of poverty of the poor measures, on average, how far the consumption of the poor is below the $1.25 (2005 PPP) per person per day poverty threshold.

Note: Estimates are based on de jure household members.

Source: Feed the Future [Country] ZOI Survey [Survey year(s)]

# Appendix 2. Methodology

## A2.1 Sampling and weighting

### Sampling

The sample of households for the Feed the Future [Country] Zone of Influence (ZOI) Survey [Survey year(s)] followed a two-stage stratified cluster sampling design. In the first stage, [xx number] enumeration areas (EAs) were selected from [the national Census frame] in [xx number] districts by probability proportional to size sampling. In the second stage, [xx number] households were selected for interview at random from a comprehensive list of households generated during a listing operation that was fielded from [date to date].

### Weighting

The weighting of survey data uses information available from the EA frame (i.e., the first-stage sampling frame), as well as information collected during the listing and data collection processes. This information includes the following: (1) EA measure of size (where size is in terms of the size of the population or number of households) used for selection of EAs; (2) measure of size of strata from which EAs are drawn; (3) measure of size of EAs at time of listing; and (4) response rates among households, women, and men. Weights were calculated for the following to account for differing levels of non-response:

1. Households (all household level indicators derived from Modules 2, 3, and 8)
2. Children under 5 years of age (Module 5—children’s anthropometry indicators)
3. Children under 2 years of age (Module 5—children’s nutrition indicators)
4. Women 15-49 years of age (Module 4—women’s dietary and underweight indicators)
5. Primary female decisionmakers (Module 6—female Abbreviated Women’s Empowerment in Agriculture Index [A-WEAI] indicators)
6. Primary male decisionmakers (Module 6—male A-WEAI indicators)
7. Farmers of any value chain commodity (Module 7—improved agriculture technologies and management practices indicator)
8. Maize farmers (Module 7.1—yield indicator)
9. Fishpond farmers (Module 7.80—yield indicator)
10. Dairy farmers (Module 7.50—yield indicator)

Design weights were calculated based on the separate sampling probabilities for each sampling stage and for each EA. We use the following notation:

first-stage sampling probability of the i-th EA in stratum *h*.

second-stage sampling probability within the i-th EA in stratum *h*. (household selection).

The probability of selecting the i-th EA from stratum *h*, in the ZOI sample is calculated as follows:

Where:

number of sample EAs selected in stratum *h*.

total number of households according to the sampling frame in all EAs in stratum *h*.

total number of households in selected EA *i* in stratum *h* (as per the first-stage sampling frame)*.*

The second-stage probability of selecting a household from EA *i* in stratum *h*, (**assuming that there is no segmentation within sampled** **EA** *i*) is:

Where:

number of sample households selected for the *i*-th sample EA in stratum *h.*

total number of households listed for the *i*-th EA in stratum *h.*

Therefore, the overall selection probability of selecting a household from EA *i* of stratum *h* is the product of the selection probabilities of the two stages:

The design weight for each household in EA *i* of stratum *h* is the inverse of its overall selection probability:

The sampling weight was calculated with the design weight corrected for non-response for each of the selected EAs. Response rates were calculated at the EA level as ratios of the number of interviewed units over the number of eligible units within adjustment classes, where units could be household or individual (i.e., woman of reproductive age, child, farmer, or primary decisionmaker).

## A2.2a Poverty prevalence and consumption expenditure methods

### Data source

[Insert details according to instructions.]

### Data preparation

#### Data excluded from analysis:

* [Insert details according to instructions.]

#### Imputations:

* [Insert details according to instructions.]

#### Prices:

* [Insert details according to instructions.]

#### Other adjustments:

* [Insert details according to instructions.]

### Currency conversions using consumer price indices and purchasing power parity

[Insert details according to instructions.]

### Poverty thresholds

[Insert details according to instructions.]

## A2.2b Wealth index

Asset-based wealth indices have increasingly been used as alternatives to income and consumption expenditure-based measures for several reasons, most notably because they are: (1) more stable measures of socioeconomic well-being, (2) able to better detect differences in equity, and (3) easier to collect and require shorter interviews. This appendix presents a short description of the methodology for calculating the wealth index. Additional details on how to prepare the data and perform the calculations for producing the wealth index are provided in the *Guide to Feed the Future Statistics*.[[98]](#footnote-99)

The methodology for computing a wealth index using the Feed the Future ZOI Survey data is based on the approach developed by the DHS. The DHS approach to computing a wealth index assumes that wealth is an underlying unobservable variable and that a set of variables can identify the relative position of households in the underlying distribution of the wealth factor. The table below summarizes assets that were used to construct the wealth index for the Feed the Future [Country] ZOI Survey [Survey year(s)]. Principal components analysis was performed to assign weights to the assets. Each household was then assigned a wealth score equal to the sum of the weighted indicators. Wealth scores were standardized with a mean of zero and a standard deviation of one and then categorized into quintiles based on the distribution of the household population.

| **Assets used to construct the wealth index** |
| --- |
| 1. Domestic servants |
| 1. Ownership of agricultural land and size of land |
| 1. Number of people per sleeping room |
| 1. House ownership |
| 1. Water source |
| 1. Toilet facility   Main type of facility  Whether the facility is shared with other households |
| 1. Floor material |
| 1. Roof material |
| 1. Wall material |
| 1. Cooking fuel |
| 1. Farm animals (type and number):   Cows  Other cattle  Horses, donkeys, or mules  Goats  Sheep  Chicken or other poultry  Fish  Other |
| 1. Household possessions:   Electricity  Radio  Television  Non-mobile telephone  Computer  Refrigerator  Watch  Mobile phone  Bicycle  Motorcycle or scooter  Animal-drawn cart  Car or truck  Boat with a motor |
| 1. Bank account |

The “percentage of households below the comparative threshold for the poorest quintile of the asset-based comparative wealth index (CWI)” ZOI Survey indicator reflects the percentage of households in the ZOI that, based on asset ownership, fall below a fixed threshold that defines the poorest quintile (bottom 20 percent) in the comparative baseline wealth index that was used to create a cross-nationally, cross-temporally comparable asset-based wealth index, the CWI. Use of a fixed threshold across ZOIs is possible because the CWI is an index with threshold values that are relative to the baseline wealth index that is used for comparison. This means that the index scores and thresholds can be compared across ZOI Surveys and over time.

## A2.3 Criteria for achieving adequacy for Women’s Empowerment in Agriculture Indicators

*The below table presents the Women’s Empowerment in Agriculture five dimensions of empowerment, their corresponding empowerment indicators, the survey questions that are used to elicit the data required to establish adequacy or inadequacy for each empowerment indicator, their corresponding variables in the ZOI Survey dataset, and how adequacy criteria are defined for each empowerment indicator. For additional details refer to the Feed the Future Guide to Statistics.[[99]](#footnote-100)*

| Domain | Indicator name | Survey questions | ZOI Survey (2018-2019)  questions | ZOI Survey (2018-2019)  variables | Adequacy criteria | Inadequacy criteria | Weight |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Decision-making over production | Indicator 1.1: Input in productive decisions | “When decisions are made regarding food crop farming, cash crop farming, livestock raising, and fishing or fishpond culture, who is it that normally takes the decision?”    “How much input did you have in making decisions about food crop farming, cash crop farming, livestock raising, and fishing or fishpond culture?”  “To what extent do you feel you can make your own decisions regarding these aspects of household life if you want(ed) to: food crop farming, cash crop farming, livestock raising, and fishing or fishpond culture if you wanted to?” | Q.6202 (a, b, c, f)  Q.6203 (a, b, c, f)  Q.6204 (a, b, c, f) | v6202\_01-v6202\_03,  v6202\_06  v6202\_01-v6202\_03,  v6202\_06  v6202\_01-v6202\_03,  v6202\_06 | For at least one activity: decides alone; OR participates and has input into some; or most or all decisions regarding the activity; OR someone else decides but feels could decide to a medium or high extent if wanted to | Participates but does not have input into some; or most or all decisions regarding the activity; OR does not make the decision NOR feels he or she could to amedium or high extent (93 “no decision made” coded as missing) | 1/5 |
| Access to resources | Indicator 2.1: Ownership of assets | “Does anyone in your household currently have any [ITEM]?: agricultural land, large livestock, small livestock, chickens/ducks/turkeys/ pigeons, fishpond or fishing equipment, hand tools, non-mechanized farm equipment, mechanized farm equipment, non-farm business equipment, house, large consumer durable goods, small consumer durable goods, cell phone, other land or structures, and means of transportation?”  “Do you own any of the item either by yourself or jointly with someone else?” | Q.6301a–Q.6301n  Q.6303a–Q.6303n | v6301\_01-v6301\_15  v6303\_01-v6303\_15 | Owns—alone or jointly—at least one large asset or two types of small assets (small assets are chickens/ducks/ turkeys/pigeons, hand tools, non-mechanized farm equipment, and small consumer durable goods) | Does not own any assets; OR owns only one type of small asset alone or jointly | 2/15 |
|  | Indicator 2.2: Access to and decisions over credit | “Has anyone in your household taken any loans or borrowed cash/in-kind from [SOURCE] in the past 12 months?: NGO, informal lender, formal lender, friends or relatives, group-based microfinance or lending (savings/credit group), informal credit/savings groups such as merry-go-rounds, tontines, funeral societies, etc.”  “Who made the decision to borrow from [SOURCE]?”  “Who makes the decision about what to do with the money/item borrowed from [SOURCE]?” | Q.6308a–Q.6308f  Q.6309a–Q.6309f  Q.6310a–Q.6310f | v6308\_1-v6303\_6  v6309\_1-v6309\_6  v6310\_1-v6310\_6 | Can alone or jointly make at least one decision regarding at least one source of credit | Household has no credit; OR household has credit but respondent did not participate in any decision about it | 1/15 |
| Control over  income | Indicator 3: Control of use of income | “How much input did you have in decisions on the use of income generated from food crop farming, cash crop farming, livestock raising, non-farm economic activities, wage and salary employment, and fishing or fishpond culture?”  “To what extent do you feel you can make your own personal decisions regarding these aspects of household life if you want(ed) to?: non-farm activities, own wage and salary employment, major household expenditures” | Q.6205a–Q.6205f  Q.6204d,  Q.6204e,  Q.6204g | v6205\_01- v6206\_03, v6206\_06  v6204\_04,  v6204\_05, v6204\_07 | Has input into some; or most or all decisions on use of income for at least one productive/ economic activity; OR feels can make decisions to medium or high extent if respondent wanted for at least one income or expenditure decision—excludes minor household expenditures | Participates in activity but has no input in decisions about income, OR feels she or he has no or very little input into the decision regarding income from non-farm activities, wage and salary employment, or decisions regarding major household expenditures even if she or he wanted to | 1/5 |
| Group member-ship and leadership | Indicator 4.1: Membership in economic or social group | “Are you an active member of an agricultural/livestock/fisheries producers’ group, waters users’ group, forest users’ group, credit/microfinance group, mutual help/insurance group, trade and business association, trade and business association, civic groups, local government, religious group, other women’s/men’s group, or any other formal or informal organization?” | Q.6405a–Q.6405k | v6405\_01-v6405\_11 | Is an active member of at least one group | Is not an active member of at least one group | 1/5 |
| Time allocation | Indicator 5.1: Workload | The survey collected information on respondents’ time allocation for a 24-hour period. Information was collected for primary activities and reported in 15-minute intervals. | Q.6601 | v6601p\_15\_[hour], v6601p\_30\_[hour], v6601p\_45\_[hour], v6601p\_60\_[hour]  where [hour] is a value 1–24 | Works less than or equal to 10.5 hours in 24-hour period | Works more than 10.5 hours in 24-hour period | 1/5 |

# Appendix 3. Data quality

This appendix presents information that reflects the quality of data collected in the Feed the Future [Country] ZOI Survey [Survey year(s)]. Data-driven decisions call for high-quality data collection. High-quality data was ensured in the endline ZOI Survey through the data collection program, field monitoring, data post-processing, and data analysis. The [Country] ZOI Survey used CSPro software and a standardized data collection program developed for all ZOI Survey implementers to use. The data collection program ensured a high level of data quality through validation constraints and automatic checks that were included in the program to check for correctness, consistency, and meaningfulness of data entered by interviewers. These checks included, but were not limited to, completion checks, structure checks, and consistency checks. The organization of the data file, including the validation constraints, is described in the ZOI Survey data dictionary.

Similarly, continuous data monitoring in the field is fundamental to the quality of data collection. In addition to using the data collection and monitoring approach described in the Feed the Future ZOI Survey Toolkit field manuals,[[100]](#footnote-101) the [Country] ZOI Survey in-country data manager ran field check tables that provided a management system for checking data quality. These tables cross-checked certain quality control indicators by field teams and individual interviewers to detect potential areas in which correction and remedial action were required. Any issues that were attributed to non-sampling error (i.e., field-based error) were communicated as feedback to the field teams.

In the post-processing stage, secondary editing procedures were implemented according to the Feed the Future ZOI Survey Data Processing Manual to ensure the data were clean and of the highest quality. During the analysis phase, any inconsistencies or issues identified by data analysts were communicated to the data processing manual for troubleshooting and resolution.

The remainder of this appendix focuses on final field check tables, which are a reflection of the quality of fieldwork, for the Feed the Future [Country] ZOI Survey [Survey year(s)].

**Table FC-1** presents the household completion rate. [Describe the results presented in Table FC-1.]

Table FC-1: Household Completion Rate

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Percent distribution of sampled households by result of household interview and household response rate by interviewer team, Feed the Future [Country] ZOI Survey [Survey year(s)] | | | | | | | | | | | |
| **Team** | **Result of household interview** | | | | | | | |  | | |
| **Completed (1)** | **Not at home (2)** | **Extended absence (3)** | **Refused (5)** | **Dwelling vacant**  **(6)** | **Not a dwelling (7)** | **Ill or impaired (10)** | **Other**  **(96)** | **Total number** | **Total percentage** | **Household response rate**  **(%) a** |
| Team 1 |  |  |  |  |  |  |  |  |  |  |  |
| Team 2 |  |  |  |  |  |  |  |  |  |  |  |
| Team 3 |  |  |  |  |  |  |  |  |  |  |  |
| Team 4 |  |  |  |  |  |  |  |  |  |  |  |
| Team 5 |  |  |  |  |  |  |  |  |  |  |  |
| Team 6 |  |  |  |  |  |  |  |  |  |  |  |
| Team 7 |  |  |  |  |  |  |  |  |  |  |  |
| Team 8 |  |  |  |  |  |  |  |  |  |  |  |
| Team 9 |  |  |  |  |  |  |  |  |  |  |  |
| Team 10 |  |  |  |  |  |  |  |  |  |  |  |
| **All teams** |  |  |  |  |  |  |  |  |  |  |  |
|  | | | | | | | | | | | |

a Household response rate=(1)/[(1)+(2)+(3)+(5)+(10)]x100. The target is 95 percent for the household response rate.

**Table FC-2** presents information about the presence of primary adult decisionmakers in households with a completed roster. [Describe the results presented in Table FC-2.]

Table FC-2: Primary Male and Female Decisionmakers

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Number of households with a completed roster and, among those households, the percentage with at least one male member 18 years of age or older, the percentage with a male decisionmaker, the percentage with at least one female member 18 years of age or older, the percentage with a female decisionmaker, and the percentage of households with at least one decisionmaker, by interviewer team, Feed the Future [Country] ZOI Survey [Survey year(s)] | | | | | | |
|  |  | **Male** | | **Female** | |  | |
| **Team** | **HH with Module 1 completed**  **(N)** | **HH with at least one male member 18+**  **(%)** | **HH with primary adult male decisionmaker**  **(%)** | **HH with at least one female member 18+**  **(%)** | **HH with primary adult female decisionmaker**  **(%)** | **HH with at least one primary adult decisionmaker**  **(%)** | |
| Team 1 |  |  |  |  |  |  | |
| Team 2 |  |  |  |  |  |  | |
| Team 3 |  |  |  |  |  |  | |
| Team 4 |  |  |  |  |  |  | |
| Team 5 |  |  |  |  |  |  | |
| Team 6 |  |  |  |  |  |  | |
| Team 7 |  |  |  |  |  |  | |
| Team 8 |  |  |  |  |  |  | |
| Team 9 |  |  |  |  |  |  | |
| Team 10 |  |  |  |  |  |  | |
| **All teams** |  |  |  |  |  |  | |

HH=household

Note: The target is [100% - expected prevalence of child-only households].

**Table FC-3** assesses age heaping in the household roster. [Describe the results presented in Table FC‑3.]

Table FC-3: Age Heaping in the Household Roster

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Percentage of household members in 5-year age groups with ages recorded as ending in 5 or 0 by interviewer team, Feed the Future [Country] ZOI Survey [Survey year(s)] | | | | | | | | | | | | |
| **Team** | **Ages of household members** | | | | | | | | | |  | |
| **Ages 3-7 recorded as 5**  **(%)** | **Ages 8-12 recorded as 10**  **(%)** | **Ages 13‑17 recorded as 15**  **(%)** | **Ages 18‑22 recorded as 20**  **(%)** | **Ages**  **23-27 recorded as 25**  **(%)** | **Ages**  **28-32 recorded as 30 (%)** | **Ages**  **33-37 recorded as 35**  **(%)** | **Ages**  **38-42 recorded as 40**  **(%)** | **Ages**  **43-47 recorded as 45**  **(%)** | **Ages**  **48-52 recorded as 50**  **(%)** | **All ages ending in 5 or 0**  **(%)** | **Number of household members** |
| Team 1 |  |  |  |  |  |  |  |  |  |  |  |  |
| Team 2 |  |  |  |  |  |  |  |  |  |  |  |  |
| Team 3 |  |  |  |  |  |  |  |  |  |  |  |  |
| Team 4 |  |  |  |  |  |  |  |  |  |  |  |  |
| Team 5 |  |  |  |  |  |  |  |  |  |  |  |  |
| Team 6 |  |  |  |  |  |  |  |  |  |  |  |  |
| Team 7 |  |  |  |  |  |  |  |  |  |  |  |  |
| Team 8 |  |  |  |  |  |  |  |  |  |  |  |  |
| Team 9 |  |  |  |  |  |  |  |  |  |  |  |  |
| Team 10 |  |  |  |  |  |  |  |  |  |  |  |  |
| **All teams** |  |  |  |  |  |  |  |  |  |  |  |  |

Note: The target for all age ranges is 30 percent.

**Table FC-4** presents the mean number of eligible women of reproductive age per household. [Describe the results presented in Table FC-4.]

Table FC-4: Eligible Women per Household

|  |  |  |  |
| --- | --- | --- | --- |
| Mean number of eligible women 15-49 years of age per household, Feed the Future [Country] ZOI Survey [Survey year(s)] | | | |
| **Team** | **Completed household**  **(N)** | **Eligible women in completed household**  **(N)** | **Mean number of eligible women per household** |
| Team 1 |  |  |  |
| Team 2 |  |  |  |
| Team 3 |  |  |  |
| Team 4 |  |  |  |
| Team 5 |  |  |  |
| Team 6 |  |  |  |
| Team 7 |  |  |  |
| Team 8 |  |  |  |
| Team 9 |  |  |  |
| Team 10 |  |  |  |
| **All teams** |  |  |  |

Note: The target is [XXX] number of eligible women per household.

**Table FC-5** presents the mean number of eligible children under 6 years of age per household. [Describe the results presented in Table FC-5.]

Table FC-5: Eligible Children per Household

|  |  |  |  |
| --- | --- | --- | --- |
| Mean number of eligible children younger than 6 years of age per household, Feed the Future [Country] ZOI Survey [Survey year(s)] | | | |
| **Team** | **Completed household (N)** | **Eligible children in household**  **(N)** | **Mean number of eligible children per household** |
| Team 1 |  |  |  |
| Team 2 |  |  |  |
| Team 3 |  |  |  |
| Team 4 |  |  |  |
| Team 5 |  |  |  |
| Team 6 |  |  |  |
| Team 7 |  |  |  |
| Team 8 |  |  |  |
| Team 9 |  |  |  |
| Team 10 |  |  |  |
| **All teams** |  |  |  |

Note: The target is [XXX] number of eligible children per household.

**Table FC-6** presents the eligibility and response rate of primary adult female decisionmakers. [Describe the results presented in Table FC-6.]

Table FC-6: Module 6 (Women) Women’s Empowerment in Agriculture Module, Eligibility and Response Rate

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Percent distribution of eligible women (primary adult female decisionmaker) by result of individual outcome, by interviewer team, Feed the Future [Country] ZOI Survey [Survey year(s)] | | | | | |
| **Team** | **Result of module** | |  | | |
| **Completed (code 1)** | **Respondent not at home (code 4)** | **Total**  **(%)** | **Number of women** | **Response ratea** |
| Team 1 |  |  |  |  |  |
| Team 2 |  |  |  |  |  |
| Team 3 |  |  |  |  |  |
| Team 4 |  |  |  |  |  |
| Team 5 |  |  |  |  |  |
| Team 6 |  |  |  |  |  |
| Team 7 |  |  |  |  |  |
| Team 8 |  |  |  |  |  |
| Team 9 |  |  |  |  |  |
| Team 10 |  |  |  |  |  |
| **All teams** |  |  |  |  |  |

a The response rate is the percentage of households completed divided by the number with response codes 1 and 5. The target response rate is 95 percent.

**Table FC-7** presents the eligibility and response rate of primary adult male decisionmakers. [Describe the results presented in Table FC-7.]

Table FC-7: Module 6 (Men) Women’s Empowerment in Agriculture Module, Eligibility and Response Rate

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Percent distribution of eligible men (primary adult male decisionmaker) by result of individual outcome, by interviewer team, Feed the Future [Country] ZOI Survey [Survey year(s)] | | | | | | |
| **Team** | **Result of module** | | |  | | |
| **Completed (code 1)** | **Respondent not at home (code 4)** | **Refused (code 5)** | **Total**  **(%)** | **Number of men** | **Response ratea** |
| Team 1 |  |  |  |  |  |  |
| Team 2 |  |  |  |  |  |  |
| Team 3 |  |  |  |  |  |  |
| Team 4 |  |  |  |  |  |  |
| Team 5 |  |  |  |  |  |  |
| Team 6 |  |  |  |  |  |  |
| Team 7 |  |  |  |  |  |  |
| Team 8 |  |  |  |  |  |  |
| Team 9 |  |  |  |  |  |  |
| Team 10 |  |  |  |  |  |  |
| **All teams** |  |  |  |  |  |  |

a The response rate is the percentage of households completed divided by the number with response codes 1 and 5. The target response rate is 95 percent.

1. Text in brackets indicates the Feed the Future indicator number. See the [Feed the Future Indicator Handbook](https://www.agrilinks.org/post/feed-future-indicator-handbook). [↑](#footnote-ref-2)
2. Agroclimatology, or agricultural climatology, refers to the interaction between climate and agriculture (Wagner-Riddle, 2005). [↑](#footnote-ref-3)
3. Current agroclimatology data for specific countries can be found on FEWS NET (FEWS, n.d.). [↑](#footnote-ref-4)
4. Survey methodological requirements and supporting documentation for Feed the Future Zone of Influence Surveys are available online at <https://www.agrilinks.org/post/feed-future-zoi-survey-methods>. [↑](#footnote-ref-5)
5. Smith & Pillarisetti, 2015 [↑](#footnote-ref-6)
6. UNSTATS, n.d. [↑](#footnote-ref-7)
7. Core questions on water, sanitation and hygiene for household surveys: 2018 Update. New York: UNICEF/WHO, 2018 [↑](#footnote-ref-8)
8. Core questions on water, sanitation and hygiene for household surveys: 2018 Update. New York: UNICEF/WHO, 2018 [↑](#footnote-ref-9)
9. WHO/UNICEF. JMP Methodology. 2017 Update & SDG Baselines. March 2018. Available at <https://washdata.org/sites/default/files/JMP%20methodology-Apr-2018-5.pdf> [↑](#footnote-ref-10)
10. Ejemot-Nwadiaro, Ehiri, Arikpo, Meremikwu, & Critchley, 2015 [↑](#footnote-ref-11)
11. Feed the Future ZOI Survey Methods Toolkit. Available at: <https://www.agrilinks.org/post/feed-future-zoi-survey-methods> [↑](#footnote-ref-12)
12. Deaton, 2008 [↑](#footnote-ref-13)
13. Guidelines on constructing the consumption aggregate can be found in: Deaton, A. and S. Zaidi (2002), [A Guide to Aggregating Consumption Expenditures, Living Standards Measurement Study](http://siteresources.worldbank.org/INTPA/Resources/429966-1092778639630/deatonZaidi.pdf), Working Paper 135. Available at: [http://siteresources.worldbank.org/INTPA/Resources/429966-1092778639630/deatonZaidi.pdf](http://siteresources.worldbank.org/INTPA/Resources/429966-1092778639630/deatonZaidi.pdf%20)  [↑](#footnote-ref-14)
14. Adjustments are made according to PPP conversions. These conversions are established by the World Bank to allow currencies to be compared across countries in terms of how much an individual can buy in a specific country. The $1.90 in 2011 PPP means that $1.90 could buy the same amount of goods in another country as $1.90 could in the United States in 2011. [↑](#footnote-ref-15)
15. World Bank. 2015. Poverty & Equality Data FAQs. <http://go.worldbank.org/PYLADRLUN0>. [↑](#footnote-ref-16)
16. This indicator differs from the depth of poverty indicator used by the World Bank and used previously by Feed the Future. As modified, this indicator only tracks the depth of poverty of households under the poverty threshold, rather than including all households and assigning non-poor households a shortfall of zero. Including the poor and non-poor households means the depth of poverty can decrease either because poor households have crossed the poverty threshold or because poor households have become less poor. One of the limitations of removing the non-poor households from the calculation is that it is possible that the depth of poverty of the poor may increase over time, because previously poor households cross the poverty threshold, leaving only households that may have started with deeper levels of poverty. Changes in this indicator must be analyzed in conjunction with changes in the prevalence of poverty indicator to capture that dynamic. [↑](#footnote-ref-17)
17. Diwakar, Albert, Vizamos, & Shepherd, 2019 [↑](#footnote-ref-18)
18. The average value of consumption of a *poor* person is calculated as follows: (70 ÷ 100) \* $1.90/day = $1.33/day. [↑](#footnote-ref-19)
19. The average daily cost of raising the income or consumption expenditures of the poor up to the poverty threshold is calculated as follows: (33 ÷ 100) \* ($1.90/day–$1.33/day) \* 3,500,000 = $658,350/day. The depth of poverty of the poor in the ZOI is 33 percent; the poverty threshold is $1.90/day, the average consumption among the poor is $1.33/day, and the population is 3.5 million. [↑](#footnote-ref-20)
20. Boukary, Diaw, & Wünscher, 2016 [↑](#footnote-ref-21)
21. Phadera, Michelson, Winter-Nelson, & Goldsmith, 2019 [↑](#footnote-ref-22)
22. Chakraborty, Fry, Behl, & Longfield, 2016 [↑](#footnote-ref-23)
23. Dekker, 2006 [↑](#footnote-ref-24)
24. Filmer & Pritchett, 2001 [↑](#footnote-ref-25)
25. The reference country quintile cutoffs and anchoring points are calculated only once but used for the CWI indicator across all ZOI Surveys. [↑](#footnote-ref-26)
26. USAID, 2012 [↑](#footnote-ref-27)
27. Resilience resources can be found on REAL (FSNNETWORK, n.d.). [↑](#footnote-ref-28)
28. Mercy Corps, n.d. [↑](#footnote-ref-29)
29. Oxfam International, 2017 [↑](#footnote-ref-30)
30. Vaughan, 2018 [↑](#footnote-ref-31)
31. WHO Europe, 2017 [↑](#footnote-ref-32)
32. To understand whether these resilience capacities actually strengthen resilience, a resilience analysis needs to be done. More information about resilience analyses can be found in the Food Security and Nutrition Network resource library at: <https://www.fsnnetwork.org/resilience-and-resilience-capacities-measurement-options>.). [↑](#footnote-ref-33)
33. Beck, 2015 [↑](#footnote-ref-34)
34. World Bank FINDEX: <http://www.worldbank.org/en/programs/globalfindex> [↑](#footnote-ref-35)
35. Cull, 2017 [↑](#footnote-ref-36)
36. Alkire, 2013 [↑](#footnote-ref-37)
37. For more information, please refer to the [Instructional Guide for the Abbreviated Women’s Empowerment in Agriculture Index.](http://www.ifpri.org/publication/instructional-guide-abbreviated-womens-empowerment-agriculture-index-weai) [↑](#footnote-ref-38)
38. The only respondents to the A-WEAI survey module are primary adult decisionmakers in the household and, therefore, are not representative of the entire female and male adult populations in the ZOI. It is thus essential to remember that the A-WEAI data reflect only the primary adult female and male decisionmakers when interpreting the data. However, to streamline the text of this report, the generic terms “woman,” “female,” “man,” and “male” will be used henceforth. When used, they refer to the primary adult female or male decisionmakers from whom the data were collected. [↑](#footnote-ref-39)
39. The Guide to Feed the Future Statistics calculates the 5DE as: 5DE score = 1 – (Hp x Ap), where Hp = the number of disempowered respondents in the ZOI (respondents whose disempowerment score is greater than0.2) divided by the total population of respondents in the ZOI with complete 5DE indicator data; and Ap = the average inadequacy score of disempowered women (i.e., the average censored inadequacy score). [↑](#footnote-ref-40)
40. In the original WEAI, an individual has to achieve adequacy in four of the five WEAI domains ORin 80 percent of the weighted WEAI indicators. The A-WEAI is composed of fewer indicators, and therefore an individual must achieve adequacy in four out of five domains to reach the 80 percent threshold for empowerment. [↑](#footnote-ref-41)
41. Zalisk, K., Dupuis, G., Gauthier, M., Kaur, J., Khan, N., Swindale, A. and Johnson, K.B., 2019. [↑](#footnote-ref-42)
42. The education and maternal behavior disaggregates were selected because they were positively associated with women’s empowerment scores when data were analyzed under the Feed the Future phase one. Additional details can be found in the [WEAI Baseline Report](https://www.ifpri.org/publication/measuring-progress-toward-empowerment-womens-empowerment-agriculture-index-baseline). No clear relationship with poverty was found at baseline; however, it is important to understand how empowerment status varies for individuals in households living above or below the USD $1.90 poverty line. Further analysis should be considered on the basis of these results. All disaggregates should align with the indicator definitions presented in the Feed the Future Indicator Handbook. [↑](#footnote-ref-43)
43. The censored headcount ratios present results from respondents who are disempowered and have adequate achievements in a given indicator, divided by the total number of respondents. Uncensored headcount ratios present results from all individuals achieving adequacy in a given indicator, regardless of empowerment status, divided by the total number of respondents. Indicator results using uncensored headcount ratios can be found in Appendix 1.2. [↑](#footnote-ref-44)
44. A smallholder is one who holds 5 hectares or less of arable land. [↑](#footnote-ref-45)
45. Solh, Braun, & Tadesse, 2014 [↑](#footnote-ref-46)
46. Djagba, Rodenburg, Zwart, Houndagba, & Kiepe, 2014 [↑](#footnote-ref-47)
47. Reeves, et al., 2016 [↑](#footnote-ref-48)
48. Wilkins, 2008 [↑](#footnote-ref-49)
49. Edmeades, 2015 [↑](#footnote-ref-50)
50. Lal, 2010 [↑](#footnote-ref-51)
51. Reeves, et al., 2016 [↑](#footnote-ref-52)
52. Snapp, Mafongoya, & Waddington, 1998 [↑](#footnote-ref-53)
53. Oerke, 2005 [↑](#footnote-ref-54)
54. Reeves, et al., 2016 [↑](#footnote-ref-55)
55. FAO, 2011 [↑](#footnote-ref-56)
56. Oswald & Ransom, 2001 [↑](#footnote-ref-57)
57. FAO, 2003 [↑](#footnote-ref-58)
58. Shepherd, 1999 [↑](#footnote-ref-59)
59. El-Mashad, Loon, Zeeman, Bot, & Lettinga, 2003 [↑](#footnote-ref-60)
60. Shepherd, 1999 [↑](#footnote-ref-61)
61. Jaja, 2016 [↑](#footnote-ref-62)
62. USDA-NRCS, 1999 [↑](#footnote-ref-63)
63. A Guide for Preparing Soil Profile Descriptions. Soils Properties and Processes. NRE 430/EEB 489 [↑](#footnote-ref-64)
64. USDA, n.d. [↑](#footnote-ref-65)
65. National Drought Mitigation Center website: https://drought.unl.edu/droughtmonitoring/SPI.aspx [↑](#footnote-ref-66)
66. From the NASA Earth Observatory website: “Satellite imagery is made up of tiny squares, each a different color or shade of grey. These squares are called pixels—short for picture elements—and represent the relative reflected light energy recorded for that part of the image. Each pixel represents a square area on an image that is a measure of the sensor's ability to resolve (see) objects of different sizes. Higher resolution (smaller pixel area) means that the sensor is able to discern smaller objects. By adding up the number of pixels in an image, you can calculate the area of a scene. For example, if you count the number of green pixels in a false color image, you can calculate the total area covered with vegetation.”

    URL: https://earthobservatory.nasa.gov/features/RemoteSensing/remote\_06.php [↑](#footnote-ref-67)
67. FAO, 2014 [↑](#footnote-ref-68)
68. For more information, see FAO training materials on fertilizing fish ponds at: <http://www.fao.org/tempref/FI/CDrom/FAO_Training/FAO_Training/General/x6709e/x6709e06.htm> [↑](#footnote-ref-69)
69. For more information, see FAO training materials on disease prevention and treatment at: <http://www.fao.org/fishery/static/FAO_Training/FAO_Training/General/x6709e/x6709e15.htm> [↑](#footnote-ref-70)
70. For more information, see FAO training materials on disease prevention and treatment at: <http://www.fao.org/fishery/static/FAO_Training/FAO_Training/General/x6709e/x6709e15.htm> [↑](#footnote-ref-71)
71. For more information, see FAO training materials on improving pond water quality at: <http://www.fao.org/tempref/FI/CDrom/FAO_Training/FAO_Training/General/x6709e/x6709e02.htm> [↑](#footnote-ref-72)
72. Francis-Floyd, 2011 [↑](#footnote-ref-73)
73. For more information, see FAO training materials on fish harvesting from ponds at: <http://www.fao.org/tempref/FI/CDrom/FAO_Training/FAO_Training/General/x6709e/x6709e11.htm> [↑](#footnote-ref-74)
74. For more information, see FAO training materials on handling live fish at: <http://www.fao.org/tempref/FI/CDrom/FAO_Training/FAO_Training/General/x6709e/x6709e08.htm> [↑](#footnote-ref-75)
75. FAO, 2019 [↑](#footnote-ref-76)
76. For more information, see FAO training materials on artificial insemination in dairy buffalo and cattle at: <http://www.fao.org/ag/againfo/resources/documents/Dairyman/Dairy/V4U6_1.htm> [↑](#footnote-ref-77)
77. Oregon State University Forage Information System, 2019 [↑](#footnote-ref-78)
78. FAO, 2019 [↑](#footnote-ref-79)
79. FAO, 2019 [↑](#footnote-ref-80)
80. WHO, 2018a [↑](#footnote-ref-81)
81. For more information, see FAO training materials on mastitis prevention at: <http://www.fao.org/3/t0218e/t0218e04.htm> [↑](#footnote-ref-82)
82. Looper, n.d. [↑](#footnote-ref-83)
83. Western Dairy Digest, 2005 [↑](#footnote-ref-84)
84. For more information, see FAO training materials on milk recording at: <http://www.fao.org/3/t1265e/t1280e05.htm> [↑](#footnote-ref-85)
85. Coates, 2006 [↑](#footnote-ref-86)
86. Food and Agriculture Organization of the United Nations, 2019 [↑](#footnote-ref-87)
87. Cafiero, Viviani, & Nord, 2018 [↑](#footnote-ref-88)
88. Ballard, 2013 [↑](#footnote-ref-89)
89. Darnton-Hill, 2005 [↑](#footnote-ref-90)
90. WHO, 2018b [↑](#footnote-ref-91)
91. The seven food groups for breastfed children are as follows: (1) grains, roots, and tubers; (2) legumes and nuts; (3) dairy products (milk, yogurt, cheese); (4) flesh foods (meat, fish, poultry, and liver or organ meats); (5) eggs; (6) vitamin-A rich fruits and vegetables; and (7) other fruits and vegetables. [↑](#footnote-ref-92)
92. The six food groups for non-breastfed children are the same as for breastfed children, except that they exclude dairy products (milk, yogurt, cheese). [↑](#footnote-ref-93)
93. WHO, 2018c [↑](#footnote-ref-94)
94. Leroy & Frongillo, 2019 [↑](#footnote-ref-95)
95. WHO, 2006 [↑](#footnote-ref-96)
96. A weight-for-length z-score is calculated for children 0–23 months of age and any other children who are measured lying down. A weight-for-height z-score is calculated for children 24-59 months of age who are measured standing up. [↑](#footnote-ref-97)
97. WHO, 2006 [↑](#footnote-ref-98)
98. Zalisk, K., Dupuis, G., Gauthier, M., Kaur, J., Khan, N., Swindale, A. and Johnson, K.B., 2019. *Feed the Future Zone of Influence Surveys: Guide to Feed the Future Statistics*. Washington, DC: Bureau for Food Security, United States Agency for International Development. [↑](#footnote-ref-99)
99. Zalisk, K., Dupuis, G., Gauthier, M., Kaur, J., Khan, N., Swindale, A. and Johnson, K.B., 2019. *Feed the Future Zone of Influence Surveys: Guide to Feed the Future Statistics*. Washington, DC: Bureau for Food Security, United States Agency for International Development. [↑](#footnote-ref-100)
100. United States Agency for International Development (USAID). (2018b). *Feed the Future ZOI Survey methods toolkit.* Washington, DC: USAID. Available at: <https://www.agrilinks.org/post/feed-future-zoi-survey-methods>. [↑](#footnote-ref-101)