Feed the Future

Survey Implementation

Document

Agriculture Interviewer’s Manual

Zone of Influence Survey

[COUNTRY]

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**INSTRUCTIONS TO [CONTRACTOR’S] SENIOR RESEARCHER:**

This document has been developed as a template to be modified for each Feed the Future ZOI Survey. The content and the text have been pre-approved by the Bureau for Food Security (BFS) and should be modified where noted. We use the following conventions in this template to indicate where modifications should or may be made:

* Where country-specific words or phrases need to be inserted, the word or concept is highlighted in yellow in the text. Substitute the appropriate word or phrase.
* Where a choice needs to be made between several text options, those options are highlighted in green. Delete the option that does not apply to your country.
* Where a section, phrase, sentence, or paragraph may need to be customized or be deleted due to irrelevance to your country or survey, instructions are provided in a comment box in the margin. Address the instructions by adding, revising, or deleting text or a table. Highlight the addition or revision or strikethrough the deletion to facilitate BFS’s review. Add a note after the instruction in the comment box that explains what you did (e.g., revised, deleted).

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# Abbreviations

BFS Bureau for Food Security

GPS Global Positioning System

LandPKS Land-Potential Knowledge System

LCC land capability classification

QCS quality control and support

US United States

USAID United States Agency for International Development

VCC value chain commodity

ZOI Zone of Influence

# Introduction

Congratulations on your selection to serve as an agriculture interviewer for this survey on food security among people in [COUNTRY]!

As an interviewer, you have the most important job in the whole survey. It is only by interviewing everyday people and asking them about their situation that the government can get the information it needs to make good decisions about agriculture, food security, nutrition, and poverty for people in [COUNTRY]. Only when we have the best information from everyone selected for an interview can we produce a good understanding of peoples’ everyday lives, so decisionmakers can do their jobs well.

This manual will help you do your best job to collect good information and ultimately contribute to a better tomorrow for the people of [COUNTRY]. It covers the following topics:

* Background information about the survey you are contributing to;
* Guidance on how to approach a respondent’s household and conduct interviews;
* A description of how your field team will work together to complete the assigned fieldwork;
* Instructions on how to use the tablets to collect data;
* An item-by-item description of the meaning and purpose of each question or instruction on the agriculture modules of the questionnaire, and how you should record responses.

## 1.1 Background and survey objectives

Feed the Future seeks to reduce poverty, hunger, and undernutrition among women and children, and to increase income, women’s empowerment, dietary diversity, appropriate feeding practices, and resilience. Program efforts are concentrated in Zones of Influence (ZOIs) in Feed the Future target countries. Progress in achieving Feed the Future’s objectives is tracked using population-based performance indicators.

* The purpose of the Feed the Future [YEAR] [COUNTRY] ZOI Survey is to provide the [COUNTRY] government and the United States Agency for International Development/[COUNTRY] with information on peoples’ well-being. The ZOI Survey is designed to monitor the progress of Feed the Future here in [COUNTRY] and determine whether there has been change over time at the population level in key indicators.

## 1.2 The survey method

There are several ways to gather information about people that can be used to help us understand conditions in [COUNTRY]:

* One way is to contact every person in the country and ask them questions. A national census works like this. However, it is very expensive to find and interview everyone in the whole country.
* Another scientifically acceptable way to gather information is through an approach called a *sample survey*. When done correctly, this approach does not require interviewing everyone, but still provides a very good understanding of the situation in [COUNTRY], and is representative of all the people in a country or a region.

In a sample survey, we can interview people and collect information from them much more quickly and at a lower cost than in a census. But for a survey to produce good information, survey methods must be followed exactly. For example:

* The sample size (the number of households that need to be interviewed in the survey) that was chosen by trained statisticians reflects the number of interviews that are needed to provide an accurate picture of the food security, nutrition, and poverty situation in [COUNTRY].

If we do not interview each of the households selected for the sample, then we will get a wrong understanding of the situation. As a result of this wrong understanding, the government may make wrong decisions about food and nutrition. So it is extremely important that interviewers try their hardest to complete all of their assigned interviews. This will ensure that the correct number of people is included in the survey.

* The survey sample must also be absolutely randomly selected to get a correct picture of the poverty and nutrition in the country. This means that all households in the ZOI must have the same chance for being included in the sample, and that there are no special criteria for selecting one household instead of another—a number of households simply were picked from all households in the ZOI like pulling numbers from out of a hat. The statisticians working on this survey have scientifically and randomly selected the households that need to be interviewed in the survey. But only you as the interviewer can make sure that the households selected for interview are interviewed. It is critical that—

***only*** the selected households are interviewed, and

***every*** household that was selected is interviewed.

By making sure that you interview only the households that were selected, and that you interview every household, even if you need to make several call-backs to the household, you in your role as the interviewer will ensure that the correct respondents are included in the survey. By including only the correct respondents will we be able to create an accurate picture of the poverty and nutrition situation in [COUNTRY].

For the [YEAR] [COUNTRY] ZOI Survey, scientifically selecting the sample required three main steps:

* First, a statistician randomly selected [NUMBER] clusters (small areas about the same size as a village or neighborhood) from throughout the parts of [COUNTRY] where Feed the Future is working (the ZOI).
* Second, listing teams went to each cluster and made a list of every household in the entire cluster. These lists were sent to the statistician.
* Third, the statistician randomly selected [NUMBER] households from each cluster. These are the households that we need to interview to make sure we provide an accurate picture of the nutrition and poverty situation in [COUNTRY].

Your team will visit a number of the selected clusters during the fieldwork for the ZOI survey. In each cluster, you and the members of your field team will be assigned a list of households to visit. Your job is to visit each of these households and ask the members of the household questions from the survey questionnaire.

When the information that your team collects from the selected households is put together with the information collected by all of the other teams, you will have helped create a very accurate picture of the nutrition and poverty situation in [COUNTRY].

## 1.3 Survey implementation

[CONTRACTOR] is in charge of implementing the entire survey—from the initial planning phase to data analysis and report preparation after the fieldwork has been completed. [CONTRACTOR] selected [SUB-CONTRACTOR] to conduct the fieldwork for this survey. [SUB-CONTRACTOR] will plan, conduct, and supervise the fieldwork, including interviewer training, managing the interviewers and field teams, and ensuring the quality of the fieldwork. [CONTRACTOR] and USAID will provide support to [SUBCONTRACTOR] for all fieldwork activities.

During fieldwork, you will work in a field team consisting of four social interviewers, one agriculture interviewer, one field supervisor, and one driver. Figure 1.1 shows a staffing plan for the [SUBCONTRACTOR]. Each household will be interviewed by a team of two social science interviewers. At least one member of each interviewer team will be female so that female interviewers can administer modules with gender-sensitive questions to female respondents. The agriculture interviewer will work with both interviewing teams to interview household members who are primarily responsible for cultivating or raising the selected value chain commodities (VCCs).

The field supervisor (this person may be male or female) plans for and keeps track of the overall implementation of interviews in a cluster, ensures ethical conduct, observes interviews being conducted, provides feedback to interviewers, solves problems, implements security protocols if needed, and communicates with the quality control and support (QCS) teams and field manager regularly. In addition, the field supervisor arranges for the field team’s meals, nightly accommodations, and a secure location for storing the tablets.

Additional support will be provided to the field teams by QCS teams, who will visit all field teams at least every two weeks to make sure the teams have the materials they need to do their work, to ensure that data collection is progressing as expected, and to help monitor data quality and solve problems.

**Figure 1.1: [SUB-CONTRACTOR] Prototype Staffing Plan**



## 1.4 The agriculture interviewer’s role

The agriculture interviewer is pivotal to the success of the survey. Carefully following procedures for conducting interviews and for recording responses to the survey questions will ensure your success as an interviewer, and will produce very important information that will help us better understand the nutrition and poverty situation in [COUNTRY].

The agriculture interviewer’s tasks include:

* Verifying the eligible household members that have cultivated or raised the selected crops;
* Interviewing all eligible household members for all applicable agriculture modules, including returning to the household if eligible household members were absent during your first or second visit;
* Entering the respondent’s answers about the selected crops and livestock onto the tablet accurately;
* Submit the interview data to the social science interviewer;
* Accurately walk the perimeter of the plot areas, record and save the track with the Field Area Measure app, measure the plot’s area, record the area on paper survey forms, and enter the values into the tablet as soon as is feasible after the interview;
* Perform a soil assessment on each plot of land included in the survey using the LandPKS application and upload the soil assessment data to the internet when complete;
* Discuss any problems or concerns with the field supervisor; and
* Track and report progress in completing assignments.

Detailed instructions on how to complete these tasks are provided in this manual.

## 1.5 Working together as a team

This survey has the potential to help people in [COUNTRY] by allowing the government and other organizations to make better decisions for the future. The only way to make this important survey a success is for everyone involved to work together in an open, honest, and transparent manner. This means that:

* We should treat our team members with kindness and respect, and we should expect to be treated the same way in return.
* When we work well together as a team, it shows in the quality of our work. Quality control measures are in place to ensure that the information collected is of the best quality. These measures include things like direct observation of interviews and re-interviews of households by the field supervisor, as well as statistical analyses of the data to ensure that there are no problems with the way that data have been collected by field teams or by individual interviewers.

If a problem is discovered through any of the quality control methods, the field team or interviewer will be provided with support and guidance on how to improve the quality of their work.

It is expected that this guidance for improvement will be delivered by the field supervisor in a constructive, supportive, and respectful manner. It is also expected that the field team or interviewer will work hard to improve on those aspects of their work. Working together in this professional manner allows us to function well as a team, and in the end, we will be proud of what we have accomplished together.

* We must each take responsibility for our share of the work, and we must make sure our team members have the support they need to do their job. We should not seek to avoid any of the work assigned to us, and we should not attempt to add extra burden to the work assigned to others.
* We must not treat each other differently because of our sex, ethnicity, language, sexual orientation, socioeconomic class, religion, or any other such characteristic. We are all working together toward the same goal, and we must treat each other fairly and equally.

In particular, sexual harassment will not be tolerated among any staff working on the ZOI Survey, including management staff, supervisors, or interviewers. Both men and women can be targets of sexual harassment, and both men and women can be perpetrators of sexual harassment. Sexual harassment includes behaviors like unwelcome sexual advances, requests for sexual favors, or other sexual comments or actions that make a person feel uncomfortable, intimidated, or at risk of losing one’s job or anything else.

To ensure a comfortable and fair working environment for everyone, we should avoid unnecessary physical contact with our colleagues, and maintain a professional and courteous attitude towards each other at all times.

Anyone who feels that he or she has been the target of sexual harassment, or who has witnessed an apparent incident of harassment, should immediately report the incident to his or her field supervisor, the field manager, or to the survey director, if relief cannot be obtained through the intervention of the field supervisor or field manager. The complaint must be taken seriously by [SUB-CONTRACTOR] through appropriate actions to correct the existing problem, and through project-wide action to prevent further occurrences. Should the response be insufficient to put a halt to the harassment, or should retaliation occur, affected staff should report their complaints directly to [CONTRACTOR COUNTRY MANAGER] at [CONTACT INFORMATION–SKYPE, EMAIL, PHONE].

## 1.6 Dismissal from the team

You have been carefully selected and are being trained by [SUB-CONTRACTOR] with the expectation you will do high-quality work and adhere to field procedures throughout the survey. Unfortunately, however, sometimes interviewers fail to do good-quality, honest work as they have been trained to do. In cases like this, such an interviewer will need to be removed from the team to safeguard the quality of this important survey.

The following will be grounds for immediate dismissal from the team:

* Inappropriate behavior (e.g., harassment of any kind) toward any member of the team or community;
* Falsification of any data (e.g., making up data);
* Unethical research conduct (e.g., intentional failure to obtain informed consent prior to interviewing a respondent; failure to maintain the confidentiality of data); and
* Attendance problems (e.g., repeated failure to show up for work as scheduled without informing your field supervisor).

Any team member who observes any of the above behaviors should immediately notify the appropriate supervisor. Interviewer performance issues should be reported to the field supervisor. Field supervisor performance issues should be reported to the QCS team or field manager.

The implicated team member will have the opportunity to defend himself or herself against the accusation prior to removal from the team. If removal is warranted, [SUB-CONTRACTOR] management will arrange for immediate replacement of the team member. The team member will not be allowed to do further work on the survey, and, after returning the tablet and any other survey materials, will return home.

Interviewers and field supervisors also will be dismissed if they repeatedly fail to follow any of the procedures outlined in the Field Supervisor’s Manual or the Agriculture Interviewer’s Manual. That individual’s supervisor should bring the problem behavior to the individual’s attention and provide instruction or guidance on how to adhere to the procedures. The supervisor should keep track of the instances when the problem behavior was discussed with the individual and the efforts made to improve performance. If the problem behavior does not improve after several attempts, the supervisor will report this to [SUB-CONTRACTOR] management, which will arrange for replacement of the team member. A dismissed team member will return home after returning the tablet and other survey materials to his or her supervisor.

# Conducting the interview

This section of your Agriculture Interviewer’s Manual provides helpful guidance on how to be a successful interviewer.

## 2.1 General guidance

You as an interviewer represent not only yourself, but also Feed the Future and [SUB-CONTRACTOR] to the communities and household members selected for participation in the survey. It is important for you to make a good impression on the communities and household members you and your team encounter during fieldwork. You should follow these basic guidelines:

* Dress appropriately for fieldwork.
* Address all community and household members politely and with respect.
* Visit households during appropriate hours, namely [ENTER APPROPRIATE TIMES]. *(Note: You may need to visit a household outside these hours to interview someone who was not available during the initial visit. This will be planned in advance with the household member or members.)*
* Treat all information that you collect as strictly confidential. Do not share any information outside of the household or with other household members; this would break the trust of the respondents, and it might result in harm to the respondents or their family members.

You should discuss household-specific information only with your interviewer team partner, field supervisor, and QCS team members to solve a problem or share a concern.

Never identify specific households in any field team discussions with other interviewers.

## 2.2 Approaching the household

You will visit the household with an interviewing team, or you will join an interviewing team that has already made contact with the household. As a potential guest in the respondents’ home, it is important for you to observe all of the rules and customs governing visits to other people’s homes:

* Knock first (acceptable method in the country for approaching the house).
* Ask to speak with a responsible adult member of the household.
* Introduce yourself politely. Explain that you are there with [SUB-CONTRACTOR] to conduct a survey on food security, nutrition, and poverty.
* Explain that the survey has the support of the [GOVERNMENT AGENCY ENDORSING THE SURVEY] and community leadership.
* Ask permission to enter the home.
* Try to put the household members at ease. Smile at them and be friendly and relaxed.
* Then read the statement about the survey on the *Informed Consent* form (see Section 4.3.2 of this manual) if interviewing a household member who has not yet agreed to participate in the survey.
* Let the household members know that you will be using a tablet to conduct the interview because new technology might be intimidating.

Be patient with household members who appear suspicious of the interview. Carefully explain the purpose of the interview, emphasizing that all information is completely confidential, and that respondents can refuse to answer any questions.

If asked, explain that households cannot be compensated for their time. Instead, express your gratitude for their willingness to participate in a survey that will help decisionmakers better understand the food security, nutrition, and poverty situation in the country.

Answer any questions from the household members frankly and courteously. After answering any questions the household members may have for you, obtain consent to begin the interview, and start the survey.

If the respondent does not consent to participate in the survey, sincerely thank the respondent for his or her time and end the interview, but do not record ‘REFUSED’ as a final result for the interview at this time. Instead, inform the field supervisor of the refusal and the possible reasons for refusal.

The field supervisor will determine whether it may be appropriate to return to the household and encourage the respondent to participate in the survey. Only record the interview result as ‘REFUSED’ only after the field supervisor has confirmed the refusal with the respondent.

## 2.3 Ensuring privacy

The interviews should only be conducted with appropriate household members. Friends, neighbors, or other non-household members should not be present during the interview. It is important to ensure privacy so that respondents feel they can answer your questions freely and honestly, and so the information that they share remains confidential.

## 2.4 Building rapport

If a respondent seems shy, try to put her or him at ease. Talk about general topics of interest (for example, the weather) for a few minutes so the respondent feels more comfortable with you.

The respondent may be distracted by the tablet. Explain that the tablet is a small computer where you enter the respondents’ answers. Explain that it is not recording the conversation. If necessary, show the respondent a typical survey screen and explain how it works in simple terms.

## 2.5 How to ask the survey questions

This section provides very important instructions you will need to follow to make sure that you collect the best information possible. Some of these instructions sound like common sense; others might need more explanation from your trainer or field supervisor about why we must follow these specific instructions. If you have any questions about them, ask your field supervisor or trainer. She or he will be happy to help.

* Do not rush the interview. Allow the respondent time to think before responding. Let the respondent know that his or her answer is very important.
* Read the question exactly as it is written. Read it slowly and clearly. If the respondent does not understand the question, explain what the question is asking, and then re-read the question again slowly. If you need to explain the question further, try to be very neutral in your re-wording so that the respondent does not feel that one answer is correct or preferred. This can create what is called *bias* in the data.
* Never read the list of possible answers that appear in all capital letters to the respondent. This can also create bias. Let the respondent answer on his or her own. Then, select the survey response that best matches the answer given by the respondent.
* Remain neutral. Do not give the impression that any response is more appropriate than others. Never appear to disapprove of any response.
* If you need to explain a question to a respondent, be very careful that you do not rephrase the question so that it becomes a *leading* *question.* A leading question is a question that can encourage a respondent to answer in a particular way as a result of how the question is structured. This creates bias in the data.

An example of a balanced question is, “Would you say you’re never hungry, sometimes hungry, or often hungry?” This gives the respondent a range of possible options to choose from.

An example of a leading question, however, is, “Would you say you are often hungry?” This question appears to give only one option, and therefore the respondent is more likely to respond in the affirmative, even if it is not the response that best suits the respondent’s situation.

* Do not suggest responses to the questions.
* Respondents may want to give you more than one answer to a question that allows you to record only one response. If this happens, ask the respondent to tell you which answer is true ***most*** of the time. If the respondent feels it is not possible to do so, this probably means that there is a problem with the way the question is written; please write down the number of the question and inform your field supervisor about the problem.
* If a question allows you to record more than one response, be sure to record all responses that the respondent gives.
* Questions include the most likely responses as response options but do not necessarily include all possible responses. Therefore, some questions include the response option ‘OTHER’ or ‘OTHER (specify).’ Select this response option ***only*** if the response that the respondent gives is not listed as a response option. If you select ‘OTHER (specify),’ be sure to manually record the response given by the respondent. If you select ‘OTHER’ and ‘specify’ is not noted, you do not need to manually record the response given by the respondent.
* Respondents may provide long answers that include a lot of information not directly relevant to the question. Simply record the relevant response and continue with the interview. If the respondent ends up talking about something else, and has not answered the question at all, politely steer the respondent back to the question.
* Do not argue with respondents.
* If the respondent seems reluctant to answer a question, explain that his or her answers will be kept completely confidential.

If you feel that any of the information a respondent tells you is questionable, or you do not know how to interpret the respondent’s answer, please write down your concerns in your notebook and discuss them with the field supervisor. She or he will help you interpret the response. Your dedication to the quality of the interview and the interview data will be respected if you bring questions and concerns to the attention of your field supervisor.

## 2.6 Language of the interview

You will conduct the interview in the native language of the respondent. Respondents understand survey questions best when they are asked in their native language. A native language is a language that a person has been exposed to and learned from birth or from when they were very young children. It is possible for a person to have more than one native language.

When you first approach an eligible respondent for Module 7, *Agriculture Technologies*, you will need to ascertain their native language, and determine which translation of the questionnaire to use to conduct the interview.

1. If the respondent’s native language is [ENTER LANGUAGES TO WHICH THE QUESTIONNAIRE HAS BEEN TRANSLATED] and you are also a native speaker of that language, you will select the language as the language of interview on the tablet screen (see Figure 2.1). Questions on the tablet will appear in the language of interview, and you should read the questions directly from the screen.

In subsequent modules, if the language of interview changes (for example, if there is another eligible farmer in the household who has a different native language), select the button menu icon on the top menu bar of the tablet screen. Then choose the “Switch Language” option to continue the interview in the native language of the new respondent (see Figure 2.2). 

1. If the respondent’s native language is [ENTER LANGUAGES TO WHICH THE QUESTIONNAIRE HAS BEEN TRANSLATED] and you are not a native speaker of that language, inform your field supervisor, who will identify an interviewer on your field team or a field team working close by who is a native speaker of the respondent’s native language to conduct the interview.
2. If the respondent’s native language is not [ENTER LANGUAGES TO WHICH THE QUESTIONNAIRE HAS BEEN TRANSLATED], but both you and the respondent fluently speak a language that the questionnaire has been translated into, you may administer the questionnaire in that language. However, this is not ideal because the respondent may not completely understand all of the questions and instructions, and you may not completely understand all of the respondent’s answers. Instead, if possible, interview the respondent in his or her native language if you are also a native speaker, or inform your field supervisor, who will identify an interviewer on your field team or a field team working close by who is a native speaker of the respondent’s native language to conduct the interview. When identifying a replacement interviewer, it is important to take the gender of the potential interviewer into consideration, especially if the module to be administered contains gender-sensitive questions.
3. If the respondent does not speak [ENTER LANGUAGES TO WHICH THE QUESTIONNAIRE HAS BEEN TRANSLATED] fluently, but you, another interviewer on your field team, or an interviewer on a field team working close by is a native speaker of the respondent’s native language, that interviewer may conduct the interview in the respondent’s native language while entering the responses into the translation of the questionnaire that the interviewer is most comfortable with. This is called “on-the-fly translation.” With on-the-fly translation, there is a risk that the questions will not be translated accurately, which puts the quality of the information collected at risk. The interviewer should work slowly and carefully to translate each question, and pay very close attention to ensure that the respondent fully understands the meaning of each question.
4. If the respondent does not speak [ENTER LANGUAGES TO WHICH THE QUESTIONNAIRE HAS BEEN TRANSLATED] fluently, and there is no one on the field team or a field team working close by who is a native speaker of the respondent’s native language, the field supervisor will need to make arrangements to find a person capable of translating for the respondent and the interviewer.

This translator should be informed about the importance of keeping the respondent’s answers to the survey confidential. To further ensure respondent confidentiality, it is essential that the translator be selected from another village or community; the translator must not reside in the same village or community as the respondent.

Ideally the translator will have some familiarity with the subject matter covered by the questionnaire. Using a translator increases the amount of time required to complete the interview and seriously increases the chance that the respondent will misunderstand many of the questions. The interviewer should pay rigorous attention to the flow of the questions and responses; it is often possible for a seasoned interviewer to identify a problem with the respondent’s comprehension of the question, even if they do not speak the respondent’s language.

## 2.7 If you find a problem during the interview

Although the people who helped design, translate, and program the questionnaire worked very hard to ensure that it makes sense to respondents, and to make certain that the tablets present all the questions in the correct order, problems may still come up during fieldwork.

You may find, for example, that—

* Certain questions are not well-understood by respondents;
* Respondents’ answers do not fit into the pre-coded response categories; or
* Tablets do not allow you to enter the information correctly.

Any time you find a problem with the questionnaire or the tablet, or you think that respondents are having trouble understanding a question correctly, write down the question number in your notebook and discuss it with your field supervisor as soon as possible.

Reporting these problems when they are found can help make the entire survey better both in [COUNTRY] and in other countries, so don’t hesitate to tell your field supervisor about an issue that concerns you.

## 2.8 Ensuring and maintaining confidentiality

You must keep all data collected for this survey completely confidential. You should not share information from the survey, including the names of respondents, with anyone. You should not discuss collected information with anyone, including your team members, or comment on them in public. You will discuss respondent’s information only with the field supervisor when you have a concern, or when you need clarification about how to interpret a response.

To ensure confidentiality, you are not allowed to interview anyone you know. If you are assigned a household where you know someone, you should inform your field supervisor. The field supervisor will re-assign that household to another interviewer, and you will be assigned a different household.

To avoid identification of respondents after the survey, the information from all respondents will be combined, and any information capable of identifying an individual household or respondent will be completely removed. Respondents’ names, villages, phone numbers, and GPS coordinates will not be reported, and it will not be possible for anyone to deduce the identity of respondents from the reports.

# Fieldwork procedures

This section provides more specific guidance on how you will perform the fieldwork. It includes discussion of the interviewer team, the interviewer assignment sheet, how to manage the interview in the household, team communications, procedures for returning to the household to obtain missed interviews, responsibilities for safeguarding your tablet and securing the data that you collect with it, and ensuring that the data you collect are of the highest quality.

## 3.1 Survey questionnaire modules

The survey questionnaire includes the following modules:

* Household Identification Cover Sheet
* Informed Consent
* Module 1 Household Roster and Demographics
* Module 2 Dwelling Characteristics
* Module 3 Food Security and Resilience
* Module 4 Women’s Nutrition
* Module 4A Women’s Anthropometry
* Module 5 Children’s Nutrition
* Module 5A Children’s Anthropometry
* Module 6W Empowerment in Agriculture–Primary Female Decisionmaker
* Module 6M Empowerment in Agriculture–Primary Male Decisionmaker
* Module 7 Agricultural Technologies and Productivity
* Module 8 Household Consumption Expenditure
* [MODULE X–ADD NAME OF COUNTRY-SPECIFIC MODULE X IF APPLICABLE]

Module 7, Agricultural Technologies, will be described in detail in section 4 of this manual, but all modules are introduced here to aid in the explanation of the fieldwork procedures described in this section of the manual.

## 3.2 Agriculture interviewer

As the agriculture interviewer, you will work as part of a field team, supporting two interviewer teams. An interviewer team consists of either two female interviewers or a female interviewer and a male interviewer. An interviewer team will visit each sampled household to administer the survey questionnaire. This will enhance the security of the interviewers, improve the quality of the interview, allow team members to share the burden of administering a long questionnaire, and provide the necessary support for taking anthropometric measurements. You are responsible for administering Module 7 (Agriculture Technologies and Production) in each household that has eligible respondents for the module.

As an agriculture interviewer, your tasks are to—

* Ensure that all agriculture data for that household are on your tablet, including the Field Area Measurement plot polygons;
* Maintain the agriculture paperwork (e.g., the land map and area forms) for that household and submit completed paperwork to the field supervisor;
* Ensure that all agriculture interviews in that household are completed, including any that required callback visits;
* Ensure that the land assessment data are uploaded to the Land Potential website; and
* Transmit the data for completed Agriculture Technologies and Production module from your tablet to the tablet of the social interviewer designated as Interviewer A for the household.

#### Maintaining rapport while sharing the work during an interview

Establishing rapport with respondents is important to the success of the interview. For this reason, modules will be assigned to interviewers so that continuity is maintained to a certain extent, but also so that interviewers have some periods of rest while administering a long questionnaire.

For example, interviewer A will begin the interview by working with the household’s primary adult male (or primary adult female, if there is no primary adult male decisionmaker in the household) decisionmaker to complete Module I, *Household Roster and Demographics*. He or she will continue to ask the primary adult male (or female) decisionmaker questions from Module 2, *Dwelling Characteristics*. After Module 2 is complete, interviewer B will administer Module 3, *Food Security and Resilience,* on his or her own tablet. When interviewer A assigns Module 3 to interviewer B and interviewer B accepts the assignment, Module 2 will be available on interviewer B’s tablet. 

As the agriculture interviewer, you will administer all components of the agriculture technologies and production modules to all eligible household members. This may include talking with several household members if multiple people are responsible for cultivating or raising selected value chain commodities (VCCs) included in the ZOI Survey. Administering the agriculture technologies and production modules will include visiting all agricultural plots where household members cultivate the selected VCCs to measure the plot area and perform a land assessment.

It may be necessary to return to some households multiple times—conduct callbacks—to interview all eligible respondents.

## 3.3 Managing the interview in the household

As the agriculture interviewer, you will be responsible for completing only survey Module 7, Agriculture Technologies and Production. The social science interviewers will complete all other survey modules. Household members eligible to be interviewed for survey Module 7 will be identified based on the responses to agriculture questions included in survey Module 2. You will administer the agriculture technologies and production modules to all eligible household members who were mainly responsible for cultivating or raising selected VCCs in the household during the past year: Module 7.X to those who cultivated or raised [VCC1], Module 7.X to those who cultivated or raised [VCC2], and Module 7.X to those who cultivated or raised [VCC3].

For VCC crops, you will interview only one respondent per plot. If different household members were mainly responsible for growing the same crop on different plots of land, each household member who was mainly responsible will be interviewed about the crop on his or her plot. If no household members cultivated or raised a selected VCC in the past year, the corresponding module will be skipped. For each respondent, you will visit the plots where he or she cultivates or raises his or her VCCs to determine the area of each plot, save the plot area polygon, and perform a soil assessment.

For livestock and fish, you will interview each household member who is primary responsible for raising livestock and fish. For each household member who raised fish, you will also visit his or her fishponds to determine the area of each pond.

## 3.4 Interviewer assignment sheet

You will be given a paper Interviewer Assignment Sheet that lists all households assigned to you in a cluster (see Appendix A). The sheet will provide the household numbers—the household IDs—that will be used on the survey forms and in the tablet. Interviewer A will use your assignment sheet to track your progress in completing the survey in all of your assigned households.

Each household has three rows on the assignment sheet. The first row is for the first visit you make to the household. The second and third rows are for information about any callback visits that you make to the household, in case you do not complete the survey for the household during your first visit. Interviewer A will fill in the sheet after each visit to a household.

## 3.5 Team communications

Communication among field team members is vital to ensure that households are assigned to appropriate interviewer teams, that data collection progresses according to schedule, that questions are answered and issues are resolved, and that data are of high quality.

Interviewer A will be responsible for the following tasks:

* Receive from the field supervisor the household assignments listed on the Interviewer Assignment Sheet;
* Inform the field supervisor when a household should be re-assigned to another interviewer team because:
* An interviewer knows someone in the household, or
* Neither interviewer speaks the language spoken in the household;
* Ask the field supervisor for advice about how to interpret responses or handle confusing parts of the survey or data entry processes during the daily debrief meetings;
* Report progress in completing assignments to the field supervisor; and
* Archive the data for completed questionnaires on his or her tablet and then transmit the completed questionnaires to the field supervisor for review.

The entire field team will meet at the end of each day to discuss household assignments, progress within a cluster, issues that came up during fieldwork that day, and issues that the field supervisor or QCS team identified when observing interviews or reviewing data. The field supervisor will also check to see that each interviewer’s tablet has the completed modules as indicated on the Interviewer Assignment Sheet.

The field supervisor may ask an interviewer team or the agriculture interviewer to return to a household to collect missing data from household members who were absent during preceding visits or to check data that appear to be incorrect.

The field supervisor, QCS teams, [SUB-CONTRACTOR], and [CONTRACTOR] will all review data regularly. If an issue with the data is identified, the field supervisor will discuss the issue and how to resolve it with the interviewer team and also provide retraining, if necessary.

## 3.6 Returning to the household to obtain missed interviews

Eligible household members may not be available during your first visit to the household, which will require that you plan a time with the household to return to interview the missing household members. While the field team is still in the cluster, you will return to the household, always accompanied by another interviewer, if the missing household member will be available. If eligible respondents are not expected to be available when the field team is working in that cluster, it will not be possible to complete the interviews for that household. You will note this in the relevant modules on the tablet and on the Interviewer Assignment Sheet. Every effort should be made to complete all modules with all eligible respondents.

## 3.7 Tablets and data management

A defining characteristic of this survey is that it is administered on tablets. Each interviewer will be assigned his or her own tablet. You are responsible for taking care of the tablet that has been assigned to you. Data for completed questionnaires is archived automatically on your tablet. You will transmit the data to Interviewer A for each household every evening so that he or she can submit the data to the field supervisor. The field supervisor will review the questionnaire forms for all households that you completed that day. After verifying that the data for households that you completed that day are in fact complete and do not require any follow-up, the field supervisor will save a backup copy of completed questionnaire forms on his or her tablet, and then submit the finalized data to [CONTRACTOR].

The field supervisor may arrange for all field team members’ tablets to be charged overnight, particularly in areas where access to electricity and charging locations is limited, but ultimately, you are responsible for charging the tablet’s battery and keeping it safe. You are also responsible for knowing where your tablet is and keeping it in a safe, secure place at all times.

You will learn more about entering and managing data on your tablet in section 5 of this manual.

## 3.8 Ensuring high data quality

As an interviewer, you have a central role in ensuring the data you collect are of high quality and the survey is a success. Your responsibilities include these tasks:

* Visiting all assigned households;
* Obtaining the cooperation and informed consent of all household members eligible to participate in the survey;
* Building rapport with respondents so they complete their interviews;
* Asking the survey questions exactly as written, while providing helpful explanations and probing for answers when necessary;
* Interpreting the respondent’s answers correctly;
* Entering all responses accurately; and
* Asking for guidance if any fieldwork procedures are unclear or if issues arise during fieldwork.

In addition to your responsibilities, several other measures are in place to ensure that the survey is a success:

* Interviewer team members will support each other, for example, by identifying eligible household members to be interviewed and reviewing data (for example, checking plot area values to see if the numbers generally reflect what is known about plot size in that community and for the specific household).
* Field supervisors will confirm that there are data for every household assigned to an interviewer and for all eligible members in the household.
* Field supervisors will review the completed questionnaires to identify missing or problematic information.
* QCS team members and field supervisors will observe interviewers as they conduct some of their interviews.
* QCS team members and field supervisors will check with a purposive sample of interviewed households to confirm the household’s roster is complete;
* The tablets have automated edit checks that will notify you immediately if you entered data that are not acceptable (for example, the weight entered is out of range). The tablets are also programmed to ensure that you enter a response to all required questions.
* Data managers in the [CONTRACTOR] offices, along with the ICDM, will carefully review all data to see if there are unusual patterns of responses or outliers.

These layers of quality control will limit errors and help identify areas where field teams or individual interviewers need additional support or re-training.

# Questionnaire guidance

This section gives an overview of the agriculture technologies survey modules and item-by-item guidance on the meaning of the questions and how to fill in the responses.

## 4.1 Agricultural technologies and production modules

The Agricultural Technologies and Production module, Module 7, includes the following sections:

* 7.1 Maize
* 7.2 Common bean
* 7.3 Coffee
* 7.4 Groundnut
* 7.5 Wheat
* 7.6 Soybean
* 7.7 Paddy rice
* 7.50 Dairy cows
* 7.80 Fish
* 7.90 Land map
* 7.91 Plot area
* 7.92 Crop yield
* 7.95 Pond map
* 7.96 Pond area

## 4.2 Questionnaire formatting and notation

The questionnaire’s formatting, as well as notations that appear on the questionnaire, serve as instructions for you as you work through the questionnaire. The following paragraphs explain the type formats, symbols and punctuation, and numbering used in the tablet program.

### 4.2.1 Use of normal text or all capitalized text

When you review the questionnaire, you will notice that some parts of the questionnaire appear in normal text, while other parts are in all capitals.

Questions or explanations that you must read to the respondent appear in normal text. Here are two examples:

* Example of a question to read to the respondent:

“What kind of land preparation did you use for the maize you planted in the last year?”

* Example of an explanation to read to the respondent:

“Next, I would like to ask you about the maize that you planted in the past year.”

Responses to questions and instructions to the interviewer appear in all capital letters. These should never be read aloud to the respondent. Here are two examples:

* Example of responses, which are not be read aloud:

ONCE A MONTH……………...1

ONCE EVERY 3 MONTHS…….2

ONCE EVERY 6 MONTHS…….3

ONCE A YEAR…………………4

OTHER (SPECIFY)……………...6

* Example of an instruction, which is not to be read aloud:

CHECK 7.101: DID THE RESPONDENT USE ZERO TILLAGE METHODS TO PREPARE THE LAND?

### 4.2.2 Use of brackets to indicate that a word or phrase should be inserted

In several places throughout the questionnaire, you will need to insert words or a phrase into a question. Brackets [ ] are placed around words that need to be inserted. Here is an example:

“Altogether, how much [C-VCC] did you harvest in the past season?”

Here, you should replace [C-VCC] with the name of the crop value chain commodity (C-VCC) you are referring to (e.g., maize, beans, or coffee), so it would read like this:

“Altogether, how much maize did you harvest in the past season?”

### 4.2.3 Numbering of agricultural technology sections and questions

Within the agricultural technologies module, each section is assigned a number that is the same across all ZOI Surveys. If a section is not used in your country, the section has been excluded, but the remaining sections have not been re-numbered.

Similarly, the numbers of some questions are not sequential. Do not worry if some question numbers appear to be out of order, unless you think there is something wrong with the questionnaire’s *skip pattern* (the way that the tablet moves you from one question to the next based on the respondent’s answer).

## 4.3 Item-by-item explanation of the questionnaire

The following sections provide information on each module in the survey. They explain the purpose of the module, who should be interviewed for each module, and instructions on how to administer the module, noting any special instructions for dealing with questions or responses. Some questions and their responses are straightforward and require no special instructions.

#### Module 7.1—Maize

**Objective:** The purpose of this module is to collect information on cultivation of the maize crop. Maize is a highly valued food source. More maize is produced annually worldwide than any other grain. As in many other regions, it is consumed as a vegetable although it is a grain crop. The grains are rich in vitamins A, C, and E; carbohydrates; and essential minerals, plus some protein. They are also rich in dietary fiber and calories.

Please see the information that applies to all agricultural modules in the introductory section of Module 7–Agriculture Technologies and Production.

***Instructions for administering the module with item-by-item guidance***

**Item 7.01a.** CHECK QUESTIONNAIRE ITEMS 234 OR 236 OR 238 TO DETERMINE IF THERE ARE ANY HOUSEHOLD MEMBERS ELIGIBLE TO RESPOND TO MODULE 7.1 - MAIZE. ADMINISTER THIS QUESTIONNAIRE INDIVIDUALLY TO ALL ELIGIBLE HOUSEHOLD MEMBERS.

* IF NO ONE IN THE HOUSEHOLD PLANTED MAIZE IN THE PAST YEAR, PROCEED TO THE NEXT MODULE OR THANK THE RESPONDENT FOR THEIR TIME AND END THE INTERVIEW.
* FOR EACH MEMBER OF THE HOUSEHOLD WHO IS ELIGIBLE TO RESPOND TO MODULE 7.1 - MAIZE, CHECK THE INFORMED CONSENT REGISTER AND ENSURE THAT THE RESPONDENT HAS PREVIOUSLY PROVIDED INFORMED CONSENT; IF NOT, ADMINISTER THE INFORMED CONSENT PROCEDURE TO THE RESPONDENT.

**Purpose:** to determine if the household cultivated at least one maize crop in the past year. The household may have grown multiple varieties of maize on their land. Some households cultivate more than one crop of maize in a year if conditions are favorable. Any type of maize that the household cultivated in the past year can be considered when responding to questions in this sub-module.

**Instructions:** If using a tablet, this module will only appear in the list of modules if there are one or more household members eligible to respond to the module. If no one in the household cultivated maize in the past year, proceed to the next module. If at least one household member cultivated maize in the past year, proceed with this module. If using a paper questionnaire, implement the check referring to Module 2, *Dwelling Characteristics*. The line numbers of any eligible household members will be listed for items 234, 236, and 238. Administer this sub-module to each eligible household member after confirming or obtaining informed consent (See Item 7.100D).

**IMPORTANT:** **You will need to administer Module 7.90 – Land Map immediately after obtaining informed consent from the farmer. The question-by-question guidance for Module 7.90 – Land Map appears on page 70 of this manual.**

**Item 7.01b.** After informed consent is confirmed, read the following statement: “Next I would like to ask you about the maize you planted during the past year.”

**Item 7.100A.** INSERT TIME MODULE STARTED

**Instructions:** If using a paper questionnaire, record the time (hour and minutes) that you start the module. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.100B.** CLUSTER AND HOUSEHOLD NUMBER

**Instructions:** If using a paper questionnaire, record the cluster number and household number. You can find this information on the questionnaire cover sheet. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.100C.** LINE NUMBER OF THE RESPONDENT TO THIS MODULE

**Instructions:** If using a paper questionnaire, record the line number of the respondent who you are interviewing. You can find this information in Module 1, *Household roster and demographics*. If using a tablet, select the respondent from a dropdown menu of household members eligible for this module.

**Item 7.100D.** OBTAIN CONSENT. DOES [NAME] AGREE TO PARTICIPATE IN THE SURVEY?

**Instructions:** If using a tablet, this question will appear only if the respondent has not yet provided informed consent. If the question appears, implement the informed consent procedure. Select ‘1’ (YES) if the respondent agrees to participate or ‘2’ (NO) if the respondent does not agree to participate. If the response is ‘NO’, skip to item 7.133. If using a paper questionnaire, consult the informed consent sheet to determine if the respondent has already agreed to participate in the survey. If the respondent has not yet provided consent, implement the informed consent procedure, record the result as continue as specified above.

**ADMINISTER LAND MAP MODULE AT THIS POINT.**

**Item 7.100E.** CHECK LAND MAP: FOR WHICH PLOTS IS THE RESPONDENT PRIMARILY RESPONSIBLE FOR MAKING THE MANAGEMENT DECISIONS ABOUT CULTIVATION OF MAIZE? SELECT ALL THAT APPLY

**Instructions:** Check the land map that contains the plots that the respondent is primarily responsible for. Select all plots on which the respondent grew maize during the past year.

**Item 7.101.** “What kind of land preparation did you use for the maize you planted in the past year?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on if and how the farmer prepared the land to cultivate maize. Land preparation can influence the growth of the maize plant and eventual crop yield.

**Instructions:** Ask the question and record the response: ‘A’ (NONE), ‘B’ (ZERO TILLAGE), or ‘C’ (PLOUGHING). Be sure to select all responses that apply, as the respondent may provide more than one response. If the answer is ‘NONE,’ skip to item 7.106. If the respondent reports a type of land preparation that is not listed, record ‘X’ (OTHER) and specify.

See Table 7.1 for a description of different types of zero-tillage methods of land preparation (slash and plant, burn and plant, herbicide and plant).

See Table 7.2 for a description of different types of ploughing methods of land preparation (hand tillage, animal traction, use of a motorized tiller, tractor).

IMPORTANT:Make sure you understand the difference between an answer of ‘A’ (NONE) and ‘B’ (ZERO TILLAGE).

**Item 7.102.** CHECK 7.101: DID RESPONDENT USE ZERO TILLAGE METHODS TO PREPARE THE LAND?

**Instructions:** If using a paper questionnaire, perform the check. If the answer to item 7.101 did not include ‘B’ (ZERO TILLAGE), skip to item 7.104. If using a tablet, the check will be performed automatically and you will be prompted with the next applicable questionnaire item.

**Item 7.103.** “What kind of zero tillage system did you use on the land where you planted maize?” SELECT ALL THAT APPLY.

**Instructions:** Ask the question and record the response. If the respondent reports a type of zero tillage system that is not listed, record their response as ‘X' (OTHER) and specify the system used. Be sure to select all responses that apply, as the respondent may provide more than one response. Please see Table 7.1 for definitions of zero tillage systems listed as response options.

**Table 7.1: Zero Tillage Systems**

| **Response Category** | **Definition** |
| --- | --- |
| Slash and plant | Process of cutting down vegetation in a plot of land and planting seeds or seedlings in between the cut vegetation. |
| Burn and plant | Process of cutting down the vegetation in a plot of land, setting fire to the remaining foliage, and using the ashes to provide nutrients to the soil for use in planting seeds or seedlings. |
| Herbicide and plant | Process of applying herbicides for a plot of land and then planting seeds or seedlings. |

**Item 7.104.** CHECK 7.101: DID RESPONDENT USE PLOUGHING METHODS TO PREPARE THE LAND?

**Instructions:** If using a paper questionnaire, perform the check. If the answer to item 7.101 did not include ‘C’ (PLOUGHING), skip to item 7.106. If using a tablet, the check will be performed automatically and you will be prompted with the next applicable questionnaire item.

**Item 7.105.** “What did you use for ploughing the land where you planted maize?” SELECT ALL THAT APPLY.

**Instructions:** Ask the question and record the response. If the respondent reports a type of ploughing that is not listed, record the response as ‘X ' (OTHER) and specify the type of ploughing used. Be sure to select all responses that apply, as the respondent may provide more than one response. Please see Table 7.2 for definitions of ploughing methods listed as response options.

**Table 7.2: Ploughing Methods**

| **Response Category** | **Definition** |
| --- | --- |
| Hand tillage | A hand-held tool, such as a hoe, used to break the soil surface |
| Animal traction | An agricultural implement with sharp blades, attached to a draft animal, for cutting and turning over the soil |
| Motorized tiller | A device equipped with a motor that is used to cut and turn over the soil |
| Tractor | An agricultural implement with sharp blades, attached to a tractor, for cutting and turning over the soil |

**Item 7.106.** “What was your main source of maize seed?”

**Instructions:** Ask the question and record the response. If the respondent lists more than one source, probe to identify the *main* source. If the main source is not listed as a response option, record the response as ‘96’ (OTHER) and specify the source. Please see Table 7.3 for definitions of maize seed sources listed as response options.

**Table 7.3: Sources of Maize Seed**

| **Response Category** | **Definition** |
| --- | --- |
| Own saved seed, seed from friend/relative (not purchased) | Seeds were saved from a previous crop cultivated by the household, or by friends or family who then gifted the seed to the household. |
| Bought from friend/relative | Money was exchanged to buy the maize seed from a friend or relative. “Bought” can also mean the seed was obtained through trade or barter. |
| Bought in market (non-ag dealer) | Money was exchanged to buy the maize seed from a non-agricultural dealer. This kind of seed is usually not certified seed.\* |
| Bought from ag dealer with cash | Money was exchanged to buy the maize seed from an agricultural dealer. This kind of seed is expected to be certified seed.\* |
| Bought from ag dealer with voucher | A voucher, for example from [LOCAL AG DEALERS], was used to buy the maize seed from an agricultural dealer. This kind of seed is expected to be certified seed. |
| Aid distribution | Maize seeds were directly provided to farmers at no cost by [NAME AID DISTRIBUTOR]. This kind of seed is expected to be certified seed. |
| \* NOTE: Certified seed is the progeny of foundation seed produced by registered seed growers under supervision of seed certification agencies to maintain the seed quality as per minimum seed certification standards. | |

**Item 7.107.** “What type of maize seed did you plant in the past year?” SELECT ALL THAT APPLY.

**Purpose:** to collect information about the type of maize seed the farmer planted during the past year. The type of maize seed used can impact crop productivity, resilience and biodiversity, as well as the farmer’s crop and varietal management strategies.

**Instructions:** Ask the question and record the response. If the respondent reports not knowing if the type of maize seed is an open pollinated variety or a hybrid, record ‘Y’ (DON’T KNOW) and skip to item 7.107B. If the respondent reports that he or she planted multiple types of seed, select all applicable responses. Please see Table 7.4 for definitions of the seed types listed as response options.

**Table 7.4: Types of Maize Seed**

| **Response Category** | **Definition** |
| --- | --- |
| Unimproved / local open pollinated | Seeds that a maize plant produces naturally. When these seeds are planted, they reproduce the same plant as the parent. Also known as “landrace.” |
| Improved open pollinated | Higher-yielding seed varieties that are usually saved and planted in the next season. |
| Hybrid | Seeds that are produced by crossing two maize plants under research conditions. When these seeds are planted, they will not have the same characteristics as the original plants that were crossed. |

**Item 7.107X.** CHECK 7.107: DID RESPONDENT SELECT MORE THAN ONE TYPE OF SEED?

**Instructions:** If using a paper questionnaire, perform the check. If only one response is selected for item 7.107, skip to item 7.107B. If using a tablet, the check will be performed automatically and you will be prompted with the next applicable questionnaire item.

**Item 7.107A.** “Would you say that most of the maize seed you planted was traditional, local seed, or was it modern, improved seed?”

**Purpose:** to collect information about the type of maize seed the farmer planted during the past year.

**Instructions:** Ask the question and record only one response. If the respondent reports that he or she planted both kinds of seed, probe to determine if the seed was mostly traditional local seed, mostly modern improved seed, or about equal amounts of the two types of seed and select the corresponding response option.

**Item 7.107B.** “When decisions are made regarding what kind of maize seed to plant, who is it that normally takes the decision?” SELECT ALL THAT APPLY.

**Purpose:** to better understand how farmers make decisions about their crops, and who influences those decisions.

**Instructions:** Ask the question and record the response. If more than one person normally takes the decision, be sure to select all applicable response options.

**Item 7.108.** “Did you grow your maize crop to provide food for the household, to be sold or traded in the market, or both for food and for the market?”

**Purpose:** Knowing if the farmer used all of the maize to feed the household, or if the farmer sold or traded some or all of the maize for money or other things, helps to understand the economic situation of the farmer’s household.

**Instructions:** Ask the question and record only one response. If the respondent does not report growing maize for food or for the market, but reports another reason for growing maize that is not listed, record the response as ‘6’ (OTHER) and specify. Please see Table 7.5 for definitions of reasons for growing maize listed as response options.

**Table 7.5: Reasons for Growing Maize**

| **Response Category** | **Definition** |
| --- | --- |
| Grown for food only | The only reason for cultivating the maize was to feed the household. |
| Grown for market only | The only reason for cultivating the maize was to sell or trade it in the market. “Market” can mean anywhere that a buyer and seller might meet, including at the farm gate, in the village, or at a town market. |
| Grown for both food and market | The farmer cultivated the maize both to feed the household and to sell or trade in the market. |

**Item 7.109.** “Some farmers plant maize seeds in rows and some randomly broadcast their maize seeds. How did you plant your maize seeds?”

**Instructions:** Ask the question and record only one response. Please see Table 7.6 for definitions of the planting methods listed as response options.

**Table 7.6: Planting Methods**

| **Response Category** | **Definition** |
| --- | --- |
| In rows | Maize is planted in straight lines with space between each row. |
| Randomly broadcast | Maize is planted by casting handfuls of maize seed over prepared soil. |

**Item 7.109A.** “Some farmers plant maize seeds alone and some plant their maize seeds along with other crops growing in the same plot. How did you plant your maize seeds?”

**Instructions:** Ask the question and record only one response: ‘1’ (ALONE), ‘2’ (WITH OTHER CROPS), or ‘3’ (SOME ALONE AND SOME WITH OTHER CROPS). If the answer is ‘ALONE,’ skip to item 7.110.

**Item 7.109B.** “What other crops did you plant in the same plot with the maize?” SELECT THE NAME OF THE CROP(S) FROM THE DROP DOWN LIST.

**Instructions:** Ask the question and record the each crop mentioned. Be sure to record all crops if the respondent lists more than one. If using a tablet, select each crop from the dropdown menu provided. If using a paper questionnaire, write the name of each crop on the lines provided.

**Item 7.110.** “Over the past two planting seasons did you rotate maize with another crop planted in the same plot area?”

**Purpose:** to collect information on whether the farmer rotated the maize with other crops over the past two planting seasons. If maize is grown repeatedly in the same space, it can deplete the soil of important nutrients, making the soil less fertile and the crops grown in it less productive.

**Instructions:** Ask the question and record the response. If the respondent reports not rotating maize with another crop, probe to determine if he or she planted maize in the previous season or left plot fallow (that is, did not plant anything in the plot). If the respondent reports they do not know whether the maize plants were rotated, record ‘8’ (DON’T KNOW). If the answer is ‘NO’ or ‘DON’T KNOW,’ skip to item 7.111.

**Item 7.110A.** “What was cultivated in the plot in the season before you planted the maize?” SELECT THE NAME OF THE CROP(S) FROM THE DROP DOWN LIST.

**Purpose:** to determine whether the crop grown prior to the maize was capable of fixing nitrogen in the soil.

**Instructions:** Ask the question and record each crop mentioned. Be sure to record all crops if the respondent mentions more than one. If using a paper questionnaire, write the name of each crop on the lines provided. If using a tablet, select each crop from the dropdown menu provided.

**Item 7.111.** “Did you apply fertilizer to the maize in the past year?”

**Purpose:** to collect information on whether the farmer used some kind of fertilizer on the maize over the past year. Maize will often be more productive if it receives fertilizer at the right time and in the right amount.

**Instructions:** Ask the question and record the response. Make certain the respondent understands that fertilizer does not mean only commercial fertilizer sold in bags. It can also mean plant residues and livestock manure. If the answer is ‘NO,’ skip to item 7.112A.

**Item 7.111A.** “At which times did you apply fertilizer to the maize?” SELECT ALL THAT APPLY.

**Instructions:** Ask the question and record the response. If the respondent reports a time that is not listed, record the response as ‘X’ ‘(OTHER)’ and specify. Be sure to select all responses that apply, as the respondent may provide more than one response. Please see Table 7.7 for definitions of the timing of fertilizer application response options.

**Table 7.7: Timing of Fertilizer Application**

| **Response Category** | **Definition** |
| --- | --- |
| Planting | At the time the maize seed is planted. |
| Early growth stage | Flowering phase that lasts about a month, resulting in the formation of the seed. |
| Mid-crop | 50-60 days after the maize seed is planted (timing varies). |

**Item 7.111B.** “What type of fertilizer did you use?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on the type of fertilizer that the farmer applied to the maize. Fertilizers vary in the type and amount of nutrients they provide under different conditions. ***Organic fertilizer*** contains only plant or animal-based materials (e.g., compost, manure). ***Inorganic fertilizer*** is manufactured artificially and contains minerals or synthetic chemicals that are refined into a liquid, powder or granulated form.

**Instructions:** Ask the question and record the response. If the respondent used a type of fertilizer not listed, select ‘X’ (OTHER) and specify. Be sure to select all responses that apply, as the respondent may provide more than one response. Please see Table 7.8 for definitions of types of fertilizer listed as response options.

**Table 7.8: Types of Fertilizer**

| **Response Category** | **Definition** |
| --- | --- |
| Soil-based organic | Organic fertilizer applied to the soil. |
| Soil-based inorganic | Inorganic fertilizer applied to the soil. |
| Foliar feeds organic | Organic liquid fertilizer applied directly to the maize plant leaves. |
| Foliar feeds inorganic | Inorganic liquid fertilizer applied directly to the maize plant leaves. |

**Item 7.111C.** “What is the name of the fertilizer you mainly used for your maize in the past year?”

**Purpose:** to collect information on the type of fertilizers farmers use for maize.

**Instructions:** Ask the question and manually record the response by typing in the name of the fertilizer. If the respondent lists more than one fertilizer, probe to determine the fertilizer primarily used. If the respondent does not know the name of the fertilizer, record ‘98’ (DON’T KNOW).

**Item 7.111D.** “What was the ratio of nitrogen, phosphate, and potassium in the fertilizer you mainly used for your maize in the past year?” ENTER '98' FOR NUTRIENT IF VALUE NOT KNOWN.

**Purpose:** The ratio is expressed as three numbers that you see on a fertilizer label, such as 5-5-5, and tell you what proportion of each macronutrient the fertilizer contains. The first number is always nitrogen (N), the second is phosphorus (P) and the third is potassium (K). This N-P-K ratio reflects the available nutrients—by weight—contained in that fertilizer. For example, if a 100 kg bag of fertilizer has an N-P-K ratio of 5-7-4, it contains 5 kg of nitrate, 7 kg of phosphate (which contains phosphorus), 4 kg of potash (which contains potassium) and 84 kg of filler.

**Instructions:** Enter NPK ratio of the fertilizer the respondent mainly used in the past year. If the respondent does not know the ratio, enter ‘98’ for each nutrient. If the respondent knows only the ratio for one or two of the nutrients, enter the known values and enter ‘98’ for the unknown values.

**Item 7.112A.** “Did you apply animal manure to your maize fields in the past year?”

**Purpose:** applying rotted animal manure is a good way to return nutrients to the soil, increasing crop productivity; at the same time, selling animal manure for fertilizer to crop farmers is a good way for livestock producers to improve their household’s economic well-being. It is therefore important to understand whether farmers are using this valuable resource to grow their crops.

**Instructions:** Ask the question and record the response. If the response is ‘NO,’ skip to item 7.112D.

**Item 7.112B.** “How was animal manure applied to your maize fields?”

**Purpose:** to determine if animal manure was applied by hand, with a machine, or if animals graze on the field and the farmer leaves the dung.

**Instructions:** Ask the question and record only one response. If the respondent reports using multiple methods, probe to determine the main method he or she used to apply manure. If the respondent reports using a method not listed for most of the fields or most often, select ‘6’ (OTHER) and specify the method.

**Item 7.112C.** “Where did you get the manure you applied to your maize fields?”

**Instructions:** Ask the question and record only one response. If the respondent reports getting manure from multiple sources, probe to determine the main source of manure.

**Item 7.112D.** “When decisions are made regarding whether or not to use fertilizer on your maize, who is it that normally takes the decision?” SELECT ALL THAT APPLY.

**Purpose:** to better understand how farmers make decisions about their crops, and who influences those decisions.

**Instructions:** Ask the question and record the response. If more than one person normally takes the decision, be sure to select all applicable response options.

**Item 7.113.** “Inorganic fertilizer is a man-made fertilizer that you can buy in a bag at the shop. Have you been trained in how to use and apply inorganic fertilizer for maize?”

**Purpose:** to collect information on whether the farmer received training in the application of inorganic fertilizer to maize. Effective inorganic fertilizer application requires skills training in what to apply, when, how to apply, and how much to apply.

**Instructions:** Ask the question and record the response.

**Item 7.114.** “Did you have any insect, rodent or disease attacks on your maize in the past year?”

**Purpose:** to collect information on whether there were any pest attacks on the farmer’s maize over the past year. Damage caused by pests can have a significant impact on the growth, yield, and quality of the maize.

**Instructions:** Ask the question and record the response. If the response is ‘NO,’ skip to item 7.115.

**Item 7.114A.** “Did fall armyworm attack your maize in the past year?”

**Purpose:** Fall armyworm is a pest that has recently arrived in sub-Saharan Africa, and is capable of devastating crops, especially maize. Because maize is such an important part of the diet in some countries, it is important to know how many farmers may have been affected by this pest.

**Instructions:** Ask the question and record the response.

**Item 7.115.** “Did you use chemicals to control insect, rodent or disease attacks on the maize?”

**Instructions:** Ask the question and record the response. If the response is ‘NO,’ skip to item 7.117.

**Item 7.116.** “Was the use of chemicals preventive, or was it in response to an insect, rodent or disease attack?”

**Purpose:** to collect information on the farmer’s primary objective in using chemicals on the maize: prevention or treatment of infestation.

**Instructions:** Ask the question and record only one response. If the respondent used chemicals for both reasons, probe to determine the *main* reason.

**Item 7.117.** “Have you been trained in when to use and how to apply pesticides for maize?”

**Purpose:** to collect information on whether the farmer has been trained in the application of pesticides for maize. Effective pesticide application requires skills training to know when to apply, what to apply, how to apply, and how much to apply. Pesticides are highly toxic to humans, and thus also require training in safe use.

**Instructions:** Ask the question and record the response.

**Item 7.118.** “How many times did you control weeds among your maize crops in the past year?”

**Purpose:** to collect information on the number of times the farmer controlled weeds in the maize crops over the past year. If not managed regularly, weeds compete with the maize plant for light, water, and soil nutrients, which in turn impacts crop growth and yield.

**Instructions:** Ask the question and record the respondent’s answer. If using a paper questionnaire, record the number of times as two digits, using ‘0’ before 1 through 9, or ‘00’ (NONE). If the answer is ‘NONE,’ skip to item 7.120.

**Item 7.119.** “How did you control the weeds among your maize crops?” SELECT ALL THAT APPLY.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer to this question. Please see Table 7.9 for definitions of the methods for controlling weeds listed as response options.

**Table 7.9: Methods for Controlling Weeds**

| **Response Category** | **Definition** |
| --- | --- |
| Hoe | Handheld farming tool that removes weeds above and below the soil surface. A bush knife can be used as a substitute for a hoe |
| Herbicide | A commercial product that is toxic to plants and is used to terminate unwanted vegetation |
| Mulching | Material, such as dried grass and/or leaves, that is placed on top of soil to retain moisture, deter weeds, and keep the soil from eroding |
| Intercropping | The practice of growing one or more crops between the rows of a maize plot |
| Slashing | Process of cutting down vegetation in a plot of land |
| Pull by hand | Process of removing a weed by pulling out the entire plant by hand |

**Item 7.120.** “Have you been trained in when to use and how to apply herbicides for maize?”

**Purpose:** to collect information on whether the farmer has been trained in the application of herbicides for maize. Effective herbicide application requires skills training to know when to apply, what to apply, how to apply, and how much to apply. Herbicides are highly toxic to humans, and thus also require training in safe use.

**Instructions:** Ask the question and record the response.

**Item 7.121.** “In the past year, did you use any of the following techniques to manage soil and water for your maize crop?”

**Purpose:** to collect information on whether the farmer applied techniques to manage soil and water for the maize crop in the past year. Proper levels of soil fertility and moisture are essential to producing a successful maize crop. Conservation techniques must be employed to optimize soil retention and water management in the maize plot.

**Instructions:** Ask the question for each listed technique (a–d) one at a time, recording the respondent’s answer for each one. After asking about all of the listed techniques, ask if some other technique was used. If the respondent says, “Yes,” select ‘1’ (YES) for sub-item x (Other) and specify the technique. If the respondent says, “No,” select ‘2’ (NO) for sub-item x. Please see Table 7.10 for definitions of the techniques for soil and water conservation listed as sub-items.

**Table 7.10: Techniques for Managing Soil and Water**

| **Response Category** | **Definition** |
| --- | --- |
| Terracing | Farmland is divided into layers that look like steps. Maize is grown between the “steps.” |
| Mulching | Material, such as dried grass/leaves, is placed on top of soil to retain moisture, deter weeds and keep the soil from eroding. |
| Soil bands or trenches | Ditches are dug along the slope of the land in such a way that they follow a contour and run perpendicular to the flow of water. |
| Adding lime to soil | Agricultural lime or limestone is a soil additive made from pulverized limestone or char added to correct the soil pH. It also provides a source of calcium and magnesium for plants. |

**Item 7.122.** “Besides rainfall, did you use any additional irrigation methods for the maize?”

**Purpose:** to collect information on whether the farmer used any irrigation methods other than rainfall for the maize crop. In rain-fed maize plots, rainfall is often uneven, which impacts growth and yield. An additional supply of water not from rain will generally improve crop growth and yield.

**Instructions:** Ask the question and record the response. If the answer is ‘NO,’ skip to item 7.123A.

**Item 7.123.** “What type of irrigation did you use?” SELECT ALL THAT APPLY.

**Instructions:** Ask the question and record the response. If the respondent reports a type of irrigation that is not listed, record the response as ‘X' (OTHER) and specify. Be sure to select all that apply, as the respondent may provide more than one answer. Please see Table 7.11 for definitions of the types of irrigation methods listed as response options.

**Table 7.11: Types of Irrigation Methods**

| **Response Category** | **Definition** |
| --- | --- |
| By hand | A watering can, pail, or a hose that is used by a person. |
| Canal | A long, narrow, artificial waterway that transports water from a source to the maize plot. |
| Permanent hose | A hose with holes in it that is placed underground permanently to allow distribution of water to the roots of the plants. Also known as “drip irrigation.” |
| Pump | A device that sucks up water from a source above or below the ground. |

**Item 7.123A.** “When decisions are made regarding whether or not to irrigate the maize crop, who is it that normally takes the decision?” SELECT ALL THAT APPLY.

**Purpose:** to better understand how farmers make decisions about their crops, and who influences those decisions.

**Instructions:** Ask the question and record the response. If more than one person normally takes the decision, be sure to select all applicable response options.

**Item 7.124.** “How did you harvest the maize?”

**Instructions:** Ask the question and record only one response. If the respondent has not harvested the maize, record ‘4’ (NOT YET HARVESTED).

Note: the respondent may ask for clarification as to whether the harvesting was for planting seeds or to make flour.

**Item 7.124A.** “After harvesting the maize, what was done with the maize stalks?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on how the maize stalk is used after maize is harvested. Note the maize stalk is the stem, the slender, elongated structure that supports a maize plant.

**Instructions:** Ask the question and record the response. If the respondent reports using the maize stalks for something that is not listed, record the response as ‘X ' (OTHER) and specify. Be sure to select all that apply, as the respondent may provide more than one answer. Please see Table 7.12 for descriptions of uses for harvested maize stalks listed as response options.

**Table 7.12: Uses for Harvested Maize Stalks**

| **Response Category** | **Definition** |
| --- | --- |
| Burned in field | Farmers can burn the maize stalks since the residue are prone to insect, weeds, and disease. It is less expensive to burn the maize stalks compared to processing the residue or preventing disease by spraying. |
| Incorporated back into soil | Farmers can turn the stalks back into the soil, i.e., leave them in the field as valuable organic matter to maintain soil health. |
| Used as bedding for own livestock | Farmers may harvest the stalks from the field and make them into bedding or litter for the livestock the farmers own. |
| Used as fuel for fire | Maize stalks are harvested and used as fuel for fire. |
| Left in field for grazing by animals | Stalks are left in the field as forage for grazing animals. |
| Harvested and fed to own animals | Maize stalks are chopped to be used as fodder for own animals, including dairy cows. |
| Harvested and sold to others | Maize stalks are harvested, cut and gathered, and sold to others. |

**Item 7.124B.** “After harvesting the maize, did you use the maize husks for any purpose?”

**Instructions:** Ask the question and record the response. If the response is ‘NO,’ skip to item 7.125.

**Item 7.124C.** “What did you use the maize husks for? SELECT ALL THAT APPLY.

**Instructions:** Ask the question and record the response. If the respondent reports doing something with the maize husks that is not listed, record the response as ‘X ' (OTHER) and specify. Be sure to select all that apply, as the respondent may provide more than one answer. Please see Table 7.13 for descriptions of how uses for maize husks listed as responses.

**Table 7.13: Uses for Maize Husks**

| **Response Category** | **Definition** |
| --- | --- |
| Used for own food preparation | Maize husks are the leafy outer covering of the maize. They can be used to encase foods to be grilled, steamed or baked, imparting a light maize flavor. |
| Sold/traded for food preparation | Maize husks that are sold/traded for food preparation. |
| Used as fuel for fire | Dried maize husks burn easily and can be used for fuel. |
| Fed to own animals | Husks can fed to animals owned by the household. |
| Sold/traded with others as animal feed | Husks can be sold or traded as livestock feed. |

**Item 7.125.** “Did you dry any of your maize harvest before sale or use?”

**Instructions:** Ask the question and record the response. If the answer is ‘NO,’ skip to item 7.127.

Note: Many maize farmers harvest part, if not all, of their crop in the green (immature) stage. The respondent may hesitate to answer because it may not be all dry or all green. Record the respondent’s answer as ‘YES’ if the respondent has dried any part of the maize crop.

**Item 7.126.** “What did you dry the maize on?” SELECT ALL THAT APPLY.

**Instructions:** Ask the question and record the response. If the respondent used a drying surface that is not listed, select ‘X’ (OTHER) and specify. Be sure to select all that apply, as respondent may provide more than one response. Please see Table 7.14 for definitions of the types of drying surfaces.

Note: The respondent may hesitate to answer because the drying for seed and drying for consumption as food may use different methods. If this happens, clarify for the respondent that we are interested in where the maize that was intended for food was dried.

**Table 7.14: Drying Surfaces**

| **Response Category** | **Definition** |
| --- | --- |
| Bare ground | Ground cleared for the purpose of drying crops. |
| Ground plastered with cow dung | Bare ground covered with cow dung to make it smooth and dust free. |
| Ground covered with straw | Bare ground covered with straw. |
| Left to dry on plant in field | Maize left on plant in the maize field to dry. |
| Tarpaulin | A large sheet of strong, flexible, waterproof material. |
| Drying yard with cemented ground | Cemented area located within home compound for drying maize. |
| Drying racks | Raised platform dryers made from local materials used for open sun drying. |
| Solar dryers | A closed, insulated box in which both solar collection and drying take place. |
| Mechanized dryers | Dryer powered by a conventional fuel source. |

**Item 7.127.** “How did you shuck the maize?” SELECT ALL THAT APPLY.

**Purpose:** Mechanized methods of shucking corn allow farmers to process their harvest more efficiently and use the time saved for other productive work. This question allows for an understanding of how many farmers use more efficient maize processing techniques.

**Instructions:** Ask the question and record the response. If the respondent used a method that is not listed, select ‘X’ (OTHER) and specify. Be sure to select all responses that apply, as the respondent may provide more than one response. If the response is ‘D’ (DID NOT SHUCK), skip to item 7.128. Note that if response option D is selected, no other response options can be selected.

**Item 7.127A.** “After shucking the maize, did you use the maize cobs for any purpose?”

**Instructions:** Ask the question and record the response. If the response is ‘NO,’ skip to item 7.128.

**Item 7.127B.** “What did you use the maize cobs for?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on how the maize cob is used. Cobs can be used as animal fodder or fuel.

**Instructions:** Ask the question and record the response. If the respondent used the cobs for a purpose that is not listed, select ‘X’ (OTHER) and specify. Be sure to select all responses that apply, as the respondent may provide more than one response.

**Item 7.128.** “Did you put the maize in bags or other containers after harvest for storage or transport?”

**Instructions:** Ask the question and record the response. If the answer is ‘NO,’ ‘YES, IN BUCKETS,’ or ‘YES, IN DRUMS,’ skip to item 7.130.

**Item 7.129.** “What type of storage bag did you use for the maize?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on the type of storage bag the farmer used for the maize. The type of bag in which maize is stored can impact the shelf life of the maize, especially in terms of quality and food safety.

**Instructions:** Ask the question and record the response. Be sure to select all that apply, as the respondent may provide more than one answer. Please see Table 7.15 for definitions of the types of storage bags listed as response options.

**Table 7.15: Types of Storage Bags**

| **Response Category** | **Definition** |
| --- | --- |
| Woven bag, single layer | Traditional bags used for maize storage; use of these kinds of bags leave maize prone to fungal growth, risk of aflatoxin contamination, and moisture loss. |
| Woven bag, 2 or 3 layers | Woven bag with 2 or 3 layers for better storage to minimize fungal growth and loss of moisture. |
| Hermetic bag | A large zip-lock type of triple layer airtight storage bags promoted as “PICS” (Purdue Improved Cowpea Storage) by Purdue University or by Grainpro Corp. The hermetic bags consists of two inner bags made of high-density polypropylene with an outer woven polypropylene bag. |

**Item 7.130.** “Did you use any of the following storage locations to store the maize?”

**Instructions:** Ask the question and read each storage location (a–f) one at a time, recording the respondent’s answer for each one. When you reach the end of the list of locations, ask if the respondent stored maize in some other type of location. If the respondent says, “Yes,” enter ‘1’ (YES) and ask, “What was the storage location you used?” Specify the location in sub-item x. If the respondent says, “No,” enter ‘2’ (NO) for sub-item x. Please see Table 7.16 for definitions of the storage locations listed as sub-items.

**Table 7.16: Storage Locations Used for Dried Crops**

| **Response Category** | **Definition** |
| --- | --- |
| Residential house | A storage area inside of the household’s main residence; this could include the kitchen or cooking room. |
| Crib | A structure made of local materials, often consisting of a roofed bin elevated on posts, to permit the maximum exchange of air with the exterior environment. |
| Granary | A traditional storehouse or room in a barn for maize, especially after it has been threshed or husked. |
| Other constructed store | A storage area within the household’s home compound, but not in the main residence. |
| Warehouse | A large building, commonly used by several households, for storing harvested crops such as maize. |
| Storage silo | A tower or pit on a farm used to store maize. |

**Item 7.130A.** CHECK ALL CATEGORIES FOR Q.7.130, IF ANY YES (CODE '1') THEN CONTINUE, OTHERWISE SKIP TO Q.7.132.

**Instructions:** If using a paper questionnaire, check item 7.130. If ‘YES’ is selected for any of the sub-items, continue to Item 7.131. If ‘YES’ is not selected for any of the sub-items, skip to item 7.132. If using a tablet, the check will be performed automatically, and you will be prompted with the next applicable questionnaire item.

**Item 7.131.** “Was your maize attacked by insects, rodents or disease while in storage?”

**Purpose:** to better understand how many farmers lose part of their maize crop during the post-harvest period.

**Instructions:** Ask the question and record the response.

**Item 7.132.** “What information source do you reply on the most to help grow your maize well?”

**Purpose:** Understanding what sources farmers rely on to get agricultural information can help agricultural extension offices reach farmers with communications about improved agricultural practices.

**Instructions:** Ask the question and record only one response. If the respondent lists multiple information sources, probe to determine the *main* information source. If the main source is not listed as a response option, record ‘6’ (OTHER) and specify the source. Please see Table 7.17 for definitions of some of the information sources listed as response options.

**Table 7.17: Information Sources**

| **Response Category** | **Definition** |
| --- | --- |
| Agro-input dealer | Agro-input dealers make inputs more easily accessible to rural-based smallholder farmers. An agro-input dealer provides a place for the sale of inputs and crop produce. |
| Ag extension worker | Agricultural extension workers educate farmers and producers on how to improve their productivity. |
| Mobile phone messaging | Farmers can get messages on things like weather, market prices, or improved agricultural practices as short message service (SMS) messages, push notifications, or in-app messaging. |

**Item 7.133.** ENTER TIME MODULE FINISHED

**Instructions:** If using a paper questionnaire, enter the time (hour and minutes) that you completed the module. If using a tablet, you will not see this question; the time will be automatically recorded for you.

**Item 7.134.** OUTCOME OF THE MODULE

**Instructions:** Record the appropriate outcome of the module, or if the outcome is not listed as a response option, record ‘96’ (OTHER) and specify the outcome.

#### Module 7.50–Dairy Cows

**Objective:** Cow’s milk is a highly valued food source, rich in calcium, potassium, and protein. Cows raised for milk production can make valuable contributions both to the household’s nutritional status as well as to the household’s economic status. The purpose of this module is to determine if the household raised dairy cows in the past year, and what management practices were used to raise the dairy cows, including production and sale of milk from the dairy cows.

***Instructions for administering the module with item-by-item guidance***

**Item 7.50.00a.** CHECK QUESTIONNAIRE ITEMS 226a TO DETERMINE IF THERE ARE ANY HOUSEHOLD MEMBERS ELIGIBLE TO RESPOND TO MODULE 7.50 - DAIRY COWS (MILK). ADMINISTER THIS QUESTIONNAIRE INDIVIDUALLY TO ALL ELIGIBLE HOUSEHOLD MEMBERS.

* IF NO ONE IN THE HOUSEHOLD RAISED DAIRY COWS FOR MILK IN THE PAST YEAR, PROCEED TO THE NEXT MODULE OR THANK THE RESPONDENT FOR THEIR TIME AND END THE INTERVIEW.
* FOR EACH MEMBER OF THE HOUSEHOLD WHO IS ELIGIBLE TO RESPOND TO MODULE 7.50 - DAIRY COWS (MILK), CHECK THE INFORMED CONSENT REGISTER AND ENSURE THAT THE RESPONDENT HAS PREVIOUSLY PROVIDED INFORMED CONSENT; IF NOT, ADMINISTER THE INFORMED CONSENT PROCEDURE TO THE RESPONDENT.

**Instructions:** If using a tablet, this module will only appear in the list of modules if there are one or more household members eligible to respond to the module. If no one in the household raised dairy cows in the past year, proceed to the next module. If at least one household member raised dairy cows in the past year, proceed with this module. If using a paper questionnaire, implement the check referring to Module 2, *Dwelling Characteristics*. The line numbers of any eligible household members will be listed for item 226a. Administer this sub-module to each eligible household member after confirming or obtaining informed consent (See Item 7.5000D).

**Item 7.50.00b.** After inform consent is confirmed, read the following statement: “Next I would like to ask you about the dairy cows you raised during the past year.”

**Item 7.5000A.** INSERT TIME MODULE STARTED

**Instructions:** If using a paper questionnaire, record the time (hour and minutes) that you start the module. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.5000B.** CLUSTER AND HOUSEHOLD NUMBER

**Instructions:** If using a paper questionnaire, record the cluster number and household number. You can find this information on the questionnaire cover sheet. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.5000C.** LINE NUMBER OF THE RESPONDENT TO THIS MODULE

**Instructions:** If using a paper questionnaire, record the line number of the respondent who you are interviewing. You can find this information in Module 1, *Household roster and demographics*. If using a tablet, select the respondent from a dropdown menu of household members eligible for this module.

**Item 7.5000D.** OBTAIN CONSENT. DOES [NAME] AGREE TO PARTICIPATE IN THE SURVEY?

**Instructions:** If using a tablet, this question will appear only if the respondent has not yet provided informed consent. If the question appears, implement the informed consent procedure. Select ‘1’ (YES) if the respondent agrees to participate or ‘2’ (NO) if the respondent does not agree to participate. If the response is ‘NO’, skip to item 7.5051. If using a paper questionnaire, check the informed consent sheet to determine if the respondent has already agreed to participate in the survey. If the respondent has not yet provided consent, implement the informed consent procedure, record the result as continue as specified above.

**Items 7.5001 to 7.5004.** “How many dairy cows do you own that are milking?”, “How many dairy cows do you own that are not milking?”, “How many male animals that are one year old or older do you own?”, and “How many calves - animals under one year old - do you own?”

**Purpose:** These questions provide an understanding of the structure of the farmer’s herd, and demonstrate how efficient the herd is. They help to understand whether the farmer is keeping only the animals needed for milk production, and removing other animals that are either non-productive or in numbers beyond the farmer’s capacity to feed, water, house, and milk appropriately.

Notes:

1. Heifers that are pregnant but not yet producing milk should be considered as “dairy cows” for the purposes of defining herd size.
2. A “male” is an intact (capable of breeding cows or heifers) bull maintained for breeding cows or for fattening, or a castrated steer being kept for fattening and sale.
3. A “calf” is defined as being less than one year of age and can be a male (bull or steer) calf or a female (heifer) calf.

**Instructions:** Ask the question and record the response. If using a paper questionnaire, record the value as two digits, using ‘0’ before a value 1 through 9, or ‘00’ for none.

**Item 7.5007.** “How do you acquire your milking cows?” SELECT ALL THAT APPLY

**Purpose:** to collect information on whether farmers acquire their milking cows through breeding them, purchasing them, or both.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a method that is not listed, record the response as ‘X ' (OTHER) and specify. If the response is ***only*** ‘A’ (FARMER BUYS MILKING COWS), skip to item 7.5015.

| **Table 7.1007. How did you acquire your milking cows** | |
| --- | --- |
| ***Response Category*** | ***Definition*** |
| Raised the milking cow or cows from within own herd | Dairy cow(s) was (were) born on the farm from a dairy cow owned or co-owned by the respondent. |
| Received one or more milking cows as gifts from family members | Respondent received one or MOST of the dairy cows present on the farm as a gift from family members. Included here are dairy cows received as part of a marriage arrangement and\or inheritance from parents. |
| Received ONE milking cow from a NGO or government as “in-kind” credit through a development program | Respondent received one or MOST dairy cows present on the farm through an “in-kind” credit program (e.g. Heifer’s “Passing on the Gift” protocol) requiring her\him to “repay” the “loan” in the future by delivering a bred heifer to the program, a designated neighbor or a “share group” member. |
| Purchased all OR MOST cows from a family member | One or MOST of the dairy cows present on the farm were purchased from a family member, with immediate payment in cash or deferred payment through some sort of credit or milk income-sharing agreement. |
| Purchased all OR MOST cows from a neighbor or trader | One or MOST of the dairy cows present on the farm were purchased from a neighbor or trader, with immediate payment in cash or deferred payment through some sort of credit agreement. |

**Item 7.5007A.** “CHECK Q7.5007: DOES RESPONDENT BREED COWS (RESPONSE ‘B’)?

**Purpose:** to verify question 7.5007, that the respondent does breed their milking cows.

**Instructions:** Ask the question and record the response. If the response is ‘2’ (NO) skip to item 7.5015.

**Item 7.5008.** “How do you breed your dairy cows?” SELECT ALL THAT APPLY

**Purpose:** to collect information on whether farmers breed their dairy cows using modern or more traditional methods.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a method that is not listed, record the response as ‘X ' (OTHER) and specify.

**Item 7.5009.** CHECK Q. 7.5008: DOES RESPONDENT BREED COWS USING NATURAL BREEDING (RESPONSE 'A')?

**Instructions:** If using a paper questionnaire, check item 7.5008. If ‘A’ (NATURAL BREEDING) is not selected skip to item 7.5013. If using a tablet, the check will be performed automatically, and you will be prompted with the next applicable questionnaire item.

**Item 7.5010.** “How are bull services acquired to breed your dairy cows?” SELECT ALL THAT APPLY

**Purpose:** to collect information on how farmers acquire bull services for breeding their dairy cows.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a method that is not listed, record the response as ‘X ' (OTHER) and specify.

**Item 7.5011.** “How do you decide which bulls to choose for breeding your dairy cows and heifers?”

**Purpose:** to better understand how a farmer makes decisions about which bulls they should use for breeding.

**Instructions:** Ask the question and record only one response. If the respondent gives multiple reasons, probe to determine the *main* reason.

**Item 7.5012.** “When decisions are made regarding which bull to choose for breeding your dairy cows and heifers, who is it that normally takes the decision?” SELECT ALL THAT APPLY

**Purpose:** to collect information on who makes decisions regarding bull breeding for the farmer’s dairy cows.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer.

**Item 7.5013.** CHECK Q. 7.5008: DOES RESPONDENT USE ARTIFICIAL INSEMINATION SERVICES (RESPONSE 'B')?

**Instructions:** If using a paper questionnaire, check item 7.5008. If ‘B’ (ARTIFICIAL INSEMINATION) is not selected skip to item 7.5015. If using a tablet, the check will be performed automatically, and you will be prompted with the next applicable questionnaire item.

**Item 7.5014.** “Where do you usually obtain artificial insemination services to breed your dairy cows?”

**Purpose:** to collect information on where farmers obtain artificial insemination services for their dairy cows.

**Instructions:** Ask the question and record only one response. If the respondent gives multiple providers, probe to determine the *primary* provider. Please see Table 7.18 for descriptions of providers of artificial insemination services that are listed as response options.

**Table 7.18: Descriptions of Providers of Artificial Insemination Services**

| **Response Category** | **Definition** |
| --- | --- |
| **Public providers** | |
| Cooperative | Farmer organization that collects, cools and sells milk to processors, provides inputs and services to members |
| Community animal health worker | Community-elected men and women selected to receive training in preventative animal health services such as vaccinations and disease diagnosis |
| Government extension agent | Government employee usually attached to a district or sub-district extension office who is a knowledgeable technician, with minimally high school-level education, trained in animal health and/or dairy cattle management practices. The extension agent usually provides services – training, advice, disease diagnosis and treatment – free of charge, though some fees might be collected to cover the cost of inputs, travel and per diems. |
| **Private providers** | |
| Private vet pharmacy | A small business that sells inputs such as feeds, parasite-control supplies, medicines, often owned and operated by a graduate veterinarian |
| Private services provider | Businesses that provide services such as routine vaccinations for dairy cows and calves, emergency aid for injuries and illness |

**Item 7.5015.** “Would you say that your dairy cows are mostly local, traditional breeds, or would you say that your dairy cows are mostly exotic, modern breeds?”

**Purpose:** to collect information on what kind of dairy cows farmers have.

**Instructions:** Ask the question and record only one response. If the respondent is unsure, record ‘8’ (DON’T KNOW).

NOTES:

**Local, “traditional” breed** dairy cows and mature heifers appear to be traditional or local breed in their genetic background – size and stature, hide color or color patterns, size and development of the udder, etc.

**Cross-bred or purebred exotic** dairy cows and mature heifers show characteristics of having 50% or more “exotic” breed in their genetic background – observable through the animal’s size and stature, hide color or color patterns, size and development of the udder, etc.

**Item 7.5016.** “Which of the following is the best description of the housing for your dairy cows:

1) The dairy cows are kept in the same housing with family members

2) The dairy cows have no housing.

3) The dairy cows have only an open corral.

4) There is a roof over the dairy cows, but the structure has no sides.

5) There is a roof with side barriers to keep the dairy cows inside; the floor is made of dirt.

6) There is a roof with side barriers to keep the dairy cows inside; the floor is made of concrete.”

**Purpose:** to collect information on the housing farmers provide for their dairy cows.

**Instructions:** Ask the question and record only one response.

**Item 7.5017.** “How do you usually supply water to your dairy cows?”

**Purpose:** to collect information on how farmers supply water to their dairy cows.

**Instructions:** Ask the question and record only one response. If the respondent reports using multiple methods to supply his or her dairy cows with water, probe to determine the *primary* method. If the respondent reports a method that is not listed, record the response as ‘X ' (OTHER) and specify.

**Note:** This is a critical issue. Milk is 87% water. Water restriction, especially in hot climates, directly impacts milk production, rapidity of return to estrus post-calving, and growth and fertility of mature heifers. Cows and mature heifers should have access to clean, cool water at all times. Drinking from surface water sources like ponds and rivers is not recommended but often the only option.

**Item 7.5018.** “Do your dairy cows graze?”

**Purpose:** to collect information on whether farmers allow their dairy cows to graze.

**Instructions:** Ask the question and record the response.

**Item 7.5019.** “Forages are crop, cereal or legume residues, and cultivated fodders. In the past one year, what forages have you fed your dairy cows?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on what forages farmers feed their dairy cows.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a type of forage that is not listed, record the response as ‘X ' (OTHER) and specify. If the response is ‘A’ (NONE), skip to item 7.5021. Please see table 7.19 for descriptions of types of forage that are listed as response options.

**Table 7.19: Types of Forage**

| **Response Category** | **Definition** |
| --- | --- |
| Conserved rice straw | The sun-dried stem portion of the rice plant that is left over after harvest/threshing for collection of grain |
| Conserved maize stover | The sun-dried stem port of the maize plant that is left over after collection of the maize cob |
| Legume haulms/stovers | Seed pods; the grain covers that are separated from the edible portion of the food plant at the time of threshing |
| Forage legumes | Nitrogen-fixing plants (annuals as well as perennials), that are bred and cultivated to produce high levels of biomass useful as feed for livestock. Examples are Centrosema purpureum and Stylosanthes spp. |
| Napier grass | A perennial forage grass – Penniseteum purpureum – bred and cultivated to produce high levels of feed biomass. Napier is often cut-and-carried to dairy cows, heifers and calves in “zero-grazing” confinement housing. |
| Guinea grass | Panicum maximum – a perennial forage grass bred and cultivated to produce high levels of feed biomass. Guinea grass can be grazed but is often cut-and-carried to dairy cows, heifers and calves in “zero-grazing” confinement housing. |
| Cut fresh grass | Vegetative biomass collected from roadsides and community lands, fed daily to cows, heifers and calves maintained in “zero-grazing” confinement housing. |
| Tree fodder (leaves, branches) | Young, tender branches and leaves cut from trees and fed to dairy cows, heifers and calves, as well as dairy buffaloes and goats, housed in zero-grazing confinement housing. |

**Item 7.5020.** “Where did you get this fodder?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on where farmers get their fodder to feed dairy cows.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a location that is not listed, record the response as ‘X ' (OTHER) and specify.

**Item 7.5021.** “A simple crop by-product is a kind of supplemental feed that is made from the parts of a plant that are left over after the main crop is harvested, like stems or seed pods. Farmers can buy simple crop by-products or make their own. In the past one year, did you feed simple crop by-products to your dairy cows?”

**Purpose:** to collect information on if the farmer fed simple crop by-products to their dairy cows.

**Instructions:** Ask the question and record the response. If the response is ‘2’ (NO), skip to item 7.5024.

**Item 7.5021A.** “How often do you feed simple crop by-products to your dairy cows?”

**Purpose:** to collect information on how often the farmer feeds simple crop by-products to their dairy cows.

**Instructions:** Ask the question and record only one response. If the respondent reports a frequency that is not listed, record the response as ‘6 ' (OTHER) and specify.

**Item 7.5022.** “What kind of simple crop by-products did you feed to your dairy cows?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on what kind of crop by-products the farmer fed their dairy cows.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a type of simple crop by-product that is not listed, record the response as ‘X ' (OTHER) and specify. Please see Table 7.20 for descriptions of simple crop by-products to feed dairy cows that are listed as response options.

**Table 7.20: Types of Simple Crop By-products**

| **Response Category** | **Definition** |
| --- | --- |
| Maize bran | Maize bran is the coating removed in the early stages of processing the maize grain. Different processing methods can result in maize bran having varied composition. |
| Wheat bran | The hard outer coating of the wheat “berry” that is separated from the grain at the time of milling. Often referred to “miller’s bran”. |
| Molasses | The liquid by-product from processing sugar cane into refined sugar |
| Fruit or vegetable processing waste | Fruits and vegetables rejected for sale for human consumption or processing due to bruising or degradation that does not preclude feeding to livestock |
| Oilseed cake | The residue left from the processing of oilseeds such as soybeans or rape seed for use as edible oils. With the fat removed oilseeds are typically high in vegetable protein but also can be subject to rapid degradation if not adequately dried and stored. Oilseed cake is often the highest cost of a mixed concentrate feed for dairy cows and other ruminants. |
| Brewer’s grain | The residue left from production of beer and other alcoholic drinks. Brewer’s grains are very high in moisture and will deteriorate quickly in tropical temperatures. They must be fed soon after collection from processing sites. |
| Cottonseed meal/cake | The residue left over from processing cotton seed for the collection of oil. Cottonseed meal or cake is high in vegetable protein. CSM or cake is considered to be excellent feed for milk production as its fiber is highly digestible. |

**Item 7.5023.** “Where did you get the simple crop by-products you fed to your dairy cows?

**Purpose:** to collect information on where farmers get the simple crop-by products to feed their dairy cows.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a location that is not listed, record the response as ‘X ' (OTHER) and specify. Please see Table 7.21 for descriptions of locations to get simple crop by-products to feed dairy cows that are listed as response options.

**Table 7.21: Locations to Get Simple Crop By-products**

| **Response Category** | **Definition** |
| --- | --- |
| Own food preparation | Saved waste from their household’s food preparation to give to cows. |
| Local brewers | Obtained by-products from brewers to feed to their cows. |
| Market | Bought the simple crop by-products from the market to give to their cows. A market is a site or location where there is sale/exchange of locally-produced products such as food, and where household goods, personal care items and other items can be purchased. |
| Dairy cooperative | Obtained their by-products from a dairy cooperative for their cows. A dairy cooperative is a farmer-owned organization that provides services and inputs to dairy-farmer members and provides services such as screening, collection, cooling and sale of members’ milk |
| Other cooperative | Obtained their by-products from a different type of cooperative. A cooperative is an enterprise that is owned by member families or small businesses, brought together to achieve economies of scale in collection, value-addition and sale of member-produced commodities and other products such as handicrafts. |
| Milk purchaser (Not coop) | Obtained their by-products from a milk purchaser that is not a part of a dairy cooperative, but is a business that buys raw milk from producers and bulks it for sale to larger traders or processing plants. |
| Local agrovet supplier | Obtained their by-products from a local agrovet supplier, which is a small business located in a village or urban area that sells inputs such as veterinary pharmaceuticals, parasite control compounds, animal feeds often embedded with advice and training. Agrovet suppliers are often owned by graduate veterinarians. |
| Local food processing enterprises | Crop by-products can be purchased or received free as waste from a local enterprise that processes foods. |
| Feed traders | By-products can also be obtained from feed traders or feed trading enterprises. These are entrepreneurs who own trucks and have exclusive access to a feed source. Their service is to collect and transport feeds from source to where they are accessed or directly used by dairy farmers for feeding dairy cows and mature heifers. |

**Item 7.5024.** “Mixed concentrates are special 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 like brans, pomaces, or oil-seed cake. They are usually purchased. In the past one year, did you feed mixed concentrates to your dairy cows?”

**Purpose:** to collect information on whether the farmer fed mixed concentrates to their dairy cows.

**Instructions:** Ask the question and record the response. If the response is ‘2’ (NO), skip to item 7.5026.

**Item 7.5024A.** “How often do you feed mixed concentrates to your dairy cows?”

**Purpose:** to collect information on how often a farmer feeds mixed concentrates to their dairy cows.

**Instructions:** Ask the question and record only one response. If the respondent reports a frequency that is not listed, record the response as ‘6 ' (OTHER) and specify.

**Item 7.5025.** “Where did you get the mixed concentrates you fed to your dairy cows?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on where farmers get their mixed concentrates to feed their dairy cows.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a location that is not listed, record the response as ‘X ' (OTHER) and specify. Please see table 7.22 for descriptions of sources of mixed concentrates to feed dairy cows that are listed as response options.

**Table 7.22: Sources of Mixed Concentrates**

| **Response Category** | **Definition** |
| --- | --- |
| Market | Bought the simple crop by-products from the market to give to their cows. A market is a site or location where there is sale/exchange of locally-produced products such as food, and where household goods, personal care items and other items can be purchased. |
| Dairy cooperative | Obtained their by-products from a dairy cooperative for their cows. A dairy cooperative is a farmer-owned organization that provides services and inputs to dairy-farmer members and provides services such as screening, collection, cooling and sale of members’ milk |
| Other cooperative | Obtained their by-products from a different type of cooperative. A cooperative is an enterprise that is owned by member families or small businesses, brought together to achieve economies of scale in collection, value-addition and sale of member-produced commodities and other products such as handicrafts. |
| Milk purchaser (not coop) | Obtained their by-products from a milk purchaser that is not a part of a dairy cooperative, but is a business that buys raw milk from producers and bulks it for sale to larger traders or processing plants. |
| Local agrovet supplier | Obtained their by-products from a local agrovet supplier, which is a small business located in a village or urban area that sells inputs such as veterinary pharmaceuticals, parasite control compounds, animal feeds often embedded with advice and training. Agrovet suppliers are often owned by graduate veterinarians. |

**Item 7.5026.** “In the past one year, did you feed vitamins or minerals to your dairy cows, for example, salt, vitamins, or other kinds of mineral supplements?”

**Purpose:** to collect information on if farmers fed vitamins and minerals to their dairy cows in the past year.

**Instructions:** Ask the question and record the response. If the response is ‘2’ (NO), skip to item 7.5027.

**Item 7.5026A.** “How often do you feed vitamins or minerals to your dairy cows?”

**Purpose:** to collect information on how often farmers fed vitamins and minerals to their dairy cows.

**Instructions:** Ask the question and record only one response. If the respondent reports a frequency that is not listed, record the response as ‘6 ' (OTHER) and specify.

**Item 7.5027.** “What do you do with your cows’ manure?”

**Purpose:** to collect information on what farmers do with their cows’ manure.

**Instructions:** Ask the question and record only one response. If the response is ‘1’ (NOTHING; LEAVE IT WHERE IT FALLS), skip to item 7.5028.

**Item 7.5027A.** “Do you dry the collected manure?”

**Purpose:** to collect information on if farmers dried their cows’ manure.

**Instructions:** Ask the question and record the response.

**Item 7.5027B.** “Where do you put the cows' manure after you collect it?”

**Purpose:** to collect information on where farmers put the cow manure after they collect it.

**Instructions:** Ask the question and record only one response. If the respondent reports multiple locations, probe to determine the *main* location. If the respondent reports a main location that is not listed, record the response as ‘6 ' (OTHER) and specify. Please see Table 7.23 for descriptions of locations where cows’ manure can be kept after collection that are listed as response options.

**Table 7.23: Locations Where Cows’ Manure Can Be Kept after Collection**

| **Response Category** | **Definition** |
| --- | --- |
| Heap in uncovered area | Manure is simply piled in an open area, hopefully away from surface waters such as rivers, streams and ponds. |
| Heap in covered area | Manure is collected and stored under some sort of roof – thatched, corrugated tin, plastic sheets, etc. |
| Pit / lagoon | Manure along with urine and waste water is pushed or washed into a hole in the ground or a low area defined by a dam that holds it from further movement. Pits or lagoons should be lined with an impervious material to prevent leakage into ground or surface waters and aerated to prevent odor-causing anaerobic digestion. |
| Tank | A structure constructed of steel, aluminum, polyvinyl or hardened rubber that is designed to hold manure and urine for later use as fertilizer. |
| Biogas-producing digester | A structure that is designed to hold manure and manure-urine mixes in anaerobic conditions leading to production of gases useful for cooking and gaslight. Digester “solids” are a by-product with high fertilizer value. |

**Item 7.5027C.** “What do you do with this collected manure?”

**Purpose:** to collect information on what farmers do with their collected manure.

**Instructions:** Ask the question and record only one response. If the respondent reports using the collected manure in multiple ways, probe to determine the *main* use. If the respondent reports a main use that is not listed, record the response as ‘6 ' (OTHER) and specify. Please see Table 7.24 for descriptions of uses for collected cow manure that are listed as response options.

**Table 7.24: Uses for Collected Cow Manure**

| **Response Category** | **Definition** |
| --- | --- |
| Household uses for fuel | Due to its high fiber content, manure can be collected, dried into patties, and used as fuel for fires for warming the house, cooking, etc. |
| Household puts on field as fertilizer | Cow manure and accompanying urine are high in nitrogenous compounds (e.g. urea) that have a high fertilizer value for food crops and fruit trees. |
| Give to friends/neighbors | Where there is intensive cropping and inorganic fertilizer is scarce and expensive, manure is often shared among friends, family members, and neighbors. |
| Sell to friends/neighbors | Informal manure “markets” often are found where mixed food producing systems – horticulture, food grains and legumes, dairy, poultry – are common. Manure (mixed with urine) is high in liquids so if it is sold, it is often not moved far, being sold to nearby friends and neighbors. |
| Sell at market | Where fertilizer is particularly expensive, manure may have sufficient fertilizer value to make it worthwhile to move it some distance to local markets for sale. |

**Item 7.5028.** “In the past one year, did you obtain any health services from a trained provider for your dairy cows? Examples of health services include things like vaccinations, treatments for sick animals, and assistance with delivery of calves.”

**Purpose:** to collect information on if farmers obtained any services from trained providers for their dairy cows.

**Instructions:** Ask the question and record the response. If the response is ‘2’ (NO), skip to item 7.5030.

**Item 7.5029.** “From whom did you obtain these health services for your dairy cows?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on who the farmer sought health services from for their dairy cows.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a provider that is not listed, record the response as ‘X ' (OTHER) and specify. Please see Table 7.25 for descriptions of providers of health services for dairy cows that are listed as response options.

**Table 7.25: Providers of Health Services for Dairy Cows**

| **Response Category** | **Definition** |
| --- | --- |
| Self | Farmer has sufficient training to handle most routine cow/heifer/calf health issues. For emergency problems, e.g. difficult calving, services of experienced community animal health workers, veterinary technicians or graduate veterinarians (if available) are sought. |
| Community animal health worker | A resident of the local village or community who is usually selected by farmers for training in basic animal health issues including diagnosis of disease and basic treatment. |
| Government extension services | Government employee usually attached to a district or sub-district extension office who is a knowledgeable technician, with minimally high school-level education, trained in animal health and/or dairy cattle management practices. The extension agent usually provides services – training, advice, disease diagnosis and treatment – free of charge, though some fees might be collected to cover the cost of inputs, travel and per diems. |
| Public veterinarian | Graduate trained, licensed animal health professional whose salary is paid by central or local governments. |
| Private veterinarian | Graduate trained, licensed animal health professional who is compensated at market rates for services provided and animal health and management inputs sold. |
| Private veterinarian pharmacy | A small business located in a village or suburb that sells animal health and management inputs, often including feed ingredients and mixed concentrate feed. Advice from an experienced technician or graduate veterinarian is often “embedded” with the sale of inputs. |

**Item 7.5030.** “In the past one year, have you given any medicines to your dairy cows, for example antibiotics, wormers, or external parasite treatments?”

**Purpose:** to collect information on if the farmer has given any type of medicine to their dairy cows in the past year.

**Instructions:** Ask the question and record the response. If the response is ‘2’ (NO), skip to item 7.5032.

**Item 7.5031.** “From where did you obtain these medicines you gave to your dairy cows?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on where farmers obtained the medicines for their dairy cows.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a location that is not listed, record the response as ‘X ' (OTHER) and specify. Please see Table 7.26 for descriptions of locations to get medicines for dairy cows that are listed as response options.

**Table 7.26: Locations to Get Medicines for Dairy Cows**

| **Response Category** | **Definition** |
| --- | --- |
| Trader | A small businessperson who engages in purchase and sale of live animals, raw milk, feed ingredients, etc. Traders usually do not have a physical business, often operating out of one or more small trucks. |
| Dairy cooperative | A farmer-member-owned business engaged in quality screening, bulking, cooling and sale of milk delivered by members. Cooperatives generally charge a small fee for services with net profits distributed to member-owners at the end of the year. As well as milk management services, dairy cooperatives often provide animal health services and sell inputs at the lowest possible prices to members. |
| Milk producer | A farmer who owns and milks dairy cows. |
| Community animal health worker | A resident of the local village or community who is usually selected by farmers for training in basic animal health issues including diagnosis of disease and basic treatment. |
| Local agrovet supplier | A small business located in a village or urban area that sells inputs such as veterinary pharmaceuticals, parasite control compounds, animal feeds often embedded with advice and training. Agrovet suppliers are often owned by graduate veterinarians. |
| Private veterinary pharmacy | A small business that sells inputs such as feeds, parasite-control supplies, medicines; often owned and operated by a graduate veterinarian |
| Government extension office | An office located in a district or sub-district that houses technicians who provide training services and advice to farmers and small businesspersons engaged at various points along food commodity value chains, including dairy producers |

**Item 7.5032.** “How long does it take to obtain emergency animal health services when you need them?”

**Purpose:** to collect information on the length of time it takes for farmers to obtain emergency health services for their dairy cows.

**Instructions:** Ask the question and record the time (hours and minutes) that it takes to obtain emergency animal health services. Probe for the respondent’s best estimate. Be sure to record a value in both the HOURS and MINUTES fields. If it takes less than one hour, record ‘0’ (on a tablet) or ‘00’ (on a paper questionnaire) in the HOURS field. If the respondent specifies a number of hours and without also specifying a number of minutes, record ‘0’ (on a tablet) or ‘00’ (on a paper questionnaire) in the MINUTES field. If using a paper questionnaire, record the number of hours and minutes both as two digits, using ‘0’ before a value 1 through 9. If the respondent reports that emergency animal health services are not available, record ‘99’ in both the HOURS and MINUTES fields.

**Item 7.5033.** “In the past one year, did you vaccinate none, some, or all of your cattle?”

**Purpose:** to collect information on if the farmer vaccinated any of their cattle.

**Instructions:** Ask the question and record only one response. If the response is ‘1’ (NO CATTLE VACCINATED), skip to item 7.5034.

**Item 7.5033A.** “What vaccinations did you give to your dairy cows and calves in the past one year?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on the kinds of vaccinations they gave to their dairy cows and calves in the past year.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a vaccination that is not listed, record the response as ‘X ' (OTHER) and specify. Please see Table 7.27 for descriptions of vaccinations given to dairy cows.

**Table 7.27: Vaccinations Given to Dairy Cows**

| **Response Category** | **Definition** |
| --- | --- |
| Foot and mouth disease (FMD) | To prevent viral Foot and Mouth Disease, which causes suffering and reduces the cow’s commercial value, but does not normally cause death. |
| Contagious bovine pleuropneumonia (CBPP) | To prevent the bacterial disease Contagious bovine pleuropneumonia (CBPP), which causes depression, dullness, weakness, lethargy, respiratory symptoms like tachypnea and coughing, and sometimes sudden death in dairy cows. |
| Rift Valley fever (RVF) | To prevent the viral disease Rift Valley fever (RFV) which causes vomiting, diarrhea, respiratory disease, fever, lethargy, anorexia and sudden death in dairy cows. |

**Item 7.5033B.** “When decisions are made regarding what vaccinations to give your dairy cows, who is it that normally takes the decision?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on who makes decisions regarding vaccinations for dairy cows.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer.

**Item 7.5034.** “Dairy cows sometimes experience a condition called mastitis, an inflammation of the cow's udder that reduces milk production and quality. Have you ever heard of mastitis?”

**Purpose:** to collect information on if the farmer is aware of mastitis.

**Instructions:** Ask the question and record only one response. If the response is ‘2’ (NO), skip to item 7.5035.

**Item 7.5034A.** “Do you do anything to prevent mastitis in your dairy cows?”

**Purpose:** to collect information on if the farmer does anything to prevent mastitis in their dairy cows.

**Instructions:** Ask the question and record only one response. If the response is ‘2’ (NO), skip to item 7.5035.

**Item 7.5034B.** “What do you do to prevent mastitis in your dairy cows?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on what farmers do to prevent mastitis in their cows.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a prevention method that is not listed, record the response as ‘X ' (OTHER) and specify. Please see Table 7.28 for descriptions of methods to prevent mastitis in dairy cows.

**Table 7.28: Methods to Prevent Mastitis in Dairy Cows**

| **Response Category** | **Definition** |
| --- | --- |
| Wash udder | Farmers routinely wash the cow’s udder to remove bacteria and dirt, which can cause mastitis. |
| Teat dip | A substance that often contains an iodine compound that farmers can use to cleanse cow’s udders after milking to remove any milk film left. This helps to prevent bacteria growth that can lead to mastitis infection. |
| Somatic cell counts | This is the total number of cells per milliliter of milk. Somatic cell counts are performed on the cow’s milk to check for an immune system response. If a cow has a mastitis infection, a heightened number of the white, or somatic, blood cells will be found in the cow’s milk. |

Other response categories could include the following:

• Make sure cows are not wet from rain during milking

• Wash hands with sanitizing soap before milking

• Don’t use cloth udder drying towels on teats unless they are sanitized and never use the same cloth on different cows

• Keep the bedding in the cow shed clean and dry

• Strip small amount of milk into a strip cup at the outset of milking to detect clotting

• Test milk with California Mastitis Test (CMT) solution and paddle to detect clotting

• If mastitis detected, treat teat with antibiotic and withdraw milk from market as per label instructions

**Item 7.5035.** “Do you usually process some of your cows' milk into other products like cheese or yoghurt?”

**Purpose:** to collect information on if the farmer processes their cow’s milk in any way.

**Instructions:** Ask the question and record the response.

**Item 7.5036.** “Do you sell your cows' milk?”

**Purpose:** to collect information on if the farmer sells their cow milk.

**Instructions:** Ask the question and record the response.

**Item 7.5037.** “Yesterday morning, how much milk in total did your dairy cows produce?”

**Purpose:** to collect information on the total amount of milk the farmer’s dairy cows produced yesterday morning.

**Instructions:** Ask the question and record the total amount of milk (quantity and unit) produced yesterday morning. Record the quantity in the QUANTITY field, rounded to the nearest whole number. Record the unit of measurement in the UNIT field by selecting the response option that corresponds to the quantity reported by the respondent. If the unit of measurement is not listed, select ‘6’ (OTHER) and specify. If no milk was produced yesterday morning, record ‘000’ (NONE), and do not record anything in the UNIT field.

**Item 7.5038.** “Yesterday evening, how much milk in total did your dairy cows produce?”

**Purpose:** to collect information on the total amount of milk the farmer’s dairy cows produced yesterday evening.

**Instructions:** Ask the question and record the total amount of milk (quantity and unit) produced yesterday evening. Record the quantity in the QUANTITY field, rounded to the nearest whole number. Record the unit of measurement in the UNIT field by selecting the response option that corresponds to the quantity reported by the respondent. If the unit of measurement is not listed, select ‘6’ (OTHER) and specify. If no milk was produced yesterday evening, record ‘000’ (NONE), and do not record anything in the UNIT field.

**Item 7.5039.** ADD QUANTITIES IN ITEMS 7.5037 AND 7.5038. “Your dairy cows produced [QUANTITY] [UNITS] of milk yesterday. How many [UNITS] of that milk did you sell?”

**Purpose:** to collect information on the total amount of milk the farmer’s dairy cows produced in a day and then how much of that milk they sold.

**Instructions:** If using a paper questionnaire, sum the quantities given in the previous two questions to get the total amount of milk the respondents dairy cows produced yesterday. If using a tablet, the sum will appear in the question automatically. Ask the question, using the total amount of milk produced yesterday, and record the total amount of that milk (quantity and unit) that was sold. Record the quantity in the QUANTITY field, rounded to the nearest whole number. Record the unit of measurement in the UNIT field by selecting the response option that corresponds to the quantity reported by the respondent. If the unit of measurement is not listed, select ‘6’ (OTHER) and specify. If none of the milk produced yesterday was sold, record ‘000’ (NONE), and do not record anything in the UNIT field.

**Item 7.5040.** “Where do you usually sell your milk?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on where a farmer sells their milk.

A milk marketing cooperative is a business owned and controlled by the dairy farmers who produce the milk used by the cooperative. A aggregator or off-taker is a dairy wholesale buyer who packages and sells the dairy products to the consumers.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a location that is not listed, record the response as ‘X ' (OTHER) and specify.

**Item 7.5041.** “Do you usually sell only morning milk, only evening milk, or both morning and evening milk?”

**Purpose:** to collect information on which milk (morning, evening, or both) the farmer usually sells.

**Instructions:** Ask the question and record only one response.

**Item 7.5042.** CHECK ITEM 7.5040: DOES FARMER SELL MILK TO A MILK MARKETING COOP (RESPONSE D)?

**Instructions:** If using a paper questionnaire, check item 7.5040. If ‘D’ (MILK MARKETING COOPERATIVE) is not selected, skip to item 7.5045. If using a tablet, the check will be performed automatically, and you will be prompted with the next applicable questionnaire item.

**Item 7.5043.** “What services does your milk marketing cooperative provide you?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on the type of services that a milk marketing cooperative provides to the farmer.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a service that is not listed, record the response as ‘X ' (OTHER) and specify. Please see Table 7.28 for descriptions of services that milk marketing cooperatives may provide.

**Table 7.28: Services that Milk Marketing Cooperatives May Provide**

| **Response Category** | **Definition** |
| --- | --- |
| Amount of milk sold | Provides counts of the amount of milk the farmer sold through the cooperative. |
| Fat content of milk sold | Provides tests to determine the amount of fat in the milk sold by the farmer. |
| Acidity of milk sold | Provides test to determine the acid levels of the milk sold by the farmer. |
| Extension services | Provide extension agriculture and livestock services to the farmer. |
| Animal health services | Provide health services for the animals providing milk to the cooperative. |
| Loans | Provides monetary loans to farmers who are a part of the cooperative. |

**Item 7.5044.** “How do you receive payment for your milk from your cooperative?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on how the farmer collects payments from the milk they sell at the cooperative.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a payment method that is not listed, record the response as ‘X ' (OTHER) and specify. Please see Table 7.29 for descriptions of payment methods.

**Table 7.29: Payment Methods**

| **Response Category** | **Definition** |
| --- | --- |
| Cash | The farmer is given legal monetary notes in exchange for the milk sold. |
| Store credit | The farmer is given a monetary amount, or credit, that can be used to buy supplies that the cooperative provides. |
| MPESA / mobile money | The farmer receives an electric mobile money cash transfer through an application on their mobile phone in exchange for the milk sold. |
| Direct deposit to bank account | The farmer receives a monetary amount in their bank account electronically in exchange for the milk they sold. |

**Item 7.5045.** “Do you keep daily written records on your dairy cows, for example how much each animal eats, what they eat, how much milk is produced, or when an animal is sold, born, or bought?”

**Purpose:** to collect information on if the farmer keeps written records on their dairy cows.

**Instructions:** Ask the question and record the response.

**Item 7.5046.** “How do you decide when to sell one of your dairy cows?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on what influences a farmer to sell their cows.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer. If the respondent reports a reason that is not listed, record the response as ‘X ' (OTHER) and specify.

**Definitions:**

Cow fails to re-breed: Cow completes lactation without being pregnant.

Cow production declines below a certain level: Cow daily milk production level falls below what is considered profitable.

New, more productive heifers are coming into the herd and need to limit the number of cows: Heifers raised on-farm or purchased are expected to produce higher daily levels of milk. Limitations on cow housing space and available feeds and forages precludes expanding cow numbers.

Needed funds to pay off loan(s): Cow was best source of cash or most easily convertible family asset to meet financial obligation.

**Item 7.5047.** “When decisions are made regarding selling a dairy cow, who is it that normally takes the decision?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on who makes decisions about selling dairy cows.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one answer.

**Item 7.5048.** “In the past year, how many of your dairy cows did you sell?”

**Purpose:** to collect information on how many dairy cows the farmer sold last year.

**Instructions:** Ask the question and record the response. If using a paper questionnaire, record the number of dairy cows sold in the past year as two digits, using ‘0’ before 1 through 9, or ‘00’ (NONE).

**Item 7.5049.** “In the past year, how many male animals did you sell?”

**Purpose:** to collect information on how many male cows the farmer sold in the last year.

**Instructions:** Ask the question and record the response. If using a paper questionnaire, record the number of male animals sold in the past year as two digits, using ‘0’ before 1 through 9, or ‘00’ (NONE).

**Item 7.5050.** “What information source do you rely on the most to help you raise your livestock well?

**Purpose:** to determine the principal sources of assistance for producer “skills and knowledge building” among the surveyed dairy producer population.

**Instructions:** Ask the question and record only one response. If the respondent lists multiple information sources, probe to determine the *main* information source. If the main source is not listed as a response option, record ‘6’ (OTHER) and specify the source. Please See Table 7.30 for definitions of the main information sources listed as response options.

**Table 7.30: Information Sources**

| **Response Category** | **Definition** |
| --- | --- |
| Parent or other family member | Skills and knowledge transfer from a parent or other family member to a younger family member. |
| Friend/neighbor | Dairy producers who are friends or neighbors serve as “learning resources” and mentors |
| Community animal health worker | Men or women selected by the community to receive training in livestock disease diagnosis, simple treatments, vaccination techniques and emergency injury response |
| Local agrovet supplier | A small business located in a village or urban area that sells inputs such as veterinary pharmaceuticals, parasite control compounds, animal feeds often embedded with advice and training. Agrovet suppliers are often owned by graduate veterinarians. |
| Private veterinary pharmacy | Graduate trained, licensed animal health professional who is compensated at market rates for services provided and animal health and management inputs sold |
| Ag extension worker, including extension veterinary technician | Government employee – extension services technician or veterinary technician -- usually attached to a district or sub-district extension office who are knowledgeable technicians, with minimally high school-level education, trained in milk production management and cow health management practices. These trainers usually provide services – training, advice, disease diagnosis and treatment – free of charge, though some fees might be collected to cover the cost of inputs, travel and per diems. |
| Formal training school | A public or private program requiring physical attendance at a local school, for a variable number of sessions |
| Farmer Field School | A participatory training process whereby dairy producer-leaders serve as trainers for neighbor producers and producers brought to the producer-leader’s farm by NGOs or extension offices |
| Radio program | Radio broadcast providing new knowledge on cow and milk management techniques for listeners |
| Television | TV broadcasts providing new knowledge on cow and milk management techniques for viewers |
| Mobile phone messaging | Transfer of cow and milk management knowledge and information through SMS-enabled phones or apps on web-linked smart phones. |
| Internet | Transfer of cow and milk management knowledge and information through Internet-based programs and applications. |

**Item 7.551.** ENTER TIME MODULE FINISHED

**Instructions:** If using a paper questionnaire, enter the time (hour and minutes) that you completed the module. If using a tablet, you will not see this question; the time will be automatically recorded for you.

**Item 7.552.** OUTCOME OF THE MODULE

**Instructions:** Record the appropriate outcome of the module, or if the outcome is not listed as a response option, record ‘96’ (OTHER) and specify the outcome.

#### Module 7.80—Fishpond Aquaculture

**Objective:** The purpose of this module is to collect information about cultivation of fish in ponds. Fish are a highly valued food source, rich in protein and important micronutrients.

Please see the information that applies to all agricultural modules in the introductory section of Module 7–Agricultural technologies.

***Instructions for administering the module with item-by-item guidance***

**Item 7.80.00a.** CHECK QUESTIONNAIRE ITEMS 226g TO DETERMINE IF THERE ARE ANY HOUSEHOLD MEMBERS ELIGIBLE TO RESPOND TO MODULE 7.80–FISHPONT AQUACULTURE. ADMINISTER THIS QUESTIONNAIRE INDIVIDUALLY TO ALL ELIGIBLE HOUSEHOLD MEMBERS.

* IF NO ONE IN THE HOUSEHOLD RAISED FISH IN THE PAST YEAR, PROCEED TO THE NEXT MODULE OR THANK THE RESPONDENT FOR THEIR TIME AND END THE INTERVIEW.
* FOR EACH MEMBER OF THE HOUSEHOLD WHO IS ELIGIBLE TO RESPOND TO MODULE 7.80–FISHPOND AQUACULTURE, CHECK THE INFORMED CONSENT REGISTER AND ENSURE THAT THE RESPONDENT HAS PREVIOUSLY PROVIDED INFORMED CONSENT; IF NOT, ADMINISTER THE INFORMED CONSENT PROCEDURE TO THE RESPONDENT.

**Purpose:** to determine if the household raised dairy cows in the past year.

**Instructions:** If using a tablet, this module will only appear in the list of modules if there are one or more household members eligible to respond to the module. If no one in the household raised fish in ponds in the past year, proceed to the next module. If at least one household member raised fish in ponds in the past year, proceed with this module. If using a paper questionnaire, implement the check referring to Module 2, *Dwelling Characteristics*. The line numbers of any eligible household members will be listed for item 226g. Administer this sub-module to each eligible household member after confirming or obtaining informed consent (See Item 7.8000D).

**Item 7.80.00b.** After inform consent is confirmed, read the following statement: “Next I would like to ask you about the fish you raised during the past year.”

**Item 7.8000A.** INSERT TIME MODULE STARTED

**Instructions:** If using a paper questionnaire, record the time (hour and minutes) that you start the module. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.8000B.** CLUSTER AND HOUEHOLD NUMBER

**Instructions:** If using a paper questionnaire, record the cluster number and household number. You can find this information on the questionnaire cover sheet. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.8000C.** LINE NUMBER OF THE RESPONDENT TO THIS MODULE

**Instructions:** If using a paper questionnaire, record the line number of the respondent who you are interviewing. You can find this information in Module 1, *Household roster and demographics*. If using a tablet, select the respondent from a dropdown menu of household members eligible for this module.

**Item 7.8000D.** OBTAIN CONSENT. DOES [NAME] AGREE TO PARTICIPATE IN THE SURVEY?

**Instructions:** If using a tablet, this question will appear only if the respondent has not yet provided informed consent. If the question appears, implement the informed consent procedure. Select ‘1’ (YES) if the respondent agrees to participate or ‘2’ (NO) if the respondent does not agree to participate. If the response is ‘NO’, skip to item 7.8028. If using a paper questionnaire, consult the informed consent sheet to determine if the respondent has already agreed to participate in the survey. If the respondent has not yet provided consent, implement the informed consent procedure, record the result as continue as specified above.

**Item 7.8001.** “How many fish in total have you stocked in the past one year?

**Purpose:** to collect information on the number of fish a farmer stocked in the past year, allowing for calculation of annual yield.

**Instructions:** Ask the question and record the response. If using a paper questionnaire, record the value as four digits, using ‘0’s before a value 1 through 999 so that all four boxes are filled in, or record ‘0000’ for none. If the respondent is unsure how many fish he or she has stocked in the past one year, ask for the respondent’s best estimate.

**Item 7.8002A.** “What was the main source of fish you stocked in the past year?”

**Purpose:** to collect information on the main source for the farmer in the past year.

**Instructions:** Ask the question and record only the response. If the respondent reports multiple sources, probe to determine the main source. If the respondent reports a main source that is not listed, record the response as ‘6 ' (OTHER) and specify the source. Please see Table 7.31 for descriptions of fish sources that are listed as response options.

**Table 7.31: Sources of Fish**

| **Response Category** | **Definition** |
| --- | --- |
| Raised on own, received from friend or relative (not purchased) | Farmer used his/her own stock as their source of fish. |
| Purchased from friend/relative | Money or goods were exchanged to buy the fish from a friend or relative. |
| Purchased from local hatchery | Money or goods were exchanged to buy the fish from a local hatchery. |
| Purchased non-local hatchery | Money or goods were exchanged to buy the fish from a non-local hatchery. |
| Aid distribution | Fish were directly provided to fish farmers at no cost to them by X. |

**Item 7.8002B.** CHECK 7.8002a: DID RESPONDENT PURCHASE FINGERLINGS FROM HATCHERY (RESPONSE 3 OR 4)?

**Instructions:** If using a paper questionnaire, check item 7.8002A to determine if the respondent purchased fingerlings from a hatchery (response option 3 or 4). If the answer is ***not*** ‘3’ (LOCAL HATCHERY) or ‘4’ (NON-LOCAL HATCHERY), skip to item 7.8003. If using a tablet, the check will be performed automatically and you will be prompted with the next applicable questionnaire item.

**Item 7.8002C.** “Was the hatchery where you purchased your fish a registered or certified hatchery?”

**Purpose:** to collect information on whether the hatchery where the farmer purchased his or her fingerlings was registered or certified by the government or industry as a fingerling producer.

**Instructions:** Ask the question and record the response.

**Item 7.8003.** “Where do you raise your fish? In a man-made earthen pond, a cemented pond, a natural pond, a stream, or somewhere else? SELECT ALL THAT APPLY.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one response. If the respondent reports raising his or her fish somewhere other than the locations specified, record ‘X’ (OTHER) and specify the location. Please see Table 7.32 for descriptions of places where fish are raised that are listed as response options.

**Table 7.32: Places Where fish Are Raised**

| **Response Category** | **Definition** |
| --- | --- |
| Man-made earthen basin | Fish are raised in a large basin made of natural materials, filled with water. |
| Cemented pond | A man made pond, that is filled and lined with cement to raise fish. |
| Natural pond / lake | A pond or lake that is not man made that has sections with a barrier for raising fish. |
| Stream | A stream that has sections with a barrier for raising fish. |

**Item 7.8004.** “As you know, fish eat foods that occur naturally in the pond, like algae and plankton. Some people also give their fish supplemental feed to make their fish grow faster. Supplemental feeds can be made from things like rice bran, cassava flour, soy meal, leaves from crops, or fish meal. In the past year, did you give your fish supplemental feed?”

**Purpose:** to collect information on if the farmer gave their fish any supplemental feed in the past year.

**Instructions:** Ask the question and record the response. If the response is ‘2’ (NO), skip to item 7.8006.

**Item 7.8005.** “Where did you get the supplemental feed you gave to your fish—did you make it yourself or did you buy it?”

**Purpose:** to collect information on where they got their supplemental feed for their fish.

**Instructions:** Ask the question and record only one response. If the respondent reports that he or she both made and bought feed, probe to determine which he or she did most often.

**Item 7.8006.** “In the past year, did you use hormones to raise your fish?”

**Purpose:** to collect information on if the farmer used hormones to raise their fish.

**Instructions:** Ask the question and record the response. If the answer is ‘NO,’ skip to item 7.8009.

**Note:** Growth hormones are a dangerous controlled substance and it is not recommended to use them; the respondent may therefore hesitate to answer these questions. Do not give any indication of personal judgment regarding this question or the answer the respondent provides.

**Item 7.8007.** “At what stage of growth did you apply the hormone to the fish?” SELECT ALL THAT APPLY

“When did you apply the hormone to the fish?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on what stage of growth or when the farmer applied hormones to the fish.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one response. If the respondent reports applying hormone to the fish at a time not listed, select ‘X’ (OTHER) and specify. Please see Table 7.33 for descriptions of times when hormones are applied to fish that are listed as response options.

**Table 7.33: Timing of Hormone Application**

| **Response Category** | **Definition** |
| --- | --- |
| Initial growth phase | From when the fish are eggs to the juvenile stage. |
| Development phase | When fish grow from juveniles to adults. |

**Item 7.8008.** “Have you been formally trained in the use of hormones for fish farming?”

**Purpose:** to collect information on if the farmer has been trained on using hormones for fishing.

**Instructions:** Ask the question and record the response.

**Item 7.8009.** “What kind of fish did you raise last year?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on what kind of fish the farmer raised last year.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one response. If the respondent reports raising a type of fish not listed, select ‘X’ (OTHER) and specify. Please see Table 7.34 for descriptions of fish varieties that are listed as response options.

**Table 7.34: Fish Varieties**

| **Response Category** | **Definition** |
| --- | --- |
| Carp | A common freshwater fish with barbels, or “whiskers”, around the mouth that are commonly farmed. |
| Tilapia | A common name for fish of the cichlid tribe, that are freshwater fish usually found in shallow streams, ponds, rivers, and lakes. |
| Catfish | A common name for a diverse group of with barbels, or “whiskers”, fish that live in freshwater and are bottom feeders, usually found in muddy waters. |
| [Local variety 1] |  |
| [Local variety 2] |  |
| [Local variety 3] |  |
| Other selected |  |

**Item 7.8010.** “Did you observe any disease among your fish in the past year?”

**Purpose:** to collect information on any disease the farmer may have observed in their fish in the past year.

**Instructions:** Ask the question and record the response.

**Item 7.8010A.** “Did you do anything to control disease among your fish in the past year?”

**Purpose:** to collect information on if the farmer did anything to control disease in their fish in the past year.

**Instructions:** Ask the question and record the response. If the answer is ‘NO,’ skip to item 7.8011.

**Item 7.8010B.** “What did you do to control disease among your fish?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on what the farmer did to control disease in their fish.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one response. If the respondent reports using a method not listed, select ‘X’ (OTHER) and specify. Please see Table 7.35 for descriptions of disease control methods that are listed as response options.

**Table 7.35: Disease and Parasite Control Methods**

| **Response Category** | **Definition** |
| --- | --- |
| Salt | A salt solution treatment is used to control the amount of protozoans on the gills and skin of the fish. |
| Formalin | This is a chemical used in a bath treatment for fish to control parasites on the fish. |
| Malachite green | This is a chemical that is used as an effective way to control external parasites on fish. It also controls fungus and acts as a disinfectant for fish eggs. It is toxic to humans. |
| Methyl blue | This chemical is used against external fungal infections of fish. |
| Antibiotics / antibiotic-treated feed | This type of feed is used to control bacterial diseases in fish (disease only). |

**Item 7.8011.** “Did you have any parasite cases among your fish in the past year?”

**Purpose:** to collect information on if the farmer had any cases of parasites in their fish in the last year.

**Instructions:** Ask the question and record the response.

**Item 7.8011A.** “Did you do anything to control parasites among your fish in the past year?”

**Purpose:** to collect information on if the farmer did anything to control parasites on their fish in the past year.

**Instructions:** Ask the question and record the response. If the answer is ‘NO,’ skip to item 7.8012.

**Item 7.8011B.** “What did you do to control parasites among your fish?”

**Purpose:** to collect information on what the farmer did to control parasites on their fish.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one response. If the respondent reports using a method not listed, select ‘X’ (OTHER) and specify. Please see Table 7.8010B (above) for descriptions of parasite control methods.

**Item 7.8012.** “Did you monitor the water quality in your pond in the past year?”

**Purpose:** to collect information on if the farmer monitored the water quality in their pond in the past year.

**Instructions:** Ask the question and record the response. If the answer is ‘NO,’ skip to item 7.8013.

**Item 7.8012A.** “How did you monitor the water quality in your pond in the past year?” SELECT ALL THAT APPLY

**Purpose:** to collect information on how the farmer monitored water quality in their pond in the past year.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one response. If the respondent reports using a method not listed, select ‘X’ (OTHER) and specify. Please see Table 7.36 for descriptions of water quality monitoring methods that are listed as response options.

**Table 7.36: Water Quality Monitoring Methods**

| **Response Category** | **Definition** |
| --- | --- |
| Used hand to assess turbidity | Turbidity (how clear or cloudy the water is) can be assessed by putting one’s hand in the water, palm facing upward, and measuring the depth at which it is no longer visible. |
| Used secchi disk to assess turbidity | A secchi disk is a plain white (or black-and-white patterned) disk that is used to measure turbidity. It is lowered into the water and a measurement is taken at the depth that the disk is no longer visible. |
| Tested water pH | pH of the water is measured to determine the acidity of the water. |
| Observed fish for piping behavior | Fish are found “gasping” for air due to low levels of oxygen in the water. |

**Item 7.8013.** “Did you do anything to maintain good water quality in your pond in the past year?”

**Purpose:** to collect information on whether the farmer did anything to maintain good water quality in the past year.

**Instructions:** Ask the question and record the response. If the answer is ‘NO,’ skip to item 7.8014.

**Item 7.8013A.** “What did you do to maintain good water quality in your pond in the past year? SELECT ALL THAT APPLY.

**Purpose:** to collect information on what steps the farmer took to maintain good water quality in their pond in the past year.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one response. If the respondent reports using a method not listed, select ‘X’ (OTHER) and specify. Please see Table 7.37 for descriptions of methods to maintain good water quality that are listed as response options.

**Table 7.37. Water quality maintenance methods**

| **Response Category** | **Definition** |
| --- | --- |
| Screened the water coming into the pond | The farmer passed the water through some kind of screen to filter out large contaminants before allowing the water into the pond with the fish. |
| Cut grass around pond | The farmer cut the grass around the pond to eliminate frog habitat. Frogs often lay their eggs on grasses allowed to overhang the pond’s edge; when the eggs hatch, the tadpoles may consume any fish eggs in the pond, compete with fish for space and access to feed, and serve as vectors for fish disease. |
| Drained pond to clean it | Farmer pumped the water out of the pond so it can be cleaned. |
| Added ash to stabilize water pH | Ash is added to raise the pH of water. |
| Added dissolved oxygen | Oxygen levels can be increased by adding wind or wave action and adding plants. |

**Item 7.8014.** “In the past one year, how many times have you drained the water from your fish pond and allowed the bottom of the pond to dry?”

**Purpose:** to collect information on the number of times the respondent cleaned and managed his or her fish pond over the past year. If not managed regularly, other organisms compete with the fish for light, water, and nutrients, which in turn will impact growth and yield.

**Instructions:** Ask the question and record the response. If using a paper questionnaire, record the number of times as two digits, using ‘0’ before a value 1 through 9, or ‘00’ for none.

**Item 7.8015.** “In the past year, have you used any techniques to improve your production of fish?”

**Purpose:** to collect information on if the farmer used any techniques to improve their fish production.

**Instructions:** Ask the question and record the response. If the answer is ‘NO,’ skip to item 8.817.

**Item 7.8016.** “What kind of technique did you use in the past year to improve your production of fish? Did you practice: [technique]?

**Purpose:** to collect information on what kind of techniques used to improve fish production.

**Instructions:** Ask the question for each listed technique (a–d) one at a time, recording the response for each. After asking about all listed techniques, ask if some other technique was used. If the respondent says, “Yes,” select ‘1’ (YES) for sub-item x (OTHER) and specify the technique. Please see Table 7.38 for definitions of techniques to raise and improve fish production listed as sub-items.

**Table 7.38: Techniques to Improve Fish Production**

| **Response Category** | **Definition** |
| --- | --- |
| Sex separation | Fish are separated by sex in order to promote growth. |
| Age separation | Fish are separated into age groups in order to promote growth and survival. |
| Variation of feed | Fish feed is varied to promote growth in fish. |
| Stocking method | Fish are added to the pond in order to encourage growth of a favored species or introduce new species to a pond. |

**Item 7.8017.** “Did you add animal manure to your fish ponds in the past year?”

**Purpose:** Adding animal manure to fish ponds facilitates production of fish food.

**Instructions:** Ask the question and record the response. If the response is ‘NO,’ skip to item 7.8018A.

**Item 7.8017A.** “Where do you usually get the manure you add to your fish ponds?”

**Instructions:** Ask the question and record only one response. If the respondent reports getting manure from multiple sources, probe to determine the main source of manure.

**Item 7.8018A.** “Do you usually harvest all of your fish at one time, or do you usually do partial harvests?”

**Purpose:** to collect information on when the farmer harvested fish.

**Instructions:** Ask the question and record the response.

**Item 7.8018B.** “What method do you usually use to harvest your fish?”

**Purpose:** to collect information on the method the farmer used to harvest their fish.

**Instructions:** Ask the question and record only one response. If the respondent reports using more than one method, probe to determine which method he or she most often uses. If the respondent reports that he or she most often uses a method not listed, record ‘6’ (OTHER) and specify the method. If the response is ***not*** ‘3’ (PULL CAGES UP), skip to item 7.8019A. Please see Table 7.39 for descriptions of methods used to harvest fish listed as response options.

**Table 7.39: Methods to Harvest Fish**

| **Response Category** | **Definition** |
| --- | --- |
| Cast net | A net with weights at the edge is cast into water and as it spread out it catches fish, which are hauled back in. |
| Seine net | A type of fishing where a net hangs vertically and the bottom is held down by weights and the top is buoyed. Fish are collected as the net is pulled in. |
| Pull cages up | A cage that is thrown into water and sinks to the bottom and sits as fish or other water animals are trapped inside and pulled in. |

**Items 7.8018C–F.** Information about cages used to harvest fish.

**Purpose:** to collect information on number, height, width, and depth of fishing cages the farmer uses. This information is necessary to calculate measures of yield.

**Item 7.8018C.** “How many cages do you have?”

**Instructions:** Ask the question and record the number of cages that the respondent has. If the respondent unsure of the number of cages, probe for the respondent’s best estimate. If after probing, the respondent is still unsure, record ‘998’ (DON’T KNOW). If using a paper questionnaire, record the value as three digits, using ‘0’s before a value less than 100 so that all three boxes are filled in.

**Item 7.8018D.** “What is the height of your cages?”

**Instructions:** Ask the question and record the height of the respondent’s cages in meters to one decimal place (e.g., 2.3 meters). If the respondent has cages of different heights, record the height of most of his or her cages. If the respondent unsure of the height, probe for the respondent’s best estimate. If after probing, the respondent is still unsure, record ‘998’ (DON’T KNOW). If using a paper questionnaire, record the value as three digits, using ‘0’s before a value less than 10.0 so that all three boxes are filled in.

**Item 7.8018E.** “What is the width of your cages?”

**Instructions:** Ask the question and record the height of the respondent’s cages in meters to one decimal place (e.g., 2.3 meters). If the respondent has cages of different heights, record the height of most of his or her cages. If the respondent unsure of the height, probe for the respondent’s best estimate. If after probing, the respondent is still unsure, record ‘998’ (DON’T KNOW). If using a paper questionnaire, record the value as three digits, using ‘0’s before a value less than 10.0 so that all three boxes are filled in.

**Item 7.8018F.** “What is the depth of your cages?”

**Instructions:** Ask the question and record the height of the respondent’s cages in meters to one decimal place (e.g., 2.3 meters). If the respondent has cages of different heights, record the height of most of his or her cages. If the respondent unsure of the height, probe for the respondent’s best estimate. If after probing, the respondent is still unsure, record ‘998’ (DON’T KNOW). If using a paper questionnaire, record the value as three digits, using ‘0’s before a value less than 10.0 so that all three boxes are filled in.

**Item 7.8019A.** “How many fish have you harvested in the past one month?”

**Purpose:** to collect information on how many fish the farmer has harvested in the past month. This information is necessary to calculate measures of yield.

**Instructions:** Ask the question and record the response. If using a paper questionnaire, record the value as four digits, using ‘0’s before a value 1 through 999 so that all four boxes are filled in, or ‘0000’ for none. If the respondent is unsure how many fish he or she harvested in the past one month, ask for the respondent’s best estimate. If the respondent did not harvest any fish in the past one month, skip to item 7.8019C.

**Item 7.8019B.** “What was the total weight of the fish you harvested in the past one month?”

**Purpose:** to collect information on the total weight of fish the farmer harvested in the past month. This information is necessary to calculate measures of yield.

**Instructions:** Ask the question and record the total weight and unit of measurement. Record the total weight in the WEIGHT field and the unit of measurement in the UNIT OF WEIGHT field. If the unit of measurement is not listed, select ‘6’ (OTHER) and specify. If using a paper questionnaire, record the weight as four digits, using ‘0’s before a value 1 through 999 so that all four boxes are filled in, or ‘0000’ for none. If the respondent unsure of the total weight of fish harvested in the past one month, ask for the respondent’s best estimate.

**Item 7.8019C.** “How many fish have you harvested in the past one year?”

**Purpose:** to collect information on the number of fish harvested in the past year. This information is necessary to calculate measures of yield.

**Instructions:** Ask the question and record the response. If using a paper questionnaire, record the value as four digits, using ‘0’s before a value 1 through 999 so that all four boxes are filled in, or ‘0000’ for none. If the respondent is unsure how many fish he or she harvested in the past one year, ask for the respondent’s best estimate. If the respondent did not harvest any fish in the past one year, skip to item 7.8020.

**Item 7.8019D.** “What was the total weight of the fish you harvested in the past one year?”

**Purpose:** to collect information on the total weight of the fish harvested in the past year. This information is necessary to calculate measures of yield.

**Instructions:** Ask the question and record the total weight and unit of measurement. Record the total weight in the WEIGHT field and the unit of measurement in the UNIT OF WEIGHT field. If the unit of measurement is not listed, select ‘6’ (OTHER) and specify. If using a paper questionnaire, record the weight as four digits, using ‘0’s before a value 1 through 999 so that all four boxes are filled in, or ‘0000’ for none. If the respondent unsure of the total weight of fish harvested in the past one year, ask for the respondent’s best estimate.

**Item 7.8020.** “Did you raise your fish: to provide food for the household, to be sold or traded in the market, or both for food and for the market?”

**Purpose:** to collect information on why the farmer raised fish.

**Instructions:** Ask the question and record the response. If the respondent does not report raising fish for food or for the market, but reports other reasons for raising the fish that are not listed, record the response as ‘6’ (OTHER) and specify the reason. If the respondent raised fish for market only (response option ‘2’), skip to item 7.8022. Please see Table 7.40 for definitions of reasons for raising fish listed as response options.

**Table 7.40: Reasons for Raising Fish**

| **Response Category** | **Definition** |
| --- | --- |
| Raised for food only | Only reason to raise fish was so they could be eaten by the household. |
| Raised for market only | Only reason to raise fish was so they could be sold or traded in the market. “Market” can mean anywhere that the buyer and seller meet, including at the farm gate, in the village, or at the town marketplace. |
| Raised for both food and market | Raised fish so that some could be eaten by the household, and some could be sold or traded in the marketplace. |

**Item 7.8021.** “After you harvest the fish that you use to provide food for your household, do you usually: leave the fish whole round, gut the fish, salt, smoke, dry, or pickle the fish?”

**Purpose:** to collect information on how the farmer stores fish they do not eat in the household, post-harvest.

**Instructions:** Ask the question and record only one response. If the respondent reports more than one method of processing the fish, probe to determine what he or she does *most often*. If the respondent reports that he or she uses a processing method that is not listed, record ‘96’ (OTHER) and specify the method. Please see Table 7.41 for descriptions of post-harvesting activities that are listed as response options.

**Table 7.41: Post-harvesting Activities**

| **Response Category** | **Definition** |
| --- | --- |
| Leave whole round | Fish is left whole, as captured, without any removal or treatment of parts. |
| Gut only | Fish is left whole, with the gut cavity removed. |
| Salt | Fish, either whole or gutted, is preserved in salt. |
| Smoke | Fish that has been cured by smoking to preserve the fish. |
| Dry | Fish that has the water removed, either by open air drying, sun drying, smoking, or wind drying in order to preserve it. |
| Pickle | Fish is preserved in a brine to inhibit the growth of microorganisms. |

**Item 7.8022.** CHECK 7.8020: WERE FISH RAISED TO BE SOLD OR TRADED IN THE MARKET (RESPONSE 2 OR 3)?

**Instructions:** If using a paper questionnaire, perform the check. If fish were not raise for direct consumption by the household. That is, if response option 1 is selected, skip to item 7.8023A. If using a tablet, the check will be performed automatically, and you will be prompted with the next applicable question.

**Item 7.8023.** “After you harvest the fish that you sell or trade in the market, do you usually: leave the fish whole round, gut the fish, salt, smoke, dry, or pickle the fish?”

**Purpose:** to collect information on how the farmer stores fish they sell or trade on the market.

**Instructions:** Ask the question and record only one response. If the respondent reports more than one method of processing the fish, probe to determine what he or she does *most often*. If the respondent reports that he or she uses a processing method that is not listed, record ‘96’ (OTHER) and specify the method. Please see Table 7.41 (above) for descriptions of post-harvesting activities that are listed as response options.

**Item 7.8023A.** “After you process your fish, what do you do with the fish guts?” SELECT ALL THAT APPLY.

**Purpose:** Fish guts can be used as fertilizer for soil, thereby increasing soil fertility and crop production; it is therefore important to know whether farmers are making use of this fish by-product.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one response. If the respondent reports doing something not listed, select ‘X’ (OTHER) and specify.

**Item 7.8023B.** “After you process your fish, what do you do with the fish skins or scales?” SELECT ALL THAT APPLY.

**Purpose:** Fish skins can be dried and fed to domesticated farm animals like cats (which control pest populations on farms) and dogs (which help herd livestock and defend them against predators); fish scales can also be used in the production of certain kinds of pharmaceutical products. It is therefore important to know whether farmers are making use of this fish by-product.

**Instructions:** Ask the question and record the response. Be sure to select all responses that apply, as the respondent may provide more than one response. If the respondent reports doing something not listed, select ‘X’ (OTHER) and specify.

**Item 7.8024.** “Do you keep regular written records on your fish, for example how much feed the fish are given, what kind of feed the fish are given, the number of fish stocked, or the number of fish harvested?”

**Purpose:** to collect information on if the farmer keeps written records of their fish.

**Instructions:** Ask the question and record the response.

**Item 7.8025.** “Have you ever been trained in aquaculture, either formally or informally?”

**Purpose:** to collect information on if the farmer has had any training on aquaculture.

**Instructions:** Ask the question and record the response. If the response is ‘2’ (YES, INFORMALLY TRAINED) or ‘3’ (NOT TRAINED), skip to item 7.8026

**Item 7.25A.** “When was the last time you participated in a formal training on aquaculture?”

**Purpose:** to collect information on when the farmer was last trained on aquaculture.

**Instructions:** Ask the question and record the most relevant response. If the respondent is unsure, probe to determine when the training occurred. If the respondent attended a training in the past one year, select ‘1’ (WITHIN THE PAST ONE YEAR). If the respondent’s last training was more than one year ago but two or less years ago, select ‘2’ (WITHIN THE PAST TWO YEARS). If the respondent’s last training was more than two years ago but three or less years ago, select ‘3’ (WITHIN THE PAST THREE YEARS). If the respondent’s last training was more than three year ago, select ‘4’ (MORE THAN THREE YEARS AGO).

**Item 7.8026.** “Do you have access to extension services for your fish?”

**Purpose:** to collect information on if the farmer has access to any extension services for their fish.

**Instructions:** Ask the question and record the response.

**Item 7.8027.** “What information source do you rely on the most to help you raise your fish well?”

**Purpose:** to collect information on what information source farmers rely on most to help them raise their fish.

**Instructions:** Ask the question and record only one response. If the respondent lists multiple information sources, probe to determine the *main* information source. If the main source is not listed as a response option, record ‘6’ (OTHER) and specify the source. Please see Table 7.42 for definitions of information sources.

**Table 7.42: Information Sources**

| **Response Category** | **Definition** |
| --- | --- |
| Family / friend / neighbor | Trusted friend or neighbor who shares information on raising livestock. |
| Ag extension worker | A agriculture professional who provides research and new knowledge to communities on aquaculture. |
| School | A local institution providing information on aquaculture. |
| Radio program | Information on aquaculture distributed through the radio. |
| Television | Information on aquaculture distributed through the television. |
| Mobile phone messaging | Information on aquaculture distributed through mobile phone messaging. |
| Internet | Information on aquaculture distributed through the internet. |

**Item 7.8028.** ENTER TIME MODULE FINISHED

**Instructions:** If using a paper questionnaire, enter the time (hour and minutes) that you completed the module. If using a tablet, the time will be automatically recorded for you.

**Item 7.8029.** OUTCOME OF THE MODULE

**Instructions:** Record the appropriate outcome of the module, or if the outcome is not listed as a response option, record ‘96’ (OTHER) and specify the outcome.

#### Module 7.90—Land Map

**Objective:** The purpose of this module is to collect information about the location and composition of the plot or plots where the household grows the C-VCCs included in the ZOI Survey.

***Instructions for administering the module with item-by-item guidance***

You will administer this module once to each eligible household member, or farmer, who is primarily responsible for one or more plot where he or she grows C-VCCs included in the ZOI Survey.

**Item 7.9000A.** ENTER TIME MODULE STARTED

**Instructions:** If using a paper questionnaire, record the time (hour and minutes) that you start the module. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.9000B.** CLUSTER AND HOUSEHOLD NUMBER

**Instructions:** If using a paper questionnaire, record the cluster number and household number. You can find this information on the questionnaire cover sheet. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.9000C.** NAME AND LINE NUMBER OF ELIGIBLE RESPONDENT (FARMER)

**Instructions:** If using a paper questionnaire, record the line number of the respondent who you are interviewing. You can find this information in Module 1, *Household roster and demographics*. If using a tablet, select the respondent from a dropdown menu of household members eligible for this module.

**Item 7.9000D.** CHECK 235, 237, AND 239: WHICH C-VCCS DID FARMER 1 CULTIVATE? SELECT ALL THAT APPLY.

**Instructions:** Check items 235, 237, and 237 in Module 2, Dwelling Characteristics, to identify which C-VCCs the respondent cultivated during the past season. Select all that apply.

**Item 7.9000E.**

1. MAP OUT/DRAW THE LAND WHERE THE RESPONDENT CULTIVATED C-VCC(S) DURING THE PAST YEAR. CONFIRM THAT THE RESPONDENT IS THE PERSON IN THE HOUSEHOLD PRIMARILY RESPONSIBLE FOR MAKING DECISIONS ABOUT CULTIVATING EACH OF THE PLOTS, AND THAT NO OTHER HOUSEHOLD MEMBER CLAIMS TO BE THE PRIMARY DECISIONMAKER FOR ANY OF THESE PLOTS.
2. ASSIGN EACH PLOT A NUMBER (E.G., 1, 2, 3, 4).
3. INDICATE FOR EACH PLOT WHAT VCC(S) WERE GROWN ON THE PLOT.
4. INDICATE FOR EACH PLOT WHAT OTHER CROPS WERE GROWN ON THE PLOT, IF ANY.

THE PLOT INFORMATION IN THIS DIAGRAM WILL BE USED TO COMPLETE MODULES 7.91 and 7.92.

**Instructions:** To begin drawing the diagram, locate the household’s dwelling (house) at the center of the sketch area in the paper version of Module 7.90–Land Map. Map out all of the plots that the respondent is the primary decisionmaker for, and indicate which crops (including C-VCCs and any other crops) the respondent grew on each plot during the past season. Include landmarks, such roads, churches, and rivers, as appropriate. After mapping out all of the plots, assign each plot a number (starting with 1 and numbering them sequentially: 1, 2, 3, etc.), and note the approximate time it takes to walk to the plot from the dwelling (in hours and minutes).

Then fill in the fields to the right of the diagram. Write each plot number, and indicate with a checkmark which C-VCCs the respondent grew on that plot during the past season. Note that there are spaces for up to eight plots, but many respondents may only have one or two plots. If the respondent was responsible for more than eight plots, add the information for additional plots below the existing spaces.

**Item 7.9000F.** A PLOT IS A CONTINUOUS PIECE OF LAND ON WHICH A UNIQUE CROP OR A MIXTURE OF CROPS IS GROWN UNDER A CONSISTENT CROP MANAGEMENT SYSTEM. IT MUST BE CONTINUOUS AND SHOULD NOT BE SPLIT BY A PATH OF MORE THAN ONE METER IN WIDTH. PLOT BOUNDARIES ARE DEFINED ACCORDING TO THE CROPS GROWN AND THE OPERATOR.

Note: the definition of a plot is included for reference. When talking with a respondent and identifying plots, keep in mind that:

* A plot is an area of agricultural land that is primarily managed by one farmer. Only one farmer can be designated as primarily responsible for a plot of land, so if multiple farmers make decisions about a plot of land, the farmer who is primarily responsible for the plot is the one who usually makes the decisions about managing the plot.
* Consider a large rectangular piece of land:
* If household members consider this piece of land to be one plot, but one farmer is responsible for cultivating maize on half of it, and another farmer is primarily responsible for cultivating chickpeas on the other half of it, for the purposes of this survey, the land should be designated as two separate plots—one where the first farmer grows maize, and a second where the second farmer grows chickpeas.
* If one farmer is primarily responsible for growing both maize and chickpeas in separate areas of this piece of land, the land should be considered to be one plot if both crops are grown using the same crop management system. If the crops are grown using different crop management systems, the land should be considered two separate plots.
* If one farmer is primarily responsible for growing both maize and chickpeas on this piece of land, but the two crops are intercropped, the land should be considered one plot under the same crop management system.
* A plot is a continuous piece of land. There may be a path that runs through it, but the path cannot be wider than one meter. If the path is wider than one meter, then the land on one side of the path is considered one plot, and the land on the other side of the path is considered a second, separate plot.

**Item 7.9000G.** ENTER TIME MODULE FINISHED

**Instructions:** If using a paper questionnaire, enter the time (hour and minutes) that you completed the module. If using a tablet, you will not see this question; the time will be automatically recorded for you.

**Item 7.9000H.** OUTCOME OF THE MODULE

**Instructions:** Record the appropriate outcome of the module, or if the outcome is not listed as a response option, record ‘96’ (OTHER) and specify the outcome.

#### Module 7.91–Plot Area

**Objective:** The purpose of this module is to collect information about the size and composition of the plot or plots where the household grows the C-VCCs included in the ZOI Survey.

***Instructions for administering the module with item-by-item guidance***

This module, Module 7.91–Plot Area, is set up to collect information about the first plot that the first eligible household member, or farmer, is primarily responsible for. You will initially record the information on a paper version of Module 7.91 and then enter the data into your tablet at a later time.

You will administer this module separately to the first farmer for each plot on which he or she is primarily responsible for growing a C-VCC included in the ZOI Survey. Therefore, if the same farmer is primarily responsible for three plots, you will administer this module to the same farmer three times—first asking the farmer about the first plot, then the second plot, and finally the third plot.

If there are additional eligible household members, or farmers, who are primarily responsible for separate plots on which they grow a C-VCC included in the ZOI Survey, you will also administer this module to those farmers about each of their plots. Therefore, if one farmer is primarily responsible for two plots—one of maize and one of cowpeas, and a second farmer is primarily responsible for one plot of maize, you will administer the module to the first farmer two times—first asking about his or her maize plot, and then asking about his or her cowpea plot. Then you will administer the module to the second farmer asking about his or her maize plot.

NOTE: Each plot can only have ONE farmer who is primarily responsible for the plot. The farmers who are primarily responsible for one or more plots are determined in questions 235, 237, and 239 of Module 2, Dwelling Characteristics.

**Item 7.9100** “Next I will ask you some questions about plot 1 where you were responsible for cultivating [C-VCC] during the past season.” SHOW PLOT 1 ON THE PLOT MAP TO THE RESPONDENT.

**Item 7.9100A.** ENTER TIME MODULE STARTED

**Instructions:** If using a paper questionnaire, record the time (hour and minutes) that you start the land area module. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.9100B.** CLUSTER AND HOUSEHOLD NUMBER

**Instructions:** If using a paper questionnaire, record the cluster number and household number. You can find this information on the questionnaire cover sheet. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.9100C.** NAME AND LINE NUMBER OF THE RESPONDENT

**Instructions:** If using a paper questionnaire, record the line number of the respondent who you are interviewing. You can find this information in Module 1, *Household roster and demographics*. If using a tablet, select the respondent from a dropdown menu of household members eligible for this module.

**Item 7.9101.** “Have you tested the soil for fertility in the past 12 months?”

**Purpose:** to collect information on whether the soil has been tested in the past 12 months.

**Instructions:** Ask the question and record the response. If the response is ‘Yes,’ skip to item 7.9103.

**Item 7.9102.** “Have you ever tested the soil fertility?”

**Instructions:** Ask the question and record the response. If the response is ‘No,’ skip to item 7.9105.

**Item 7.9103.** “What kind of testing was done to measure soil fertility?” SELECT ALL THAT APPLY.

**Purpose:** There are many kinds of testing that can be performed to measure soil fertility. Some test for nutrients such as calcium, copper, magnesium, and zinc. Others test for organic matter, pH (acidity), and salt content.

**Instructions:** Ask the question and record the response. Be sure to select all that apply, as the respondent may provide more than one answer. If the respondent mentions a test not listed, select ‘X’ (OTHER) and specify. If the respondent is unsure what kind of testing was done, select ‘Y’ (DON’T KNOW).

**Item 7.9104.** “Who tested the soil?” SELECT ALL THAT APPLY.

**Purpose:** to collect information on who tested the soil.

**Instructions:** As the question and record the response. Be sure to select all that apply, as the respondent may provide more than one answer. If the respondent mentions a test not listed, select ‘X’ (OTHER) and specify.

**Item 7.9105.** FARMER 1, PLOT 1 BARCODE: PLACE THE BARCODE FOR PLOT 1 IN Q.7.9105 FOR SOIL ASSESSMENT.

**Purpose:** The barcode contains a unique number that you will also use to name Plot 1 for Farmer 1 in the LandPKS application that you will use for the land potential assessment. The barcode will allow researchers to link the soil assessment data in the LandPKS application to the household data in the CSPro data collection system.

**Instructions:** On the paper version of Module 7.91, place the barcode sticker that has the number used to name the plot in the LandPKS application.

**Item 7.9106.** “What is the area of this plot?”

**Instructions:** Ask the question and record the area to two decimal places and also record the units of the measurement (e.g., hectares or square meters). Record the area in hectares if possible, but if the respondent is not familiar with hectares, record the area in units that the respondent is familiar with. If the respondent uses area units not listed, select ‘6’ (OTHER) and specify the units used. For the area, record ‘999995’ if the respondent refuses to answer, or ‘999996’ if the respondent does not answer for another reason.

**Item 7.9107.** WALK THE PERIMETER OF PLOT 1 AND ENTER THE LAND AREA IN HECTARES.

**Instructions:** Follow the instructions in Section 6, Measuring the Land Area of Agricultural Plots, to walk the perimeter of the plot and obtain the land area using the Field Area Measurement application on your tablet.

You will record the area in hectares on the paper version of Module 7.91–Plot Area to two decimal places. If the farmer is not available and you are unable to measure the plot area, record ‘NOT PRESENT’ (9999994). If the farmer refuses to let you visit or measure the area of the plot, record ‘REFUSED’ (9999995). If you cannot measure the area of the plot for another reason, record ‘OTHER’.

Also save the plot area in the Field Area Measurement application using the number from the plot’s soil assessment barcode.

**Item 7.9108.** CHECK THE LAND DIAGRAM FOR FARMER 1, PLOT 1: LIST C-VCCS GROWN ON THIS PLOT. THEN FOR EACH C-VCC ASK: “How much of Plot 1 was cultivated with [C-VCC]?” ENTER ‘000’ FOR C-VCC NOT CULTIVATED IN PLOT.

**Instructions:** For each C-VCC grown in Plot 1, ask the question and record the response as a percentage of the area of the entire plot. If the respondent finds it difficult to answer this question, help the respondent by drawing a picture of the plot on a piece of paper or on the ground, and asking the farmer to shade in the parts of the plot where each C-VCC was grown. Estimate the percentage of the plot area based on the farmer’s drawing.

**Item 7.9109.** CHECK LAND MAP. WAS THE RESPONDENT PRIMARILY RESPONSIBLE FOR CULTIVATING ANY OTHER PLOTS IN THE PAST SEASON?

**Instructions:** Check the land map. If the respondent was responsible for cultivating another plot, select ‘YES’ and ask the respondent about Plot 2. If not, select ‘NO’ and proceed to Module 7.92.

**Item 7.9110.** ENTER TIME MODULE FINISHED.

**Instructions:** If using a paper questionnaire, enter the time (hour and minutes) that you completed the module. If using a tablet, the time will be automatically recorded for you.

**Item 7.9111.** OUTCOME OF THE MODULE

**Instructions:** Record the appropriate outcome of the module, or if the outcome is not listed as a response option, record ‘96’ (OTHER) and specify the outcome.

#### Module 7.92–Crop Yield

**Objective:**The purpose of this module is to collect information about the household’s yield of each C-VCC included in the ZOI Survey.

***Instructions for administering the module with item-by-item guidance***

You will administer this module to each eligible household member, or farmer, who is primarily responsible for one or more plot where he or she grows C-VCCs included in the ZOI Survey. You will administer this module separately for each C-VCC the farmer grew on the plot or plots that he is primarily responsible for. In this module, you will ask the farmer about his or her yield of one C-VCC on all of the plots that he or she is responsible for together at one time. Therefore, if the farmer is primarily responsible for two plots where he or she grew maize and three plots where he or she grew cowpeas, you will administer this module to the same farmer twice—once for maize and once for cowpeas.

**Item 7.9200** “Next I will ask you some questions about the [C-VCC] you harvested.”

**Instructions:** Read the transition statement to the respondent.

**Item 7.9200A.** ENTER TIME MODULE STARTED

**Instructions:** If using a paper questionnaire, record the time (hour and minutes) that you start the land area module. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.9200B.** CLUSTER AND HOUSEHOLD NUMBER

**Instructions:** If using a paper questionnaire, record the cluster number and household number. You can find this information on the questionnaire cover sheet. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.9200C.** NAME AND LINE NUMBER OF THE RESPONDENT

**Instructions:** If using a paper questionnaire, record the line number of the respondent who you are interviewing. You can find this information in Module 1, *Household roster and demographics*. If using a tablet, select the respondent from a dropdown menu of household members eligible for this module.

**Item 7.9200D.** WHICH C-VCC ARE YOU ASKING ABOUT?

**Instructions:** Select the crop that you are asking about. Only one response is allowed. If the farmer grew more than one C-VCC, you will administer the module separately for each C-VCC.

**Item 7.9201.** “Altogether, how much [C-VCC] did you harvest in the past season?”

**Instructions:** Ask the question and record the total amount (quantity and unit) harvested in the past season. Be sure that the respondent understands that you are asking about the total amount harvested across all plots he or she is primarily responsible for. Record the quantity in the QUANTITY field using one decimal place. Record the unit of measurement in the UNIT field by selecting the response option that corresponds to the quantity reported by the respondent. If the unit of measurement is not listed, select ‘6’ (OTHER) and specify.

**Item 7.9202.** “How much of the harvested [C-VCC] did you sell?”

**Instructions:** Ask the question and record the total amount (quantity and unit) of the crop harvested in the past season that was sold. Be sure that the respondent understands that you are asking about the total amount sold across all plots he or she is primarily responsible for. Record the quantity in the QUANTITY field using one decimal place. Record the unit of measurement in the UNIT field by selecting the response option that corresponds to the quantity reported by the respondent. If the unit of measurement is not listed, select ‘6’ (OTHER) and specify.

**Item 7.9203.** “Who was the main buyer of your harvested [C-VCC]?”

**Instructions:** Ask the question and record only one response. If the respondent reports that there were multiple buyers, probe to determine who the *main* buyer was. If the main buyer is not listed, select ‘8’ (OTHER).

**Item 7.9204.** “How much of the harvested [C-VCC] was consumed by your household?”

**Instructions:** Ask the question and record the total amount (quantity and unit) of the crop harvested in the past season that was consumed by the respondent’s household. Be sure that the respondent understands that you are asking about the total amount consumed across all plots he or she is primarily responsible for. Record the quantity in the QUANTITY field using one decimal place. Record the unit of measurement in the UNIT field by selecting the response option that corresponds to the quantity reported by the respondent. If the unit of measurement is not listed, select ‘6’ (OTHER) and specify.

**Item 7.9205.** ENTER TIME MODULE FINISHED

**Instructions:** If using a paper questionnaire, enter the time (hour and minutes) that you completed the module. If using a tablet, the time will be automatically recorded for you.

**Item 7.9206.** OUTCOME OF THE MODULE

**Instructions:** Record the appropriate outcome of the module, or if the outcome is not listed as a response option, record ‘96’ (OTHER) and specify the outcome.

#### Module 7.95–Pond Map

**Objective**

Pond maps are important to determine certain pond variables including average water depths, maximum water depths, water volumes, sediment volumes and surface areas. Many of these variables are important when properly implementing pond and lake management and restoration techniques such as, chemical control of nuisance algae and aquatic weeds, alum additions, liming, aeration, etc.

***Instructions for administering the module with item-by-item guidance***

You will administer this module once to each eligible household member, or farmer, who is primarily responsible for one or more pond where he or she raised fish in the past year.

**Item 7.9500A.** ENTER TIME MODULE STARTED

**Instructions:** If using a paper questionnaire, record the time (hour and minutes) that you start the land area module. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.9500B.** CLUSTER AND HOUSEHOLD NUMBER

**Instructions:** If using a paper questionnaire, record the cluster number and household number. You can find this information on the questionnaire cover sheet. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.9500C.** NAME AND LINE NUMBER OF ELIGIBLE RESPONDENT (FARMER)

**Instructions:** If using a paper questionnaire, record the line number of the respondent who you are interviewing. You can find this information in Module 1, *Household roster and demographics*. If using a tablet, select the respondent from a dropdown menu of household members eligible for this module.

**Item 7.9501.** “Did you raise fish in ponds during the past year?”

**Instructions:** Ask the question and record the response. If the response is ‘NO,’ go to the next applicable module.

MAP OUT/DRAW THE PONDS WHERE FISH ARE RAISED. INDICATE THE LOCALITY AND NUMBER EACH POND. THE PONDS IDENTIFIED IN THIS MODULE WILL BE USED WITH MODULE 7.96.

**Instructions:** To begin drawing the diagram, locate the household’s dwelling (house) at the center of the sketch area in the paper version of Module 7.95–Pond Map. Map out all of the ponds that the respondent is the primary decisionmaker for. Include landmarks, such roads, churches, and rivers, as appropriate. After mapping out all of the ponds, assign each pond a number, starting with 1 and numbering them sequentially: 1, 2, 3, and so forth, and note the approximate time it takes to walk to the pond from the dwelling (minutes and hours).

#### Module 7.96–Pond Area

The purpose of this module is to collect information about the size of the pond or ponds where household members raise fish.

***Instructions for administering the module with item-by-item guidance***

This module, Module 7.96–Pond Area, is set up to collect size information about all ponds that the first eligible household member, or aquaculture farmer, is primarily responsible for. You will initially record the information on a paper version of Module 7.96 and then enter the data into your tablet at a later time. You can record information for up to four ponds on the paper version of the module. If a farmer is primarily responsible for more than four ponds, collect information about additional ponds using a second paper version of Module 7.96.

If there are additional eligible household members, or aquaculture farmers, who are primarily responsible for separate ponds where they raise fish, you will also administer this module to those farmers about each of their ponds. Therefore, if one farmer is primarily responsible for two ponds, and a second farmer is primarily responsible for one pond, you will administer the module to the first farmer—first asking about his or her first pond and then asking about his or her second pond. Then you will administer the module to the second farmer asking about his or her pond.

NOTE: Each pond can only have ONE farmer who is primarily responsible for the pond. The farmers who are primarily responsible for one or more ponds are determined in question [228/230/232] of Module 2, Dwelling Characteristics.

**Item 7.9600.** CLUSTER AND HOUSEHOLD NUMBER

**Instructions:** If using a paper questionnaire, record the cluster number and household number. You can find this information on the questionnaire cover sheet. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Items 7.9601–7.9605.** You will complete items 7.9601 through 7.9605 for each pond identified in Module 7.95–POND MAP.

**Item 7.9601.** NAME AND LINE NUMBER OF THE RESPONDENT

**Instructions:** If using a paper questionnaire, record the line number of the respondent who you are interviewing. You can find this information in Module 1, *Household roster and demographics*. If using a tablet, select the respondent from a dropdown menu of household members eligible for this module.

**Item 7.9602.** POND NUMBER

This field indicates the pond number. For item 7.9604, be sure that you record the pond area in the column that corresponds to the correct pond number, which you indicated on the pond map (Module 7.95).

**Item 7.9603.** ENTER TIME MODULE STARTED

**Instructions:** If using a paper questionnaire, record the time (hour and minutes) that you start the module for each pond included in the survey. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.9604.** WALK THE PERIMETER OF THE POND AND ENTER THE AREA IN SQUARE METERS.

**Instructions:** Follow the instructions in Section 6, Measuring the Land Area of Agricultural Plots, to walk the perimeter of the pond and obtain the pond area using the Field Area Measurement application on your tablet.

You will record the area in square meters to one decimal place on the paper version of Module 7.96–Pond Area. If the farmer is not available and you are unable to measure the pond area, record ‘NOT PRESENT’ (99994). If the farmer refuses to let you visit or measure the area of the pond, record ‘REFUSED’ (99995). If you cannot measure the area of the pond for another reason, record ‘OTHER’.

Also save the area in the Field Area Measurement application.

**Item 7.9605.** ENTER TIME MODULE FINISHED

**Instructions:** If using a paper questionnaire, record the time (hour and minutes) that you finish the module for each pond listed in Module 7.95–Pond Map for the farmer. If using a tablet, you will not see this question; the time will automatically be recorded for you.

**Item 7.9206.** OUTCOME OF THE MODULE

**Instructions:** Record the appropriate outcome of the module, or if the outcome is not listed as a response option, record ‘96’ (OTHER) and specify the outcome.

# Entering and managing data on tablets

This section first notes some differences between administering the ZOI survey using a paper questionnaire and using a tablet. The remainder of the section focuses on the use of the tablets and CSPro software to collect ZOI Survey data. It describes the physical features of your tablet, how to start a survey on your tablet, how to navigate through the survey, how to enter and edit responses, how to transfer your data to your field supervisor, and how to troubleshoot problems.

## 5.1 Differences between the paper questionnaire and the tablet screens

There are some differences between the paper questionnaire and the tablet:

*Number of Questions on Paper Questionnaire vs. Tablet Screen*

The paper questionnaire has many questions on one page. A screen on the tablet, however, can display only one data field at a time, so each screen on the tablet shows one question at a time. One page of the paper questionnaire will require several screens on the tablet to cover the same questions. However, in all cases, the questions on the paper questionnaire have the same numbers as the questions on the tablet. (Note that the numbering of questions in the questionnaire may not be consecutive in all cases, but nevertheless will always match between the paper and the tablet versions of the questionnaire).

*Skip Instructions*

If a particular response to one question makes subsequent questions irrelevant, you skip to the next appropriate question. On the paper questionnaire, this is indicated by an arrow sign: ‘→’. Following the ‘→’ are instructions about what to do next—for example, go to a specific question.

On the tablet, there are no skip instructions. Instead, the tablet automatically goes to the next appropriate question based on the response that you entered. It is important to carefully enter responses as the tablet will automatically follow what is entered, and subsequent questions may not make sense if you enter an errant response.

## 5.2 Getting started

*Power on the tablet*

The power button is the small rectangular button on the right edge of the tablet behind the screen (Figure 5.1).

To power the tablet on, press the power button on the upper right hand corner and hold, pressed down, for 3 seconds.

Note: In some instances you may need to press the power button for more than 3 seconds.

You will see the screen light up and begin to power on.

To turn the tablet power off, press the power button and follow the steps below when prompted to confirm the tablet is to be shut down. (You will see the prompt in the tablet screen).

> Select [Power Off] > Select [Power Off]

*Log in*

Tablets are encrypted for the purpose of data security, so you will have to log in to use the tablet. You will be given a password specific to your tablet that will be used to log into the tablet (Interviewer Password). Do not share your tablet password with anyone. The field supervisor will have a list of tablet usernames and passwords in case you lose and cannot remember your password.

* Write the date and time that you are logging into your tablet to enter data for a household on your Interviewer Assignment Sheet. (Note that if you visit the same household multiple times, you will write the date and time of each visit on your Interviewer Assignment Sheet.)
* Enter your login password and press ‘OK’. 

*Home screen*

The home screen is what you see when you log into the tablet (Figure 5.2). The tablet is configured to have two different applications on the home screen:

1. CSEntry (to start the data collection tool and carry out all survey activities)
2. Settings (to manage settings)

*Tablet home screen navigation symbols*

You should always see three navigation symbols at the bottom of the home screen: Back Arrow, Home Screen and History Button (Figure 5.3).

1.  Back Arrow.

You will use this arrow to return to the previous screen/location. The back arrow functions like the back button on an internet browser.

1.  Home screen. 

Touching this icon allows you to directly return to the home screen.

1.  History Button.

Touching this icon opens a list of all applications and functions recently used on the tablet. You rarely, if ever, need to use this button.

## 5.3 Using CSPro for data collection

To open the CSPro application and navigate to the Interviewer Main Menu, tap on the CSEntry icon on your home screen (Figure 5.4) and select “Interviewer” from the Entry Applications options.

The Interviewer Main Menu is the starting point for all tasks within CSPro CAPI data collection.

The Interviewer Main Menu has several choices (Figure 5.5):

Main Options

1. Data entry options
2. Second interviewer options
3. Change cluster

Communication Options

1. Transmit data to Supervisor
2. Receive updates from Supervisor

Other Options

1. Backup to external flash memory
2. Exit application

Section 5.3 will cover all “Main Options” and related information in detail. Section 5.4 will cover all “Communication Options,” and Section 5.5 will provide detail for the remaining “Other Options”.

### 5.3.1 Main options

The Main Options of the Interviewer Main Menu include the “Data entry options”, “Second Interviewer options”, and “Change cluster” functions. The first two functions have several options that are described in detail.

#### Data entry options

The “Data entry options” function is used to start a survey in a new household, revisit a partially completed household and carry out module interviews, and to modify households that have been completed. Most data collection processes in the field are found in this menu option. After selecting “Data entry options”, the CAPI system will prompt you to choose the household with which you want to work (Figure 5.6). Only households to which you have been assigned will appear. If a particular household is missing, notify your field supervisor to resolve. 



To begin an interview with a new household, first select the household in which you would like to begin an interview. Next, options for data entry will appear and to begin a new household, select option “1. Start new household” (Figure 5.7).

You will see the CAPI system take a GPS reading, followed by a screen prompting you to enter the result of the visit to the household. If you are able to find the respondent to the household, choose the first option “Start interview” to begin the Module 1 interview (Figure 5.8). This first screen after starting the interview is described earlier in Section 2.6, choosing the language of interview.

If Module 1 of the questionnaire cannot be carried out, you should choose the applicable result of the visit. It is important to record the result of each visit to a household, especially if the result code will be final, such as a vacant dwelling or the dwelling is not found. In the case of a refusal, notify your field supervisor to confirm the refusal in person.

1. **Data entry structure in CSPro**

Survey data are entered into a data entry program developed in CSPro, using an application on the tablet called CSEntry. The structure for CAPI data entry in CSPro consists of modules, just as the paper questionnaire is organized. Each module contains a number of related questions. The ZOI survey in your country has [XX] modules. For each module, the CAPI system records the date and time the interview began and ended.

For Modules 1, 2, 3, and 8, one respondent answers the questions on behalf of the entire household. For Modules 4 and 5, the respondent answers questions about herself or her children, respectively, and the module is repeated for each eligible individual in the household. Modules 6 (female) is asked of the household’s primary adult female decisionmaker, and Module 6M (male) is asked of the household’s primary adult male decisionmaker, answering questions about themselves. Module 7 is asked of the household member (or household members) primarily responsible for cultivating each of the selected VCCs included in the ZOI Survey.

1. **Working within CSPro questionnaire**

Now that you have opened the questionnaire form to begin a new survey, you need to know how to initiate a module, how to navigate within a questionnaire, and how to manage responses.

1. **Initiation of modules**

After choosing option “1. Start a new household” from the Data Entry Menu, Modules 1 and 2 are automatically initiated. These modules must be completed before any other modules in the household can be initiated because they contain information determining the eligibility of the household members for other modules.

To navigate to other required modules, select the button menu icon on the top menu bar of the screen. Then choose the option “Module Menu” (Figure 5.9) and “Select module for data entry”, followed by the module you wish to complete. If at any point during data collection you need to end an interview or exit the CAPI system, select the second option “Exit interview”.

The number of modules in the Module Menu depends on the responses given by the Module 1 and 2 respondent. For example, if the respondent indicates that the household cultivates [VCC1] only, Module 7.1 will be shown but Modules 7.2 and 7.3 will not be included since they apply to other crops not cultivated by that household.

1. **How to navigate in CSPro**

There are several ways to navigate a questionnaire in CSPro. You may use the following:

* Scroll screen up or down
* Swipe screen left or right
* Press the arrow keys at the sides of the screen
* Select a specific question in the menu bar on the left side of the screen
* Use Module Menu to directly navigate to a specific module
* Advance to last answered question or end of questionnaire using menu bar

Each of these ways of navigating is explained below:

*Scroll screen up or down*

Many text screens in CSpro may extend below or above what you may see on a screen. When the contents of a question extend beyond the screen, you will see a grey scroll bar on the side of the screen. To see the entire text, you may need to scroll down or up the screen with your finger on the scroll bar.

*Swipe across the screen*

You may advance one question, and you may go back one question in CSPro, provided you have entered responses to the questions on the screens you are navigating through:

To advance one screen:

 If you want to move to the next screen in the survey, swipe your finger from right to left across the center of the screen (like turning a page).

To go back one screen:

Swipe your finger from left to right across the center of the screen (like turning back a page in a book).

Note that you cannot advance through screens if you have not already entered responses to the questions on those screens.

*Press the arrow key at the bottom of the screen*

You may use the left and right arrows on the sides of the question screens to move forward or go back (Figure 5.10). Using the arrows does the same thing as swiping. In order to advance after answering a question, you must use these arrow buttons (or swipe as described earlier) to advance forward. This decreases keying mistakes and increases the likelihood you will catch a mistake before moving forward.



*Select a specific* *question*

As you complete one part of the survey, you can move to an earlier part of the survey. You may do this to check a respondent’s previous answer, or to correct a specific question found to be errant. Using the menu on the left screen, a list of all questions and responses in the survey can be reviewed (Figure 5.11).

Here’s how:

* On the left side of the screen is a list of modules and questions. Below the name of each question is the current answer that you keyed. 
* For those questions earlier in the questionnaire, the question is colored dark grey. For those moving later in the questionnaire, the question is colored white.
* To look at questions in other modules, simply click on the name of the module and the question list from that module will expand below.
* Navigate to any module or to any question in a module by scrolling down the list and tapping the question text. This will allow you to view or edit the response. However, if any questions are skipped using the Prompts Menu, CSPro will require that they be answered before the questionnaire can be finalized.
* When you finish reviewing the survey questions and responses, you can either swipe or click the arrows to navigate one at a time or use the “Advance to End” feature, found in the small menu button in the upper right corner. This feature advances you to the last question in the questionnaire that was answered, allowing you to carry on with the remaining parts of the questionnaire.

*Use the Module Menu*

As described earlier in Initiation of Modules (Part 1 in this section), you can navigate to any module in the questionnaire once you have completed Modules 1 and 2. If you are Interviewer B in a household, you will be able to navigate to any module that you have been assigned by Interviewer A in the household. See Figure 5.9 and the respective descriptions on how to navigate the questionnaire using the Module Menu.

1. **How to manage required responses**

If you are completing a module on your tablet, you must enter a response for every question that appears. If you try to advance to the next screen without entering a response to all questions on the current screen, you will receive the message, “Out of range! Please enter a valid value.” Click “OK” to remove the error message and answer the question appropriately.

Note that respondents can refuse to answer some questions. Enter or select ‘REFUSED’ if the respondent refuses to answer a question. However, there are certain questions for which a ‘REFUSED’ response is not acceptable. For example, name, age and other questions require a valid answer. 

1. **How to enter different types of responses**

There are several ways to enter data on the tablet. The tablet is programmed to provide you with the appropriate format in which to enter various kinds of data, including numbers, dates, text, single response, multiple response, and other data entry formats. Each of the data entry formats is described below.

1. **Enter a number** using the virtual number keypad that automatically appears on the screen when a numeric response is required (Figure 5.12).

* Often, you will see numeric questions that are programmed to accept numbers that include decimal places. You must include the decimal place (key to the right of the “9”) in the entry of the number.
* Length or content of response is limited by CSPro validation checks.

1. **Enter a word or words** using the virtual letter keypad that automatically appears on the screen a question requires a text response. Text responses are for text-type questions. You will use this, for example, to enter a household member’s name (Figure 5.13).
2. **Select one of several options** by touching the appropriate radio button, the appropriate response from a drop down list, or other formats.

This option provides a limited list of values from which you can choose one response. The value lists may be further filtered based on previous responses.

*Select a single response with a radio button:*



In the example shown in Figure R, touching the radio button next to a question selects that answer. You can change the answer by touching a different radio button to indicate your revised response (Figure 5.14).

*Select a response from a combo box with a dropdown list:*

Some questions have more than one entry option, including a drop down list. You may either enter a number (including a decimal place in the example), or you may need to choose one of the other options available (Figure 5.15). 

To see the options, first touch the dropdown list circled in

Figure S. Then, select the appropriate response from the dropdown list as shown.

In this example, you would either type in the number using the number pad or select one appropriate response from among those displayed in the middle of the screen by tapping it.

1. **Select one or more options** by checking items on a list, using your finger to tap the options that apply (multiple response options always are shown with check boxes). 

This is for a ‘multiple response’ -type question, where you will be provided with a list of values from which you may choose one or more responses (Figure 5.16).

Note that some long lists of response options do not fit on one screen. In this case, a scroll bar will appear and you will be able to scroll down and see all available response options.

1. **How to manage refusals on the tablet**

There are three types of refusals, which should be dealt with as follows:

1. *Refusal of a respondent to answer an individual question.*

If a respondent refuses to answer a question in the middle of a module, select ‘REFUSED’ for that question if available and continue to the next question. For a numeric response, there will be instructions for you to select a code for ‘REFUSED’. You will type in that code.

1. *Refusal of a respondent to answer the remaining questions in a module.*

In this scenario, the household is willing to continue with the survey, but the individual respondent is no longer willing to answer questions for that module. If the respondent refuses to continue after you politely encourage him or her to do so, you will need to exit the interview (described later) and assign a refusal code to the module, particularly if ‘REFUSED’ is not an option for the remaining questions.

Note that questions asked in this survey are not considered particularly sensitive questions; therefore, you are highly unlikely to have a respondent refuse to answer most questions. The ‘REFUSED’ response code is programmed so a response can be selected and you can continue with other questions or other respondents, as applicable. However, be sure to probe an individual politely to respond to the question by ensuring confidentiality, it is important to minimize the number of refused questions for the integrity of the data.

1. *Refusal to be a respondent.* 

If a household member does not consent to provide any answers for a particular module, indicate that the individual did not give consent (Figure 5.17). The tablet will navigate to the Module Menu to continue data collection.

### 5.3.2 Editing questionnaires

This section tells you what to do when you need to make changes to a questionnaire that is either completed and needs to be modified or is not yet complete and you need to finish data entry.

1. **Editing incomplete household**

If a household is not completed (i.e., some modules either haven’t been visited or the interview was not completed) but has been started by following the instructions in Section 5.3.1, you will be revisiting a household that is incomplete. 

To add more data to a previously started household, access data entry by choosing option “1. Data entry options” from the Main Interviewer Menu. You will then select the household from the list of your assignments and will see the screen in Figure T.

* Select ‘Revisit incomplete household’ (Figure 5.18).
* Select the appropriate module in which you would like to work from the Module Menu.
* Advance to the question where you want to add, correct, or review data and continue the interview.
* You may also navigate to the question you need by finding it in the menu on the left side of the screen as described earlier.

1. **Modifying data in a complete household**

If a household and all of its modules has been completed (i.e., all applicable modules have been either completed or assigned a final result code), you may need to modify parts of the questionnaire. You will be modifying a household that has been completed.

To modify data in a completed household, access data entry by choosing option “1. Data entry options” from the Main Interviewer Menu. You will then select the household from the list of your assignments and will see the screen in Figure T.

* Select ‘Modify completed household’ (Figure T). You will be taken to the beginning of the questionnaire.
* Select the appropriate module in which you would like to work from the Module Menu.
* Advance to the question where you want to correct or review data.
* You may also navigate to the question you need by finding it in the menu on the left side of the screen as described earlier.

### 5.3.3 Troubleshooting

*Check battery level*

You are responsible for maintaining the charge on your tablet. It is recommended to start every day with a fully (100 percent) charged tablet. Samsung tablets have a non-removable battery that will last between 6-8 hours when fully charged. Your tablet is configured to minimize battery usage and conserve power. To monitor the battery level, check the upper right corner of the table screen regularly for the percentage of charge remaining on the tablet (Figure 5.19).

**Follow these instructions to save battery life:**

* Leave the tablet on airplane mode.
  + From the home screen, tap on “Settings.”
  + Select “Airplane mode” on the left side menu. Check that it is “ON”.
  + Note that if you turn on airplane mode, you should check that Bluetooth is still on and active (found on the left side menu just above the airplane mode option). This is needed for data transfer to your supervisor.
* Use the tablet only for survey activities. This also helps ensure security of the data and the tablet.
* Regularly check the battery level and charge during break time and any other time there is an available power source.

If the tablet otherwise malfunctions during an interview, please contact your field supervisor.

If lost data cannot be saved, politely explain the situation to the respondent and ask him or her to re-start the interview. DO NOT attempt to recall the respondent’s answers.

*Tablet times out*

If you do not touch the tablet screen for five minutes, the tablet will time out. Simply press the home button until you see the login or the survey screen again. After entering your password, you will return to the most recent screen you were on. The data you entered on previous screens will be saved. If you experience any interruption of the interview that you suspect may take you away from data entry for more than five minutes, you may want to log out and return to the interview using the “Revisit incomplete household” option in the data entry options menu.

*Missing question text*

If yousee a blank question text screen, advance forward and backward and the question text should appear.

*Broken tablet*

If your tablet breaks, communicate with your field supervisor to obtain a working tablet immediately. It will be important that your field supervisor consult with the in-country data manager to preserve any data you had collected.

*Lost log on password*

If you lose your tablet password, communicate with your field supervisor. Field supervisors will have a master list containing tablet numbers and login passwords.

### 5.3.4 Agriculture interviewer options

The social interviewers in this survey will work in pairs, where one interviewer (Interviewer A) will begin a questionnaire in a household and a second interviewer (Interviewer B) will assist in completing the questionnaire. In addition, the agriculture interviewer will work with both pairs of interviewers on the field team to complete the agriculture modules. To meet this requirement, Interviewer A will need to assign work in a household to the Agriculture Interviewer after eligible farmers have been identified during the initial household interview. All social interviewers will act as both Interviewer A and Interviewer B for households in a cluster, but only the Ag Interviewer will complete the agriculture modules.

All options for assignments of the Ag Interviewer, modules, and data transfer will be found in option “2. Second interviewer options” in the interviewer main menu (Figure 5.9). Interviewer A in the household will assign work to the Ag Interviewer after the household roster and Module 2 have been completed. When Interviewer A wishes to send the Ag module assignments to the Ag interviewer, both interviewers must be near each other to allow for Bluetooth transfer of the data.

1. **Sending module assignments to the Ag interviewer**

Before beginning work on the agriculture technologies module in a household, Interviewer A must transmit data and assignments to the Ag Interviewer. This is important for three reasons:

* The Ag Interviewer’s CAPI system will need to know which modules have been assigned for them to complete. Therefore, the module assignment must be transferred from Interviewer A to the Ag Interviewer.
* Parts of the questionnaire in all modules refer back to data collected in Modules 1 and 2. The Ag Interviewer’s CAPI system will need access to data collected by Interviewer A in order to complete work assigned to the Ag Interviewer.
* The module assignment controls which interviewer can complete which modules. This is necessary to avoid duplicating any work, and more importantly, data files.

To share the module assignment and data collected in Module 1 and 2, you will need to work together with your teammate to receive the data over Bluetooth. You (the Ag Interviewer) are assigned work in the household by Interviewer A, and you will choose “2. Second interviewer options” in the interviewer main menu (Figure 5.5) and select the household in which you have been assigned work. The CAPI system on your tablet knows that you are the Ag Interviewer for the chosen household (it has been assigned to you by Interviewer A). Therefore, your will see a different menu appear with options for data collection as the Ag Interviewer. To receive the assignment, the Ag Interviewer will need to select option “2. Receive assignment from first interviewer” (Figure 5.21). Note that in Figure 5.21, because you have not received the module assignment yet, you cannot choose option 1 or 3 (shown as not available) to collect data or send work back to Interviewer A. These options will become available once the module assignment has been successfully transmitted.

At the same time that you are preparing to receive the module assignment, Interviewer A, who was assigned the household by the field supervisor, and will use option “3. Send assignment to second interviewers” (Figure V) from the second interviewer menu. When both you and Interviewer A are ready, you will both choose your options as the same time, initiating a Bluetooth file transfer. Once you both see a message that the transfer was successful, the Ag Interviewer (you) can begin work collecting data for the modules you have assigned.

1. **Sending data to the first interviewer**

In order to avoid duplication of work, all work completed by you (Ag Interviewer) will need to be first transferred back to Interviewer A’s tablet before submitting to the supervisor. This allows all the data for each household to be transmitted together to the field supervisor.

To send your completed work to the first interviewer, you will again need to work together to transmit the data, choosing the correct options on each tablet at the same time. Remember that the CAPI system is set up to know which person is Interviewer A and which is the Ag Interviewer and will show the appropriate options for each person when you each need second interviewer options.

When ready, both teammates will first select “2. Second interviewer options” from the main menu (Figure 5.5). Next, Interviewer A will choose option “4. Receive data from second interviewers” from the second interviewer options menu (Figure 5.20). You (Ag Interviewer), will choose option “3. Send data to first interviewer” from your second interviewer options menu (Figure 5.21). A Bluetooth data transmission will be initiated and both interviewers will be notified when the transmission is successful.

### 5.3.5 Other data collection options

This section will review the remaining options and functions of the Interviewer Main Menu.

1. **Changing cluster number**

Each time your field team enters a new cluster for work, the cluster number in the CAPI system must also be changed. This is important for data transmission within your field team, finding the correct households in the CAPI system to interview, and for receiving work assignments. When you need to change the cluster number, simply choose option “3. Change cluster” from the main interviewer menu (Figure 5.5). A number entry screen will appear for you to type in the cluster number that you need (Figure 5.22). The screen will automatically return to the interviewer main menu and you may begin work in the new cluster.

1. **Backing up data**

There are several ways that data collection with CSPro has been designed to ensure no data collected are lost. However, the main responsibility for keeping data safe and intact falls onto each interviewer and field supervisor. As an interviewer, you have the option to back up your own work to an external flash memory and should do so at least daily. Keep your flash memory in a different location from your tablet to avoid theft or damage to both.

To back up your data, choose option “6. Backup to external flash memory” from the interviewer main menu (Figure E). A message will appear asking you to confirm that the flash memory has been connected to your tablet. After you confirm, the data will immediately be backed up to the flash drive and you can continue work.

# Measuring the land area of agricultural plots

To collect data about the size of farmers’ agricultural plots where they grow VCC crops included in the ZOI Survey you will use a land area measurement application, Field Area Measurement, that has been downloaded to your tablet. Plot size will be used to ultimately calculate the yield of VCC crops grown by producers interviewed for the ZOI Survey. These instructions are written for version 1.3.0 of the application.

To collect plot area data, use the following procedure:

1. Before you measure the area of an agricultural plot, walk the perimeter of the plot with a household member who is familiar with the plot boundaries—ideally, the farmer who is the primary decisionmaker for the plot.
   * Ensure that you understand the plot boundaries.
   * Ask the farmer who is showing you the plot for clarification if any of the plot boundaries are unclear.

| **Figure 6.1: Application Icon** |
| --- |

* + Remove any obstructions from your path so that you can walk the perimeter along an unobstructed path when you measure the plot area.

1. Identify where you will start the plot measurement (e.g., the northwest corner of the plot) and go there.
2. Open the land area measurement application on your tablet by selecting the Field Area Measure application icon (Figure6.1).
3. If you are not already logged into your Field Area Measure application account, sign in using the Google account email address and password assigned to you for the ZOI Survey.
4. Select “Map” from the menu screen to start a new area measurement (Figure 6.2). Your location will be indicated with a blue dot that has a white outline on the map (Figure 6.3).
5. Select the plus sign in the bottom left corner of the map screen. If the plus sign does not appear, tap the screen and it will appear.
6. Follow the prompt and select one of the three choices: “Area,” “Distance,” and “POI” on the next screen (Figure 6.4). Select “Area.”
7. Follow the prompt and select one of the two choices: “GPS measuring” and “Manual measuring” on the next screen (Figure 6.5). Select “GPS measuring,” and the map screen will reappear.
8. While standing in the location where you want to start the plot measurement, select “Start measuring” at the bottom of your screen (Figure 6.6).
9. Walk the entire perimeter of the plot at a comfortable walking pace while holding your tablet.
10. When you return to your starting point, select “Stop measuring” at the bottom of your screen (Figure 6.7). Your path will be indicated by a line on the screen, and the measured area will be shaded. The area will be displayed toward the top of screen on the right side.
11. Record the area value in hectares on your plot area worksheet for the specified plot.
12. Save the measurement in the Field Area Measure application.
    * Select “Save” in the top right corner of the screen.
    * Enter the ZOI Survey plot barcode in the “Measure name” field.
    * Select the Group field to select the appropriate cluster number from the list of clusters that appears.
    * Select “Save” again.

| **Figure 6.2: Menu Screen** | **Figure 6.3: Map Screen**C:\Users\26167\Pictures\FAM_mapscreen.png | **Figure 6.4: Measuring Options**  **C:\Users\26167\Pictures\FAM_measopts2.png** |
| --- | --- | --- |

| **Figure 6.5: Measuring Mode**  C:\Users\26167\Pictures\FAM_measopts.png | **Figure 6.6: Start Measuring**  C:\Users\26167\Pictures\FAM_start.png | **Figure 6.7. Stop Measuring**C:\Users\26167\Pictures\FAM_stop.png |
| --- | --- | --- |

**Field area measure application notes**

***Changing distance and area measurement units***

You can change the distance or area units. Select “Settings,” (the gear image in the upper left corner of the menu screen) and then select the units that you want to change (distance or area).

* Distances can be measured in kilometers (km), meters (m), feet (ft), yards (yd), and miles (mi).
* Area can be measured in hectares (ha), square meters (m2), square kilometers (km2), square feet (ft2), square yards (yd2), acres (ac), and square miles (mi2).

For the ZOI Survey, ensure that the area unit is always hectares. The distance units do not matter because we are measuring only area. After you finish updating the area units, select the three horizontal bars in the upper left corner of the screen to return to the menu screen.

***Reviewing saved area measurements***

| **Figure 6.8: Review Saved Measurements**  C:\Users\26167\Documents\PEEL FTF\Ag Module Resources\FAM app pics\FAM_savedmeasures.png |
| --- |

You can review an area measurement that you saved. Select “Saved measures” from the menu screen. Select the plot you want to review on the “Saved measures” plot menu screen (Figure 6.8). Although plot areas are shown to only two decimal places on the “Saved measures” plot menu screen, when you select a plot, the area on the next screen is shown to three decimal places.

***Assigning a group when the cluster is not an option***

If you cannot find the appropriate cluster number in the list of group names when you want to save an area measurement, select the group “Other,” and at the end of the day inform your field supervisor that the cluster is missing from the list. Your field supervisor will set up a group for the cluster and reassign to the new group any area measurements you saved to the “Other” group.

***Logging in and out of the application***

To log into the Field Area Measurement application, select the red circle image at the top of the menu screen, and then select “Sign in with Google” when prompted. If a pop-up box prompts you with the message: *“FieldAreaMeasure: Wanted to Use “google.com” to Sign In*,” select “Continue,” and then select the account assigned to you for the ZOI Survey on the next screen. You will be logged in and returned to the menu screen.

To log out of the Field Area Measurement application, select the circle image at the top of the menu screen, and then select “Log Out” when prompted.

***Adjusting the map view settings***

| **Figure 6.9: Map View Settings** |
| --- |

To adjust your view of the map screen, select the white down arrow in the dark gray circle in the top right corner of the screen. A pop-up box will appear (Figure 6.9).

* The top of the pop-up box has four view options: “Hybrid,” “Satellite,” “Terrain,” and “Normal.” You can select only one option at a time.
* The left side of the pop-up box offers three options for what you can view on the map: “Fields,” which are saved area measurements; “Distances,” which are saved distance measurements; and “POI,” which are saved point of interest coordinates. You can select any combination of the options at one time—from none to all three. Select your option. A checkmark appears next to that option. The application defaults are “Fields” for measuring an area, “Distances” for measuring a distance, and “POI” for setting coordinates of a POI.

Appendix B has additional information for survey team members setting up the application on agriculture interviewers’ tablets.

# Performing a soil assessment on agricultural plots

## 7.1 Purpose of this manual

This section of the Agriculture Interviewer’s Manual provides guidelines and procedures for assessing soil for the Feed the Future Zone of Influence (ZO1) Survey (2018–2019). It is written to provide a standard approach to soil and land-potential assessment based on the Land-Potential Knowledge System (LandPKS) version 3.1 mobile application. The intent is to ensure comparability not only across countries, but also across time within a country, when possible. This manual is a reference for anyone collecting, managing, or analyzing soil assessment data, but especially for the agriculture field manager, agriculture specialists, agriculture interviewers, data analysts, the data processing manager, and the in-country data manager. It includes an overview of land assessment and the LandPKS mobile application; sections about using the application, troubleshooting problems, and sharing the land assessment results with farmers.

## 7.2 Land potential assessment overview

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. Land potential is based on soils, topography, and climate, which are relatively static land properties, and do not include properties that fluctuate over time, such as organic matter content in the soil. The long-term sustainability of land use is largely based on these static land properties. Understanding land potential is important both for human uses, such as agriculture and livestock keeping, but 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.

## Land Potential Knowledge System overview

LandPKS is an open-source project aimed at improving sustainable land management through local inputs into a cloud database system. LandPKS aims to help users determine the potential of their land. LandPKS is a free mobile application that can run on both Android and Apple operating systems and includes two modules:

1. LandInfo: to characterize soil and the site
2. LandCover: to monitor vegetation cover

Note, however, that only the LandInfo module will be used for the ZOI Surveys.

After downloading and logging in to the LandPKS application, you do not need to be connected to the internet to use LandPKS. LandPKS will store any data collected in the application, and you can upload the data to the data portal the next time the mobile device is connected to the internet. The application marks any plots that have not been uploaded as requiring “background upload,” and you will be notified when the data are uploaded after you return to internet access.

LandPKS can increase a 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. LandPKS 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. LandPKS allows users to identify the soil type and characteristics at specific spots. 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.

## Materials and resources needed for land potential assessment

To use LandPKS for the ZOI Survey, you should have the following materials and resources:

Required:

* Computer tablets with LandPKS installed
* Google account emails for each agriculture interviewer, set up by [CONTRACTOR], to create LandPKS application accounts
* Internet connectivity to upload the data collected to the data portal (Note that connectivity is not needed to collect site data)
* Digging tools of different sizes (e.g., shovel, hoe, cup, spoon)
* Water bottle or spray bottle with water
* Measuring device (e.g., tape measure, second meter stick, ruler)
* Tarp, cardboard, or maize bag[[1]](#footnote-0) to lay out soil sample for each soil depth
* Soil color reference card for soil color assessment[[2]](#footnote-1)

Optional:

* Hand spade or knife to collect soil from different soil depths
* Sieve or other tool to break up hard soil clumps
* Pad or cushion to kneel on when digging holes and taking soil samples 

## Opening LandPKS and adding a new plot

1. Find the LandPKS icon (Figure 7.1) on your tablet and select the icon to open it. Follow the prompts on the LandPKS Entry Page screen (Figure 7.2). If you have internet access, this screen takes you to the landpotential.org website and information about the version of the app and the data and privacy policy.
2. The first time you log into LandPKS during training, tap on the entry page screen above the green line to log in or add a new account (Figure 7.2). Follow the prompt to “Sign in with Google” (Figure 7.3). On the next screen, enter the Google account email and password assigned to you for the ZOI Survey. If you previously logged into the application and you are still logged in, you will not be asked to sign in again.



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| --- |

1. After you log in, the application will display the “My Locations” screen, which will list any plot entries that you already created (Figure 7.4).
2. To create a new plot entry, select the plus sign (+) in the upper right corner of the screen to bring up the “New Site” screen.
3. On the “New Site” screen (Figure 7.5), carefully type in the plot name, which will be a five-digit alphanumeric code that is a pre-generated combination of letters and numbers. The five-digit code matches the barcode assigned to that plot during the ZOI Survey land measurement module. It is very important that this code be typed in correctly; double-check that the code you type matches the bar code.
4. On the same screen, select the “Obtain GPS” button to get your location. Be sure that you are standing in the plot where you will dig the soil pit for assessing. Allow LandPKS to access your location by selecting “Allow” if prompted by a message box. Check the location latitude and longitude coordinates to ensure that they are plausible. The latitude should be within the range: [# - #],[[3]](#footnote-2) and the longitude should be within the range: [# - #].2 An accuracy reading will tell you how accurate the GPS coordinates are. The lower the accuracy value, the better. GPS coordinates for the ZOI Survey can have an accuracy reading up to 30m. If you cannot obtain GPS coordinates below this cut-off, or if you are unable to obtain GPS coordinates in the application, you can manually enter GPS coordinates that you obtain using another tablet or device with GPS functionality on the screen. Then select “SAVE” in the upper right corner of the screen. After saving a new plot, you can access it from your “My Locations” screen to view, edit, or add information for that plot.
5. On the next screen (or any time you select a plot from your “My Locations” screen), the name of the plot appears at the top of the screen, with two options directly beneath the plot name: “Report” and “Data Input.” When you select “Report” (also the default screen displayed), a summary screen (Figure 7.6) appears. Select “Data Input,” which opens the data input menu screen (Figure 7.7), including the LandInfo module, covered in detail in section 7.4 of this manual. The data input screen has options to add or view photos of the soil pit and soil samples and enter notes about the plot assessed.

|  | **Figure 7.5: New Site Screen** |
| --- | --- |
| **Figure 7.6: Report Summary Screen** | **Figure 7.7: Data Input Menu Screen** |

## 7.6 LandInfo module

The LandPKS LandInfo module helps the survey team understand the potential productivity of the farming household’s land, the water-holding capacity of the soil, and the land capability classification (LCC). The LCC system in LandPKS is a system used globally for land evaluation to determine the land’s capability based on its ability to produce crop and pasture plants and on how cultivation will impact long-term land degradation. The system classifies nine soil criteria into one of eight classes, with a higher score indicating more severe limitations. This information is important for farmers because it can tell them which aspects of their soil are most limited and indicate areas for improvement. For example, if a land is limited by a risk of erosion, the farmer might want to implement soil conservation measures, such as contour tillage or terraces, to help mitigate soil erosion.

With the LandInfo module, you can enter data about land use (land cover and grazing), land slope (steepness and shape), soil texture at different depths, and soil limitations (vertical cracks and the presence of salt).

Before you collect LandInfo data, you must define the plot you will analyze. For the ZOI Survey, a plot is a continuous piece of land on which a unique crop or a mixture of crops is grown under a consistent crop management system. It must be continuous and should not be split by a path of more than one meter in width.



Table 7.43 shows the LandInfo menu options (Figure 7.7) and the land aspects that each option assesses.

**Table 7.43 LandInfo menu options and land aspects assessed**

| Menu option | Aspect of land assessed |
| --- | --- |
| Land use | Land cover |
| Grazing |
| Land slope | Slope |
| Slope shape |
| Soil texture | Soil texture |
| Soil limitations | Soil limitations |
| Soil color | Soil color |

This section explains the menu options and their uses. On most screens, tap on an image to select it. A dark green border appears around the image border. To unselect an image (a) if multiple images can be selected, tap the image again to make the dark green border disappear; (b) if only one image can be selected, tap on another image to change the selected image. If only one image can be selected, after you select an image, one image will always selected; you cannot change to a blank unselected image.

### 7.6.1 Land use–land cover

Land cover refers to the physical land covering on the land you are assessing. On the Land Cover screen (Figure 7.8), indicate one of the nine images that best describes the type of land. The options are forest, shrubland, grassland, savanna, garden, cropland, city or village, barren (no vegetation or structures), and water. Only one image can be selected.

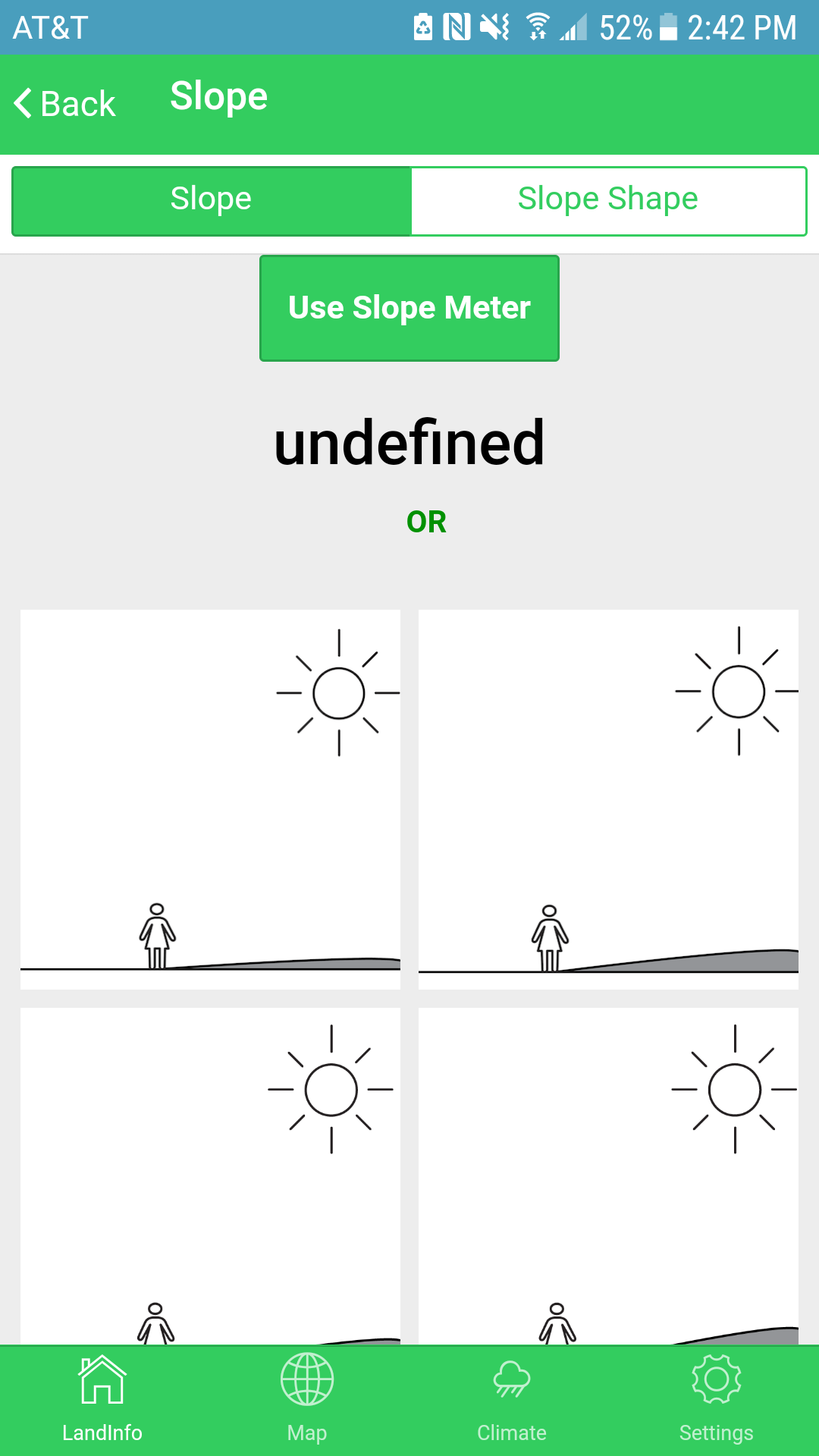


### 7.6.2 Land use–grazing

Grazing refers to whether animals graze on the plot you are assessing. On the Grazing screen (Figure 7.9), chose one of the eight images that best describes grazing on the plot at any time during the year preceding the survey. The images are “not grazed,” “cattle,” “horse,” “goat,” “sheep,” “pig,” “U.S. wildlife,” and “wildlife.” If “not grazed” is selected, no other images can be selected; however, multiple images can be selected if more than one image is applicable, that is, the animals depicted in more than one image graze on the plot.

**Note: US wildlife is an option built into the application, but it is not relevant for the ZOI Survey, so you will never select US wildlife.**

### 7.6.3 Land slope–slope

Land slope helps you understand how rainfall affects the land. On the Slope screen (Figure 7.10), indicate the slope of the plot. Select “Use a Slope Meter” or select one of the seven option images. You will use the slope meter/image for the ZOI Survey. 

***Slope meter method***

To use the slope meter built into LandPKS, select “Use Slope Meter,” and align the long edge of your tablet with the angle of the slope and hold the tablet steady. After you obtain an accurate reading, select “Lock.” A pop-up window will ask you to confirm that you want to use the value from the slope meter reading. Select “OK” to use the value or select “Cancel” to take another reading. Your reading should be less than 200 percent.[[4]](#footnote-3) If the land is flat, the reading should be close to 0 percent. The steeper the slope is, the higher the reading should be.

After obtaining a slope meter reading, you want to use an image to indicate the slope instead of the slope meter reading, select the image that describes the slope at the site. A pop-up box will ask if you want to override the slope meter value. Select “Yes” if you want to override it or select “No” if you do not want to override it.

***Image method***

To use the image method, select one of the seven images that best describes the plot of land you are assessing. The images are flat (0–2 percent), gentle (3–5 percent), moderate (6–10 percent), rolling (11–15 percent), hilly (16–30 percent), steep (31–60 percent), and very steep (61–100 percent). Select very steep (61–100 percent) if the slope is greater than 100 percent, that is, if the slope is greater than 45 degrees. Only one image can be selected.

| **Figure 7.11: Slope Shape Screen** |
| --- |

### 7.6.4 Land slope–slope shape

Slope shape determines the speed at which water will move across the land you are assessing and where it will pool. It can be used together with slope (Section 7.4.3) and soil texture (Section 7.4.5) to improve predictions of how much water will soak into the soil. Water will move faster across convex (curves outward) slopes and slower across concave (curves inward) slopes. Slope shape or curvature can be determined by imagining the flow of water if it rained. For example, would it collect in a certain area or flow in a specific direction on the plot?

On the left side of the Slope Shape screen (Figure 7.11), indicate the shape of the slope at the assessment site when looking **down** the slope. Select one of the three image options—concave, convex, or linear—that best describes the vertical slope. On the right side of this screen, indicate the shape of the slope of the plot when looking **across** the slope. Select one of the three available images—concave, convex, or linear—that best describes the horizontal slope. When assessing the slope shape, consider an area of no more than 100 m2, or land with a 20–50 m diameter.

### 7.6.5 Soil texture

Soil layers—the soil texture and rock content of the plot—indicate how efficiently water infiltrates the soil, how much water the soil can hold, and how susceptible the land is to erosion. The Soil Texture screen (Figure 7.13) is a series of screens with soil texture options at various depths: 0–1cm, 1–10cm, 10–20cm, 20–50cm, 50–70cm, 70–100cm, 100–120cm (*note: for the purposes of this survey, it is only required to dig to a depth of 70cm*). A menu on the left side of the screen helps you navigate among the soil depth screens. The screen for each depth looks the same; you can tell the difference by the depth displayed at the top of the screen and the depth highlighted in white in the menu.

You will use a soil pit to assess the soil layers. See Section 7.8 for guidance on digging a soil pit. You will observe the soil rock fragment volume and hand texture. Repeat the following steps at each depth:

1. Indicate the soil rock fragment volume at the site with one of the five option images: 0–1 percent, 1–15 percent, 15–35 percent, 35–60 percent, >60 percent. Rock fragment volume is the fraction of gravel in the soil sample that has a diameter greater than 2mm. Rocks with a diameter of 2mm are fairly small rocks, but not so small they aren’t easily noticed. If the soil has a lot of gravel, you may need to separate the soil from the gravel and rocks to make it easier to estimate the rock fragment volume.
2. Determine the soil texture. (Appendix C provides more information about soil texture classification.)
   1. Select the “Guide me” button on the Soil Texture screen under the texture input box (Figure 7.12). The Texture Guide screen (Figure 7.13) appears. Each question has a question mark that you can select on for additional guidance.
      1. On the new screen, you will be asked: “Does the soil form a ball?” To determine if the soil forms a ball, first use your fingers or a strainer to break up soil aggregates (chunks) and then put a heaping pile of soil in your hand. Spray it with water evenly so that it is wet, but not so wet that it becomes muddy. Work it in your hand to mix the soil properly, and then roll it in your hand and try to create a ball with it. If needed, Rewet the soil throughout this assessment; if it is hot, the soil may dry quickly. If you can form a ball that retains its shape, select “Yes,” and you will be asked another question. If you cannot form a ball that retains its shape, select “No,” and the application will suggest that the soil texture is sand. Select “Use this texture,” and the application will return to the Soil Texture screen and SAND will appear in the “Texture” box.
      2. If you can form a ball with the soil, you will then be asked: “Does the soil form a ribbon?” You can use the same soil you used to form a ball to determine if the soil forms a ribbon. Ensure that the soil is adequately wet, and then put it in your palm and work it out toward the side of your hand with your index finger. Use your thumb to try to form a ribbon of soil. Click the question mark next to the question for a short instructional video. It is important that the ribbon be as thin as seen in the video; a thicker ribbon means that you will overestimate the amount of clay in the soil. If a ribbon forms, select “Yes,” and you will be asked another question. If you cannot form a ribbon, select “No,” and the application will suggest that the soil texture is loamy sand. Select “Use this texture,” and the application will return you to the Soil Texture screen and LOAMY SAND will appear in the “Texture” box.
      3. If you can form a ribbon with the soil, you will then be asked: “Length of ribbon?” To determine the length, measure or estimate the average length of the ribbon pieces that form before they break, excluding the jagged edges, and select one of the three options: <2.5 cm (<in), 2.5–5 cm (1–2 in), and >5 cm (>2 in). The length of the ribbon tells you how much clay content is in the soil. Ensure you have a nice thin ribbon to get the most accurate prediction of clay content.
      4. Next, indicate the soil feel by selecting one of the three options: (1) Gritty (you can hear sand particles when you rub soil between your fingers near your ear); (2) Smooth (your fingers slip and slide over the wet soil); and (3) Not gritty or smooth (sticky).
      5. The application will use the information you entered about the length of the soil ribbon and the soil feel to suggest a soil texture. Select “Use this texture.” The application will return you to the Soil Texture screen and the soil texture will appear in the “Texture” box.

| **Figure 7.12: Soil Textures Screen** | **Figure 7.13: Texture Guide Screen** |
| --- | --- |

1. If you hit bedrock while digging the soil pit, indicate the bedrock depth at the bottom of the Soil Texture screen. Enter the depth at which bedrock begins in the pit to only the depth at which you were forced to stop digging due to bedrock, if applicable. If you select a bedrock depth value from the menu, a pop-up box will warn you that setting a bedrock value removes texture and rock fragment data for all deeper layers and ask if you want to proceed. Select “OK” to proceed using the selected bedrock depth value. Select “Cancel” to proceed without using the selected bedrock depth value. If you select a bedrock value by accident and have already entered information for deeper soil layers, you will lose that information and need to reenter it. If you never hit bedrock, leave the bedrock field blank.

### 7.6.6 Soil limitations

| **Figure 7.14: Soil Limitations Screen** |
| --- |

The app offers seven soil limitation options (Figure 7.14):

1. Vertical cracks in soil: Assess the soil pit and surrounding area when it is dry. Are there deep vertical cracks that are more than 5mm wide and 25cm deep? Can you stick a pencil into the crack? Select one response option:
   * No cracking
   * Surface cracking only
   * Deep vertical cracks
2. Salt on soil surface: Very salty soils will have a white layer of salt on the soil surface when dry. Some irrigation water can also increase salinity over time. Does the soil have a layer of salt on it? Select one response option:
   * No salt
   * Small, temporary patches
   * Yes, most of the surface
3. Flooding (growing season): The frequency with which a plot of land is flooded can affect the extent to which crops are damaged and influence crop selection. Does the plot of land you are assessing flood during the growing season? If you are conducting the assessment when it is not the growing season, be sure to ask the farmer this question to get an accurate answer. Select one response option:
   * None, crop selection is not limited
   * Rare to occasional, slight crop damage, up to 20 percent yield reduction or crop select slightly limited
   * Occasional, moderate crop damage, 20-35 percent yield reduction or crop selection moderately limited
   * Frequent, severe crop damage, 35-50 percent yield reduction or crop select severely limited
   * Very frequent, prevents normal production of crops
4. Lime requirements: Low soil pH—or high acidity—limits crop production. Adding lime to soil can raise the soil pH to within the ideal range for crops. Does the plot of land that you are assessing require lime? To answer this question, you may need to ask the farmer if he or she uses lime. Select one response option:
   * Little-to-no lime required
   * High amounts of lime required
   * Very difficult to modify with lime
5. Surface stoniness: Large surface stones can impede the use of tractors or animal-pulled plows. How much of the plot surface is covered by rocks with a diameter larger than 25cm (10in)? Select one of the six response options: <0.1 percent, 0.1-3 percent, 3-15 percent, 15-50 percent, 50-90 percent, >90 percent. Be sure to consider the entire plot when estimating the percentage.
6. Water table depth: During the growing season, how deep is the water table under the plot of land you are assessing? If you are conducting the assessment during the growing season, observation can help to determine whether the soil pit fills with water at the bottom. If it is not the growing season, ask the farmer if he or she knows the water table depth during the growing season. Select one of the five response options: <30cm, 30-45cm, 45-75cm, 75-120cm, >120cm.
7. Soil depth: The depth of the soil to bedrock or other layers can limit root growth. How deep is the soil in the plot you are assessing? Select the response option that best estimates the soil depth. The response options are in 5cm increments, from <5cm to >100cm.

### 7.6.7 Soil color

Use the Soil Color menu to determine the color of your soil by depth. Soil color is useful for identifying soil type and determining other important soil qualities. The open book icon at the top right corner provides an in-depth tutorial for how to measure Soil Color. Follow these steps to identify and determine soil type for each soil depth:

1. Prepare a soil sample by running dry soil through a sieve and then flattening the pile of soil. The soil preparation stage is critical to obtain the correct results. Ensure that the soil is dry, sieved properly with no larger chunks, and flattened.
2. Place a color reference card next to the soil pile (Figure 7.15).
3. In uniform lighting conditions, not direct sunlight, take a photo of the color card and soil sample from about 10–20cm above and then select “OK.”
4. On the screen, touch the reference card and then touch the soil sample.[[5]](#footnote-4) A box should pop up in both, and a photo of the area selected below the actual photo.
5. Ensure the correct reference card type, soil moisture, and lighting conditions are selected below the images. If the soil moisture or lighting conditions selected are incorrect, use the dropdown menus to change them. If the reference card type is incorrect, consult your field supervisor, who will adjust the color standard settings in the application’s settings menu.
6. Select Save (Figure 7.16) and the soil color results will appear for that soil depth (Figure 7.17).
7. If the color does not look right, repeat the process.

| **Figure 7.15: Soil Color Sample** | **Figure 7.16: Soil Color Input Screen** | **Figure 7.17: Soil Color Result** |
| --- | --- | --- |

## 7.7 Taking photos and recording notes

### 7.7.1 Photos

| **Figure 7.18: Photo Option Screen**  cid:43165125-5ad0-4863-bcab-3c0feb35dbf4@icf.com |
| --- |

You can take photos and store them in the LandPKS application by selecting “Photos” from the Data Input screen. For the ZOI Survey, however, you will take photos only of the soil. To maintain respondent confidentiality, you will not take any photos that could identify the respondent. You will not use the Landscape Photos option, but you will use the Pit Photo and Samples Photo options (Figure 7.18).

**Pit Photo:** After you dig your soil pit, and before you replace the soil, take a picture of it using the “Pit Photo” option in the Photos section of the app.

**Samples Photo:** After you lay samples from each soil depth on a tarp or similar material, take a picture of the samples using the “Samples Photo” option in the Photos section of the app.

To upload photos, click the cloud button at the top of the photos screen.

### 7.7.2 Notes

To add a note for a plot, select “Notes” on the Data Input screen and enter the note in the pop-up box. Press “Save.” If you have already created a note, you can edit the note or add more information. Only one note can be saved per assessment site.

## 7.8 Digging a soil pit and preparing a good soil sample

It is important to heed the following requirements when digging a soil pit and preparing soil samples:

* Dig the soil pit before entering LandInfo data.
* Dig the soil pit in an area that is representative of the field.
* Dig the soil pit as deep as possible—at least 70cm, if possible.
* Dig the soil pit only wide enough to easily access each of the soil layer depths.
* Ensure the soil sample from each depth is representative of that layer. For example, if you are collecting soil from the 20–50cm depth, make sure to collect some soil at each depth from 20-50cm. You can easily do this by placing a shovel in the soil pit at the bottom of the depth (e.g., at 50cm), and scraping the side of the pit with a hoe, knife, or some other semi-sharp object, so that some soil falls onto the shovel from every depth between 20-50cm.
* Place the soil samples, cardboard, or maize bag on the tarp for easy sampling.
* After you complete your assessment, replace the soil you removed from the soil pit and ensure that the top layer is as similar as possible to the original top layer, so that—as much as possible—it looks like the land was not disturbed.

## 7.9 Sharing the results with farmers

After you complete the land assessment for a plot, share the results with the farmer who is primarily responsible for that plot. The results can be found by selecting the “Report” tab and expanding the Land Capability Classification and Land Info tabs. Use the information to fill in a LandPKS Soils Data Report Form (Appendix D), give it to the farmer, and explain what the results mean.

The results show the LCC on a scale of 1 to 8. A lower number indicates slight to moderate limitation and higher land capability. This means that the soil has a higher potential to sustainably produce crops if it has only minor issues. A higher number indicates more severe limitations and lower land capability to produce crop and pasture plants. It also indicates how cultivation will impact long-term degradation. A higher number means that the soil is less suitable for agriculture and farming, and by not using conservation practices or selecting certain crops suitable for the soil could lead to severe, irreversible land degradation. The LCC is based on the soil texture, rock fragment volume, soil limitations, and slope measurements, described earlier.

## 7.10 Uploading the LandPKS data you collected

| **Figure 7.19: Data Synchronization** |
| --- |
|  |

To upload your data to the data portal, select "Synchronize Now?" at the top of the Data Input screen any time during the data collection process (Figure 7.19). You can submit your data multiple times while working on the same assessment site. Click on the “Synchronize Now?” icon. After you upload your data, you can still modify it or add data to an existing assessment site entry. If you are not connected to the internet when you select “Synchronize Now?” your data will be submitted the next time you have an internet connection. Assessment information collected using LandPKS is stored in the application’s cache until an internet connection is made.

You can edit uploaded data on your tablet through the Data Input page. If you edit data on your tablet, select “Synchronize Now?” to ensure the revised data are uploaded and available through the data portal.

## 7.11 Troubleshooting issues with LandPKS

You may encounter issues when using LandPKS. This section describes common issues with the application and ways to resolve them. However, if you encounter an issue that you cannot resolve, contact the agricultural supervisor for the ZOI Survey in [COUNTRY]. If the agricultural supervisor cannot resolve the issue, the field manager will request assistance from [CONTRACTOR].

**Three common issues**

1. I am having issues obtaining my location. The “Obtain GPS” button is not working or the GPS reading is extremely inaccurate.

Option 1: In the LandPKS settings, make sure that LandPKS is allowed to access your location. Go to Settings > LandPKS > Location > Allow access while using. If you are already allowing access while using, turn off (deselect) location access, and then turn it back on.

Option 2: Turn off your tablet and restart it.

Option 3: Check your settings and ensure GPS only is selected. Go to Settings > Location > Mode > GPS only.

Option 4: Obtain the GPS coordinates using another method (e.g., hand-held GPS unit, another GPS application downloaded on your tablet, Google Maps), and then type the latitude and longitude values into LandPKS.

1. My tablet screen is frozen in LandPKS.

This issue usually occurs when there is an internet connection, but it is weak. LandPKS freezes because it cannot establish a strong internet connection. To avoid this issue, turn off the data function (turn on airplane mode) if you know that you will be in a place with low internet connectivity, and be sure not to click on the climate or maps buttons. If the screen freezes, close the application completely and reopen it. If you were entering data when the screen froze, you may lose the data and need to re-enter them.

1. I uploaded my sites, but I am missing data.

Option 1: LandPKS can uploaded data to the data portal only when connected to the internet. If you synchronized your data while you did not have an internet connection, you must wait for a period of time—at least 30 minutes—until you establish an internet connection and your data uploads to the data portal.

Option 2: While connected to the internet through a Wi-Fi connection, close LandPKS, and then reopen it.

Option 3. While connected to the internet through a Wi-Fi connection, log out of LandPKS, and then log back in.

Option 4: Check to see if your sites have uploaded to the data portal on the My Locations screen of the application. Each site that has successfully uploaded to the data portal will have a black cloud icon with a check mark in the middle of it. If a site does not have the cloud icon, when you have internet access, select “Synchronize Now?” from the Data Input screen, wait for the data to upload, and then check again for the missing data.

Option 5: Check to ensure that you did not select “YES” for the test or practice plot question. If you did, de-select “YES,” synchronize your data, and check again for the missing data.

If your data still do not appear, inform your field supervisor or the ZOI Survey agricultural specialist.

# 

# Appendix A. Interviewer assignment sheet

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Cluster Number:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Field Supervisor Number:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

| **HH**  **ID** | **INTERVIEWER** | | | **VISIT RESULTS AND COMMENTS** | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **A** | **B** |  | | | | | |
|  |  |  | 1st visit date/time | | Result | If partially complete, circle modules that still need to be completed:  1 2 3 4 4A 5 5A 6W 6M 7.X 7.X 7.X 8 | Comments | Date/time next visit scheduled |
|  |  |  | 2nd visit date/time | | Result | If partially complete, circle modules that still need to be completed:  1 2 3 4 4A 5 5A 6W 6M 7.X 7.X 7.X 8 | Comments | Date/time next visit scheduled |
|  |  |  | 3rd visit date time | | Result | If partially complete, circle modules that still need to be completed:  1 2 3 4 4A 5 5A 6W 6M 7.X 7.X 7.X 8 | Comments |  |
|  |  |  | 1st visit date/time | | Result | If partially complete, circle modules that still need to be completed:  1 2 3 4 4A 5 5A 6W 6M 7.X 7.X 7.X 8 | Comments | Date/time next visit scheduled |
|  |  |  | 2nd visit date/time | | Result | If partially complete, circle modules that still need to be completed:  1 2 3 4 4A 5 5A 6W 6M 7.X 7.X 7.X 8 | Comments | Date/time next visit scheduled |
|  |  |  | 3rd visit date time | | Result | If partially complete, circle modules that still need to be completed:  1 2 3 4 4A 5 5A 6W 6M 7.X 7.X 7.X 8 | Comments |  |

# Appendix B. Field area measurement application setup notes

The information in this appendix is most suited for the survey team members who are installing and setting up the Field Area Measurement application on the agriculture interviewers’ tablets.

**Field Area Measurement application setup instructions**

The survey subcontractor ICDM will set up the application on the agriculture interviewers’ tablets according to the following procedure:

1. Download the free version of the application onto each agriculture interviewer’s tablet.
2. Log into the application on each agriculture interviewer’s tablet using the Google account email and password assigned to that interviewer for the ZOI Survey.
3. After field team assignments have been made, set up groups that align with the clusters assigned to each agriculture interviewer’s field team. Also set up groups named “Training” and “Other.” The training group can be used for any measurements taken during training, and the other group can be used for any measurements taken outside of training and ZOI Survey data collection. You can use alternate names or set up additional groups, as it makes sense for your ZOI Survey.

**Creating and editing group information**

| **Figure B1: Create New Group**  C:\Users\26167\Pictures\FAM_newgroup.png |
| --- |

To create a group (Figure B1):

1. Select “Groups” from the menu screen, and a screen listing any existing groups will appear.
2. Select the plus sign in the upper right corner of the screen.
3. Select a unique color in the “New group” pop-up box that appears and enter the name of the group.
4. Select “Save.”

To edit a group name or color:

1. Select “Groups” from the menu screen, and a screen listing any existing groups will appear.
2. Select the group you want to edit.
3. Edit the name or change the color assigned to the group.
4. Select “Save” in the upper left corner of the screen.

# Appendix C. Soil texture classes

High organic matter content makes soil feel like it has more silt than it actually does. Organic matter feels floury when dry and slippery when moist, but it does not feel sticky and it does not feel like plastic. Calcium carbonate (i.e., fizzy soil with acid) can make soil feel like it has more clay than it actually does. Strong-to-violent fizz (10-20 percent calcium carbonate) can increase a clay feel by 5-15 percent, causing an overestimation (See Figures C1 and C2, and Table C1).

| **Figure C1: Soil Content—clay, silt, sand**  Image result for soil texture triangle | **Figure C2: Soil Content—clay, sand** |
| --- | --- |

**Table C1: Soil Texture Class Characteristics**

| **SOIL TEXTURE CLASS** | | **BALL**  (form a ≈3cm diameter) | **PENCIL ROLL**  (roll to pencil thick and width of hand) | **PENCIL LIFT**  (lift pencil in middle and gently shake) | **FINGERPRINT** (when moist) | **RIBBON**  **LENGTH** (cm) | **GRITTINESS**  (sandy) | **SMOOTHNESS**  (silty) | **STICKINESS**  (clayey) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S** | **Sand** | Barely forms a ball, easily collapses | Unable | Unable to lift | No | 0 | very | not | not |
| **LS** | **Loamy sand** | Weak, easily breaks when handled | Unable ***to*** Difficult | 0 |
| **SL** | **Sandy loam** | Forms a ball,  breaks easily | Difficult | Easily breaks if able to lift | Poorly<1 |
| **SCL** | **Sandy clay loam** | Easy | Easy | Breaks or cracks when shaken | Poor to Good | ≈2.5 | moderately | moderately |
| **L** | **Loam** | Moderate ***to*** Easy | Difficult to lift ***to*** breaks when shaken | Poor | ≈2.5 | slightly | not |
| **SC** | **Sandy clay** | Easy | Does not crack, will bend when shaken | Good | >5 | moderately | very |
| **CL** | **Clay loam** | Bends when lifted | 4-5 | slightly | slightly | moderately |
| **SiL** | **Silt loam** | Difficult ***to*** Easy | Difficult to lift ***to*** breaks when shaken | ≈2.5 | not | very smooth & soapy | slightly |
| **Si** | **Silt (rare)** | Difficult ***to*** Moderate | Easily breaks when lifted | Poorly<1 |
| **SiCL** | **Silty clay loam** | Easy | Bends when shaken | 4-5 | moderately | moderately |
| **SiC** | **Silty clay** | No bends or breaks when shaken | >5 | moderately & soapy | very |
| **C** | **Clay** | No bends or breaks when shaken | >5 | not | extremely |

# Appendix D. LandPKS soils data report

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LandPKS Soils Data Report

**Site Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Land Capability Classification**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

| Land Capability Classification Criteria | LCC Class | Definition | Reason for assessment |
| --- | --- | --- | --- |
| 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. |
| 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. |
| Surface soil texture (s-t) |  | Soil texture near the surface is important for seedling establishment. | Poor surface soil texture can prevent seedling establishment. |
| Salinity (s-k) |  | Salt on the soil surface is an indicator of high soil salinity. | High soil salinity can limit crop growth. |
| Surface stoniness (s-r) |  | Percentage of soil covered by stones and boulders (larger than 25cm). | Soil covered by stones and boulders can impede the use of tractors and animal-pulled plows. |
| Soil water storage capacity (s-a) |  | The amount of water that is usable by plants that the soil can store. | A lower ability to store water means there is less water available for plants to grow. Farmers should plant drought-resistant crops. |
| 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. |
| Flooding during growing season (w-f) |  | Frequency of flooding during the growing season. | Flooding can damage crops and influence crop selection. |
| 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. |
| Permeability (w-p) |  | The ability of water to move through the soil. | Low permeability can limit root growth during wet periods due to waterlogging. |

**Soil Properties by Depth**:

| Depth (cm) | Soil Texture | Rock Fragment (%) |
| --- | --- | --- |
| 0-1 |  |  |
| 1-10 |  |  |
| 10-20 |  |  |
| 20-50 |  |  |
| 50-70 |  |  |

**Other Notes:**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**Land Capability Classification** **(LCC):** A simple system of classifying land based on its capability to produce crop and pasture plants, and how cultivation will impact long-term land degradation. Land can be classified into one of eight classes. (See table below for class descriptions.)

| Descriptions of the LCC Classes from the USDA National Soil Survey Handbook Part 622 | |
| --- | --- |
| **Class** | **Description** |
| 1 (best) | Slight limitations that restrict soil use |
| 2 | Moderate limitations that reduce the choice of plants or require moderate conservation practices |
| 3 | Severe limitations that reduce the choice of plants or require special conservation practices, or both |
| 4 | Very severe limitations that restrict the choice of plants or require very careful management, or both |
| 5 | Little or no hazard of erosion, but with other limitations; impractical to remove, limits soil use to mainly pasture, rangeland, forestland, or wildlife habitat |
| 6 | Severe limitations that make soils generally unsuited to cultivation and limit their use mainly to pasture, rangeland, forestland, or wildlife habitat |
| 7 | Very severe limitations that make the soils unsuited to cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat |
| 8 (worst) | Limitations that prevent use for commercial plant production and limit use mainly to recreation, wildlife habitat, water supply, or esthetic purposes |

To learn more about LandPKS please visit our website at landpotential.org and for questions first visit the FAQ section of the website. For any additional questions about this report, contact the LandPKS Team at [contact@landpotential.org](mailto:contact@landpotential.org).

*LandPKS development is led by the USDA-ARS Jornada Experimental Range in collaboration with New Mexico State University and the University of Colorado @ Boulder, with support from USDA and the Bureau of Land Management.*

1. Replace with country-specific materials. [↑](#footnote-ref-0)
2. Typically Whibal cards are used, which can be obtained in a variety of sizes and quantities. 3M yellow post-it cards are another option that are available globally and are a good option, especially, if cost is an issue. [↑](#footnote-ref-1)
3. Insert ranges relevant to the country or area where the ZOI Survey is being implemented. For example, if the survey were conducted in California, United States, longitudes value should be between -17 W and -11° 24' W, and the latitude values should be between 12° N and 17°° N. [↑](#footnote-ref-2)
4. A 100 percent slope means that the land is at a 45 degree angle. While most plots of agricultural land will have a slope less than that, some plots will have a slope greater than 45 degrees, which will be greater than 100 percent. A perfectly vertical slope would measure 200 percent with the slope meter. [↑](#footnote-ref-3)
5. This step is important because the pixels on the tablet screen will be used in the algorithm that compares the soil sample to the reference card. The areas inside the boxes that pop up in the reference card section and in the soil sample section will be used for the soil color calculations. It is important that the soil inside the soil sample box is uniform and representative of the entire sample. The same is true for the reference card. If you use a Whibal card, it is important to include only the grey section of the card inside the box, not any of the black lines. [↑](#footnote-ref-4)