

**Living Standards Measurement  
Study- Integrated Surveys on  
Agriculture (LSMS-ISA): Ethiopia  
Socioeconomic Survey (ESS)**



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*Crop Cutting Manual*

**Central Statistical Agency & The World Bank  
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# 1. INTRODUCTION

## 1.1 Purpose of the manual

Every year the Central Statistical Agency of Ethiopia conducts the Annual Agricultural Sample Survey (AgSS). The survey collects a range information on crop and livestock farming in Ethiopia. As part of this survey, the CSA undertakes crop cutting for 23 temporary crops (Table 1).

**Table 1. List of crops eligible for crop cutting**

<i>Cereals</i>	<i>Pulses</i>	<i>Oilseeds</i>
<i>Teff</i>	<i>Faba beans</i>	<i>Neug</i>
<i>Barley</i>	<i>Field peas</i>	<i>Linseed</i>
<i>Wheat</i>	<i>Haricot beans</i>	<i>Groundnuts</i>
<i>Maize</i>	<i>Chick-peas</i>	<i>Safflower</i>
<i>Sorghum</i>	<i>Lentils</i>	<i>Sesame</i>
<i>Finger millet</i>	<i>Grass Peas</i>	<i>Rape seed</i>
<i>Oats/'Aja'</i>	<i>Soya beans</i>	
<i>Rice</i>	<i>Fenugreek</i>	
	<i>Gibto</i>	

This manual is taken from the CSA's Annual Agricultural Sample Survey manual. It is slightly modified to fit into the Ethiopia Socioeconomic Survey (ESS).

The manual discusses the survey protocols that are followed during crop cutting. It provides information on the procedures

including field selection, crop cutting area identification and demarcation, crop cutting, and documenting the results.

## **1.2 Summary of the crop cutting procedure**

The enumerator lists all the crop fields covered by any of the 23 crops and cultivated by all the holders in the enumeration area selected for the survey. The list serves as the sampling frame to select crop fields for crop cutting.

The crop fields are taken from the Crop Field Roster of all post planting questionnaires fielded in the enumeration area. The field crops are then transferred to the attached form.

The form is used to randomly select up to five fields (in each EA) for each eligible crop listed in Table 1 above.

The random selection of crop fields gives priority to pure stand fields. Mixed stands or intercropped fields will not be selected if there are five or more pure stand fields for the crop under consideration.

Once the field selection is carried out on this form, crop cutting will be carried out in the field and the result of the crop cutting will be filled in the ERSS post harvest questionnaire Section 9.

The harvested crop is then returned to the holder.

## **1.3 Tools and materials needed in the field**

The enumerator needs to make sure that he or she has the following materials before going to the selected field.

- a) GPS
- b) Compass

- c) Calculator
- d) Measuring tape
- e) Metal sticks with ring for demarcation
- f) Rope - 16 meter long with 4 ring- knots at four points placed 4 meters apart with two of them at the beginning and at the end
- g) Sickle to cut the crop
- h) Bags to store the grain
- i) Random table
- j) Notebook forms and questionnaire to list and select the crop fields and record the results.

## 2. FIELD SELECTION PROCEDURE FOR CROP CUTTING

### 2.1. Taking inventory of eligible crop-fields for crop cutting

The listing includes all the eligible crop fields cultivated by all farm holders in the enumeration area selected for the survey. The table below is an example from one enumeration area. It includes information on household ID, holder ID, holder name, parcel ID, field ID and crop name. The crop fields listed in the table are all the eligible crop fields owned by all the holders selected for the survey in the enumeration area.

**Table 2: Inventory of eligible crops fields for crop cutting**

HH ID	Holder ID	Holder Name	Parcel ID	Field ID	Crop Name
020	01	Ato Kebede Abebe	02	01	Linseed
			03	02	Field pea
			04	02	Field pea
027	01	Ato Tessema Chala	01	03	Wheat
			02	05	Barley
			03	01	Barley
027	02	Ato Ayana Tessema	01	01	Field pea

055	01	Ato Kuma Mamo	01	04	Field pea
			01	05	Horse Beans
			02	01	Horse Beans
			02	03	Linseed
			02	04	Horse Beans
			03	02	Wheat
110	01	W/o Belaynesh Abate	01	03	Wheat
			01	06	Field pea
			02	02	Horse Beans
			03	02	Wheat
			03	03	Barley
			03	05	Wheat
120	01	Ato Mesfin Dereje	01	02	Barley
			02	04	Barley
			03	02	Wheat
135	01	Ato Lemma Tola	01	02	Barley
			03	03	Barley
073	01	Ato Mohammed Jamal	01	02	Barley
073	02	Ato Ali Mohammed	01	03	Horse Beans
081	01	Ato Awoke Bekele	02	01	Linseed
			02	03	Wheat
			03	01	Field pea
			04	02	Linseed
092	01	Ato Atomsa Feyissa	01	03	Wheat
			01	05	Wheat
			02	01	Field pea
092	02	Ato Adane Atomsa	02	01	Horse Beans
143	01	W/o Almaz Getu	01	02	Wheat
			01	03	Barley
			02	02	Horse Beans
			03	01	Wheat
			04	02	Barley
151	01	Ato Amha Fiseha	01	04	Barley
			02	05	Barley
			03	01	Field pea
151	02	Ato Abay Molla	01	01	Barley

Note: Names and addresses are examples for illustration purposes.

The above example shows that 15 holders from 11 households have one or more eligible crop fields. It should be noted that not all farming holders in the EA have crops that are eligible for crop cutting. Also, those holders listed in the table could have other fields that are not eligible for crop cutting. In addition, some farm holders cultivate only other crops such as fruits and vegetables or tree crops. Therefore, although these holders may have been selected for the study and are asked of other questions, they will not be included in the above list. Then transfer the above list to the attached table (Table -3) to conduct the random selection.

## **2.2. Preparing the listing table by crop**

This section describes the steps for completing the Table in Annex-1.

### **Section 1. Study /Survey Location**

Q1. Region: Record Code and Name of the Region where the survey is taking place.

Q2. Zone: Record Code and Name of the Zone where the survey is taking place.

Q3. Wereda: Record Code and Name of the Wereda where the survey is taking place.

Q4. Peasant/ Farmers Association (PA): Record Code and Name of the PA where the survey is taking place.

Q5. Enumeration Area (EA). Record Code and Name of the Region where the survey is taking place.

## Section 2. Crop field selection list for crop cutting

**Q1 Parcel ID:** Copy the parcel ID of all fields covered by temporary crops eligible for crop cutting. Do not restart the numbers. The number should be exactly the same as the one in the questionnaire.

**Q2. Field ID:** Copy the field ID of all fields covered by temporary crops eligible for crop cutting. Do not restart the numbers. The number should be exactly the same as the one in the questionnaire.

**Q3. Crop Name and Code:** Copy the crop name and crop code of the crop that covered the field.

**Q4. Household ID:** This is the ID of the household whose field crop is eligible for crop cutting. The household ID recorded in Q3. Household ID should be written in three digits (e.g. 001, 019, 123).

**Q5. Holder ID:** This is the ID of the holder whose field crop is selected for crop cutting. Holder id should be recorded in two digits (e.g. 01, 02, etc.).

**Q 6-Q21. Field Serial Number and Field ID:**

Two columns are given for each crop selected for crop cutting. Columns 6 & 7 are for the first crop, 8 & 9 for the second etc. until the last crop which will take the last two columns, 20 & 21. For each crop, the first column is used to record the serial number starting from 1 and the second column is the field ID of the selected crop field. Question 6, 8, 10, 12, 14, 16, 18 and 20 will have the serial number for the selected crop.



For example, if the first crop is linseed, there are four crop fields in the EA (See Table 2 and Annex-1). Therefore, the serial number in Q6 will be 1, 2, 3, and 4. The field Ids for this crop are recorded in Q7. In the example, these are 01, 03, 01, and 01.

**Note:** The listing form accommodates 8 crops. If there are more crops use additional forms. In the example (Annex-1) there are 5 crops (Linseed, Field pea, Wheat, Barley and Horse beans) and only columns or questions 6 to 15 are completed.

### **2.3. Random selection of crop fields for crop cutting**

Once the serial numbers are assigned and field Ids are copied for all eligible crops in the EA the crop fields are selected randomly. The random selection is done for each crop. The serial numbers (not the field Ids) are used as a reference for the selection.

In each enumeration area, five crop fields will be selected randomly for each crop, if there are more than five fields.

The random selection is for crops with more than five crop fields. For crops with 5 and less crop fields, all the fields will be selected for crop cutting.

**Example:** In Annex-1 the example there are 11 wheat fields. Out of these fields, 5 will be selected using the two digit random number from the random table. The selection is as follows: the interval is 2 ( $11/5=2.2$  and ignore the decimal). Then to get the starting number, select 1 or 2 randomly. If for example, the starting number is 2 then 4 more fields will be selected by following the interval accordingly. For field peas, there are 6 fields in the above example, then the first five fields will be selected.

Once the fields are randomly selected, circle the serial numbers of all those crop fields selected for crop cutting in questions 6, 8, 10, 12, 14, 16, 18, and 20. . Circle also the field ID in Question/Column 2 on the same row. Then the numbers will be transferred to questions 7, 9, 13, 15, 17, 19 and 21. Then crop cutting will be selected on the fields selected for crop cutting and the result will be recorded in the Questionnaire (See section 4 of this manual).

## **2.4. Special Cases**

### *2.4.1. Mixed or intercropped fields*

What to do when there are mixed crop fields.

1. *Ignore if there are enough monocrop fields or pure stands:* If there are five and above monocrop fields in the EA the mixed crop fields are excluded from the selection and crop cut of that crop will be carried out on monocrop fields. For example, in the EA, suppose there are five teff monocrop fields, six maize monocrop fields and one teff and maize mixed crop field. In this case, for Teff, we select all the five teff monocrop fields for crop cutting. For maize, we randomly select five out of six fields for crop cutting. The mixed crop field is excluded from the selection.

2. *Consider if there are fewer than five pure stand or mono crop fields:* If one of the crops is in five and more pure stand fields and the other crop in fewer than five pure stand fields, the mixed stand field will be considered for crop cutting for the crop with fewer than five pure stands.

However, if both crops are found only in mixed crop fields the field will be selected for the crop that occupies the largest share

of the field. If the proportion is equal (about 50% each), the crop that is more common in the area will be selected.

#### *2.4.2. Damages and replanting*

After a crop is damaged by pests or rain etc., the holder could replant another crop on the field. It could be one or more crops. In all cases the status of the field changes. Therefore, when the enumerator comes back to the field for crop cutting he/she won't find the field originally recorded. In this case new field Ids should be given to the new crop field or fields and all the information need to be corrected in all applicable questionnaires and forms.

**Note:** The questionnaire should be completed for the crop that was damaged after it was selected (See section 4 of this manual).

#### *2.4.3. Multiple harvest*

During the survey, in some places, it is possible to find more than one harvest on a field. In this case, the field needs to be recorded again and the measurement should be redone. The results need to be documented considering this as a new field. If the crop is eligible for crop cutting, it should be included in the list for selection. If selected randomly, crop cut on this field should take place even if there was a crop cut for the preceding crop.

**Note:** The crop cutting for the second harvest should take place only if the crop was new, i.e. it was not selected for crop cutting in the first procedure, or there were no enough crop fields for the crops selected in the first procedure.

### 3. DEMARCATING THE 4MX4M PLOT FOR CROP-CUTTING

Once the field selection is complete, the next step is to go to the field and demarcate the crop-cutting area. The following steps are followed to identify and demarcate the 4mX4m plot area.

Step-1. *Identify the corner point/ major angles of the selected crop field.* Then, entering the field, the enumerator will identify the closest corner point to the North-West side of the field using the compass. If the field has sides less than 10, use a single digit column from the random table. If the field has more than 10 sides use a double digit column from the random table.<sup>1</sup>

Step-2. *Identify the two sides (short and long) of the field by standing at the selected corner.* In the example given below (Figure 1), the long side is given by the distance from point 5 to 6 while the short side of the field is given by the distance from point 5 to point 4.

Step-3. *From Point 5, measure the long distance (from Corner 5 to Corner 6) using a tape measure.* As indicated in the illustration below, this distance is 40 meters. Then using the random table look for a number less or equal to 40 and record that number. In the example below, the randomly selected number for the entry point in the longer side of the field is 10. The distance for the short side of the field on this example is 20 meters. Using the same procedure used for the longer side, the randomly selected number for the shorter side is 15.

Step 4. *Identify the long and short sides of the field and the entry point to the field.* The long and short sides that were obtained

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<sup>1</sup> A field with more than 10 sides is not common.

using the random table will be used to identify the entry point to the crop field. The random table that will be used to identify the entry point to the field is determined by the length of the short and long sides of the field. If the length is less than 10, single digit random table will be used. If 10 meters and above, double digit random table will be used.

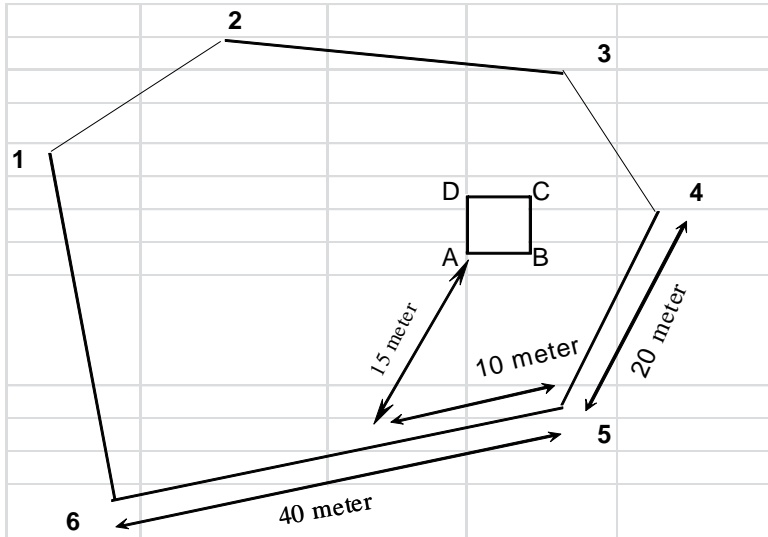
*Step 5. Entering the field and demarcating the 4mX4m plot.*  
<sup>2</sup>Next, use the following procedures to find the starting point for the 4mX4m plot on which the crop cutting would take place. By standing at the corner of the selected crop field, obtain the reading from the compass bearing. Record the result on the Form 2004/2A Section 2, Question numbers 4 and 5. Also, record the result on a note book. Again, while on this field, stand at the corner and look towards the long side of the field, get the entry point using the number taken from the random table. In the example below, stand on Corner point 5 and look towards Corner point 6. Then measure the entry point distance from Corner point 5. For example, if the random number identified for the long side of the plot is 8 meters and the long side is 10 meters total, measure 8 meters starting from Corner point 5. That will be the entry point from the longest side of the field. Then, at the entry point post a stick and look towards the field and measure the number obtained for the short side of the other side of field starting from the entry point already identified for the long side of the field. That point (Point A in the example below) will be the starting point for the 4mX4m plot.

Note: If the random numbers obtained from the random table for long and short sides of the field do not fall in the crop field area, drop both random numbers and start all over again. Each

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<sup>2</sup> In Wave 1- the crop cut was carried out from a 2m by 2m plot. In wave 2 this was changed to 4m by 4m plot.

time when one or both of the random numbers fail to fall in the field, then drop both and start again until both random numbers fall on the field. Then, use these random numbers as a starting point to prepare the 4mX4m plot.



**Figure 1. An illustration for the 4 meter X 4 meter plot identification/ preparation in a crop field**

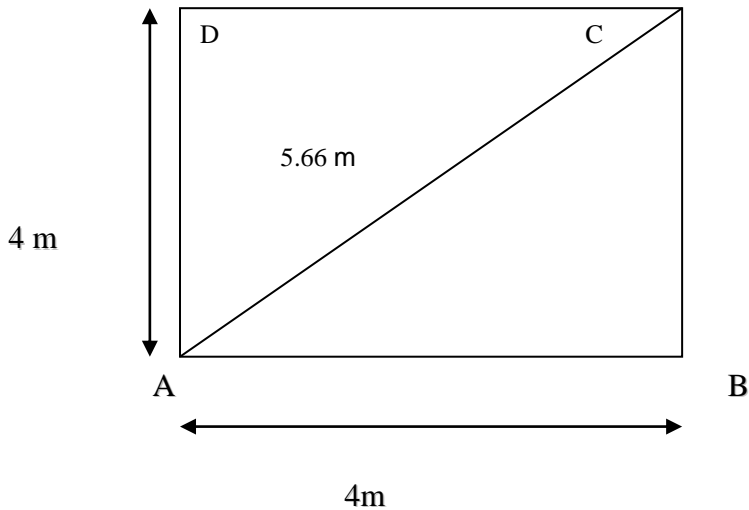
In order to prepare a 4 meter X 4 meter plot, you need 4 sticks and one 16 meters long rope with ring- knots at each end.

- a. At point “A” insert firmly the first stick on the ground, then turn your face to east and read 90 degrees from the compass. On this direction, starting from point “A”, measure 4 meters and insert firmly the second stick on the ground. The point at which the stick is posted is Point B in the example below (See Figure 2).

b. At point “B”, turn your face to north and read 360 degrees or 0 degree from the compass. On this direction, starting from point “B”, measure 4 meters and insert firmly the third stick on the ground. The point at which the stick is posted is Point C in the example below.

c. At point “C”, turn your face to west and read 270 degrees from the compass. On this direction, starting from point “C”, measure 4 meters and insert firmly the fourth stick on the ground. The point at which the stick is posted is Point D in the example below.

d. At point “D”, turn your face to south and read 180 degrees from the compass. On this direction, starting from point “D”, measure 2 meters and tie the rope at the stick at point “A”. If this does not happen, check for any bearing or measurement error. In order to make sure that the plot is a 4mX4m, check if the diagonal line (Line AC) is 5.66 meters.



The crop cutting should cover only all the area in the 4mX4m plot. Once separated from the straw, the grain should be weighed carefully and the results obtained from the weight measurement should be recorded in the questionnaire.

#### 4. RECORDING THE RESULTS

The crop cutting results are recorded in Section 9 of the agriculture questionnaire. The relevant questions include the following four questions (Q2 to Q5). These are completed by the enumerator.

Parcel ID	Field ID	Crop Name	Crop Code	1	2		3		4		5	
				WAS [CROP] CUT ON THIS FIELD AND PARCEL ? Yes...1 No....2	Day	Month	Kilo	Gram	Day	Month	Kilo	Gram

First, complete Parcel ID, Field ID, Crop Name and Crop Code for all temporary crops whether they are selected for crop cutting or not. Then, answer Q1 records 1 for “Yes” for Q1 for those fields where crop cut took place. If not record 2 for “No”.



Then for Q2 record day and month of the crop cut. For Q3 record the fresh weight of the grain obtained from the 2mX2m. This weight is just after the grain is separated from the straw (pods or husks). The kilo and the gram are recorded in the kilo column. For Q4 record the day and month when the dry weight was taken. This measurement is taken after the grain is dried. Finally for Q5, record the kilo and the gram in space provided.

**Note 1:** If the crop on the selected crop field is damaged, the process of documenting the results should continue. The particulars of this crop field should appear not only in the listing forms. The particulars should be recorded in the questionnaire. In this case put “0” in the fresh and dry weight columns. Record the reason for the crop damage and also the extent of the damage in the follow-up questions.

**Note 2:** If the selected crop field was harvested earlier by the holder or if the whole crop was consumed while in the field, put dash mark in the questionnaire where results are recorded.

**Note 3:** All other questions in section 9 before question Number 2 and after Q5 are asked for all crop fields whether they are selected for crop cutting or not.

## **5. WHAT TO DO AFTER THE CROP CUTTING IS COMPLETED.**

The enumerator returns the grain to the holder as soon as the crop cutting exercise is completed, i.e. after the grain’s fresh and dry weight are collected and the results are recorded.



Section 2: Crop field selection list for crop cutting (Continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21				
Parcel ID	Field ID	Crop Name and Code		HH ID	Crop Name																			
		Crop Name	Code		Linseed				Field Pea		Wheat		Barley		Horse Beans									
					Holder ID	Field Serial number	Field ID	Field Serial number	Field ID	Field Serial number	Field ID	Field Serial number	Field ID	Field Serial number	Field ID	Field Serial number	Field ID	Field Serial number	Field ID	Field Serial number	Field ID	Field Serial number	Field ID	
02	01	Field Pea		092	1				06															
02	01	Horse beans		092	2									05	01									
01	03	Wheat		110	1				06	03														
01	06	Field Pea		110	1				07															
02	02	Horse beans		110	1									06										
03	02	Wheat		110	1				07															
03	03	Barley		110	1							05	03											
03	05	Wheat		110	1				08	05														
01	02	Barley		120	1							06												
02	04	Barley		120	1							07	04											
03	02	Wheat		120	1				09															
01	02	Barley		135	1							08												
03	03	Barley		135	1							09	03											
01	02	Wheat		143	1				10	02														
01	03	Barley		143	1							10												
02	02	Horse beans		143	1									07										
03	01	Wheat		143	1				11															
04	02	Barley		143	1							11												
01	04	Barley		151	1							12												
02	05	Barley		151	1							13												
03	01	Field Pea		151	1				08															
01	01	Barley		151	2							14												

	Name	Signature	Date
Enumerator			
Supervisor			