# THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
# CENTRAL STATISTICAL AGENCY

## AGRICULTURAL SAMPLE SURVEY
## 2008/09 (2001 E.C) VOLUME V

# REPORT ON AREA AND PRODUCTION OF BELG SEASON CROPS FOR

# PRIVATE PEASANT HOLDINGS

**ADDIS ABABA**

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# CHAPTER I

## 1. INTRODUCTION AND OBJECTIVES OF THE SURVEY

## 1.1 INTRODUCTION

As it is true in most developing countries, in Ethiopia, agriculture is the dominant sector of the economy. As a result, Ethiopian agriculture contributes the lion share of the Gross Domestic Product (GDP) and foreign currency earnings of the country from the sell of agricultural outputs abroad. Moreover, the sector creates employment opportunity to the majority of the country's population and at present nearly 85 percent of the country's population depends on agriculture to sustain their livelihood. Hence, as it had been for centuries in the past, still being the leading sector at present, it is believed to remain being the determinant sector to play a dominant role to bring about an overall sustainable economic growth to the country, for the years' to come if and only if strenuous efforts are made by the government and the concerned stakeholders including the farmer, to increase productivity through increased use of farm inputs such as improved seed, fertilizers etc and modernize the farm activity through increased use of modern and improved farm implements and farming systems as well as through the introduction of modern farming technology to the sector as a whole.

In order to meet the goals mentioned above and pave the way for the concerned stakeholders' to identify, plan, implement and monitor agricultural projects and developmental programs among others, the availability and regular supply of reliable, comprehensive and timely statistical information on the overall performance of the sector is considered essential for use as a primary input to their planning purpose and related activities.

To minimize the existing data gap and fulfill the demand of the stakeholders' concerned, for the past three decades, the Central Statistical Agency (CSA) has been conducting the agricultural sample survey under which four integrated sample surveys designed for the collection of agricultural information on the performances of the sector were launched all over the country and used to disseminate the survey results to ultimate users' on annual basis. The 2008/09 (2001 E.C.), Belg Season Crop Production Sample Survey, for which this report is meant for, is among

the four integrated sample surveys launched on annual basis under the umbrella of the agricultural sample survey all over the country.

This report, which is Volume V of the six series of statistical reports on Agriculture, presents quantitative results on crop land area, production, and yield of major Belg crops, grown during the 2008/09 Belg season by private peasant holdings as obtained from the results of the year 2008/09 (2001 E.C.), Belg Season Crop Production Sample Survey.

## 1.2 Objectives of the Survey

The objectives of the **2008/09 (2001 E.C.),** Belg Season Crop Production Sample Survey is to produce basic quantitative information on cropland area, production and yield of major Belg season crops, as well as to provide quantitative information on:-

- cropland area, production and yield of major belg season crops, and
- the extent and use of different farm management practices on belg season crops such as fertilized crop land area and quantity of fertilizer used by crop and fertilizer type, irrigated crop land area under improved seed, pesticide treated cropland area … etc.

The adequate and timely supply of this information to ultimate users is therefore, important for use as a primary input in the process of policy formulation, designing developmental agricultural projects and programmmes. This report therefore presents quantitative information on the above-mentioned major variables at country and regional levels.

# CHAPTER II

## 2. SURVEY METHODOLOGY, DATA COLLECTION AND PROCESSING

### 2.1 COVERAGE

The 2008/9 (2001 E.C) Annual Agricultural Sample Survey (Belg season) covered the entire rural parts of the country except the non-sedentary population of three zones of Afar & six zones of Somali regions. Accordingly the survey took in to account of all parts of Harari, Dire Dawa, and actually **59** Zones / Special weredas (that are treated as zones) of other regions.

To be covered by the survey, a total of around 1,400 Enumeration Areas (EAs) were selected. However, due to various reasons that are beyond control, in EAs the survey could not be successful and hence interrupted. Thus, all in all the survey succeeded to cover 1314 EAs throughout the regions. The Annual Agricultural Sample survey (Belg season) was conducted on the basis of 30 agricultural households selected from each EA.

### 2.2 SAMPLING FRAME

The list containing EAs of all regions and their respective households obtained from the 1999 E.C cartographic census frame was used as the sampling frame in order to select the primary sampling units (EAs). Consequently, all sample EAs were selected from this frame based on the design proposed for the survey. The second stage sampling units, households, were selected from a fresh list of households that were prepared for each EA at the beginning of the survey.

### 2.3 SAMPLE DESIGN

In order to select the sample a stratified two-stage cluster sample design was implemented. Enumeration areas (EAs) were taken to be the primary sampling units (PSUs) and the secondary sampling units (SSUs) were agricultural households.

The sample size for the 2008/09 agricultural sample survey was determined by taking into account of both the required level of precision for the most important estimates within each

domain and the amount of resources allocated to the survey. In order to reduce non-sampling errors, manageability of the survey in terms of quality and operational control was also considered.

Except Harari, and Dire Dawa, where each region as a whole was taken to be the domain of estimation; each zone of a region / special wereda was adopted as a stratum for which major findings of the survey are reported.

## 2.4 SELECTION SCHEME

Enumeration areas from each stratum were selected systematically using probability proportional to size sampling technique; size being number of agricultural households. The sizes for EAs were obtained from the 1999 E.C cartographic census frame. From the fresh list of households prepared at the beginning of the survey 30 agricultural households within each sample EA were selected systematically.

Estimation procedure of totals, ratios, sampling error and the measurement of precision of estimates (CV) are given in Appendix-I and II respectively. Distribution of sampling units (sampled and covered EAs and households) by stratum is also presented in Appendix-III.

## 2.5 Field Organization

The Central Statistical Agency (CSA) branch statistical office heads, field supervisors and enumerators, other supporting staff and drivers were all involved in the field operation activities of the 2008/09 (2001 E.C.) Belg season Crop Production Sample survey. To accomplish the data collection activities, all field enumerators were equipped with the necessary survey equipment (i.e. compass, programmable calculator, measuring tape, sample bags…etc). To assist with the fieldwork and data collection activities all available four-wheel drive vehicles were used for supervision and collection of completed questionnaires.

## 2.6 Training of Field Staff

At the beginning of the survey year, the field staff-training program was carried out in two stages. The first stage consisted of trainees from the head office, branch statistical office heads, statisticians and some of the field supervisors for one week at CSA's headquarters in Addis Ababa. Those trained in the first stage conducted similar training for field supervisors and enumerators for 20 days in the 24 branch statistical offices, which are distributed all over the country. During the second stage training, the field staff were given detailed classroom instruction on the objectives and uses of the Agricultural Sample Survey (AgSS), concepts, and definitions of terms used, the method of area measurement, interviewing procedures, … etc. The enumerators' and supervisors' training also included a field practice to reinforce the procedures discussed in the classroom with regard to field area measurement, use of the programmable calculator and crop-cutting techniques.

## 2.7 Methods of Data Collection.

Except cropland area of major Belg Season crop, the data of which collected objectively using compasses and measuring tape, the information on production of major Belg Season crops and agricultural practices (uses of fertilizer, pesticide, improved seed and irrigation) were subjectively collected by interviewing the holders of sampled households. Appendix II**,** illustrates the total number of EAs and households reporting for the 2008/09 (2001 E.C.), Belg crop production by region.

***A major characteristic of Ethiopian agriculture is the existence of two well-known crop production seasons referred to as the Meher (or main) and Belg(short rain) Seasons. The generally accepted definition of the Meher season is that of the long rainy season, which normally occurs from June to September. The Belg Season most often refers to small but timely rainy season, which normally occurs from February to May but in limited areas of the country. Generally, the Meher Season rainy period provides ideal growing conditions for the longer maturing crops. Planting and harvest of Meher crops can extend to December or January in some areas. Most of the time holders rely on short maturing crops for planting during the Belg rainy period and harvest of the crops is in June or July.***

***A point of contention arises with respect to the pure definition of the Belg crop. Belg cropping practices are heterogeneous across different portions of the country. The nature of the sowing period also overlaps with some of the Meher Season crops. Consequently, the report on Belg Season crops in the past faced a problem of a clearly defined growing period. It is important not to overlook or miss agricultural practices performed all year round due to use of irrigation or soil moister from sufficiently***

***dried areas that from time-to-time are swampy or marshy. To help clarify the two-crop season, the following definition has been in use since 1987/88:***

***<u>Belg Season Crops were</u> defined as any crops that are harvested during the months of March to August, while those crops that are harvested during September to February are considered Meher (or main) season crops.***

This report consists of estimates of area, production and yield of major Belg Season crops for the year 2008/09 (2001 E.C.) The data collection period for obtaining the area, production and agricultural practices of the Belg season crops was from 'Ginbot' 15-30, 2001 E.C. (i.e. From May 23 to June 7, 2009). Data on area under Belg season crop are collected objectively using compass and measuring tapes, while data on production of belg season crops were using subjective method based on face-to-face interviewing of the holder by the enumerator. Data on production of belg season crops are calculated from the condition factor data that are collected directly from the sampled holders within household, peasant association chairpersons and development agents. The enumerators were trained to systematically present the questions to the respondents on percentage changes using the local translation and meaning. The enumerators were also trained on how to use comparative associations to represent the concept of percentage changes and fill in the questionnaire.

## 2.8 Data Processing

### a. Editing, Coding and Verification

To insure the quality of the collected survey data an editing, coding, and verification instruction manual was written, and thirty four editors, data coders and verifiers were trained for one day to edit, code and verify the data using the aforementioned manual as a reference and teaching aid.

The enumerator completed edited and coded questionnaires sent to the head office were thoroughly verified by trained verifiers on a 100% basis before the questionnaires were sent to the data entry unit. The editing, coding, verification and data entry of all questionnaires was completed in two weeks time.

**b. Data Entry, Cleaning and Tabulation**

Before starting data entry computer edit specifications were prepared for use on personal computers, utilizing the CSPRO Software for data consistency checking purposes. The data on the coded questionnaires were then entered into the CSPRO software on personal computers. The data was then checked and cleaned using the computer edit specifications prepared earlier for this purpose. Forty six data encoders and eight supervisors were involved in this total process and it took twenty five days to complete the job. Finally, tabulation was done on personal computers to produce results as indicated in the tabulation plan.

## 2.9 Basic concepts and definitions

For better understanding and ultimate use of the data presented in this report, the definitions and concepts of technical terms and terminologies used for the collection of all types of data of the **2008/09 (2001 E.C.)** Belg Seasons Crop Production Sample Survey is presented here below: -

**Enumeration Area (EA):** An Enumeration Area in rural parts of the Country is a locality that is less than or equal to a farmer's association area and usually it consists of 150-200 households.

**Household:-** A household may be either;

a) a one person household, that is a person who makes provision for his own food or other essentials for living without combining with any other person to form part of a multi person household or
b) a multi person household, that is, a group of two or more persons who live together and make common provision for food or other essentials for living. The persons in the group may pool their incomes and have a common budget to greater or lesser extent. They may be related unrelated persons, or a combination of both.

**Agricultural Household:-** A household is considered an agricultural household when at least one member of the household is engaged in growing crops and/or breeding and raising livestock in private or in partnership with others.

**Holder:-** A holder is a person who exercises management control over the operations of the agricultural holding and takes the major decision regarding the utilization of the available resources. He has technical and economic responsibility for the holding. He may operate the holding directly as an owner or as a manager.

Under conditions of traditional agricultural holding the holder may be regarded as the person, who with or without helps, of others, operates land or raises livestock in his own right, i.e. the person who decides on what, when where and how to grow crops or raise livestock and has right to determine the utilization of the products.

**Holding: -** A holding is all the land and livestock kept which is used wholly or partly for agricultural production and is operated as one technical unit by one person alone, or with others, without regard to title, legal form, size or location.

**Parcel: - A** parcel of holding is any piece of land entirely surrounded by land, Water, road, forest, etc. which is not part of the holding. It may consist of one or more cadastral units, plots or field adjacent to each other.

**Field: - A** field is defined as any plot of land, which is a parcel or part of a parcel under the same crop.

**Belg Season Crops: -** are defined as any crops that are harvested during the months of March (Megabit) to August (Nehase).

**Meher Season Crops**: - are those crops that are harvested during September (Meskerem) to February (Yekatit) are considered as main (Meher) season crops.

**Irrigated area: -** refers to the area of land purposely and actually provided with water, other than by rain, for improving the production of crops. The uncontrolled flooding of land by the over flow of rivers or streams is not categorized as irrigation practice although sometimes farmers use this incidence for production.

**Improved Seed:** is defined as crop variety, which gives significantly higher yield, better quality and/or better benefit compared to traditional varieties of seeds, and usually produced by the Ethiopian Seed Enterprise (ESE) in Ethiopia.

**Fertilizer: -** refers to anything added to the soil intended to increase the amount of plant nutrients available for crop growth. Usually fertilizers are divided into two parts, Natural and commercial. Examples of natural fertilizers are farmyard manure and wood ashes while commercial fertilizers are DAP (Di-Ammonium phosphate) and UREA (Ammonium Nitrate).

**Pesticides:** Pesticides are chemicals useful for the mitigation, control or elimination of pests which are troublesome or harmful to crop. Insecticides, herbicides and fungicides are all considered as pesticides.

# CHAPTER III

## 3. SUMMARY OF THE MAJOR FINDINGS OF THE SURVEY.

As it has been forecasted earlier by the Ethiopian Metrological Agency and practically proved by farmers' interviewed at their farm gate during the survey field work, except in few pocket areas in Oromia and SNNP regions, the overall performance of the 2008/09 (2001 E.C.) Belg season crop production activity was found to be poor in all Belg Crop producing areas across the country.

The prolonged delay of Belg rain's which was below normal and erratic in its amount and distribution coupled with unfavorable weather condition dominated by frequent dry and windy days were among the major factors, which affected the land preparation, and sawing activities, and later on the Belg crop production activities as a whole. As a result considerable number of belg dependent farmers were forced to leave their farm plots fallow and those who were able to harshly prepare and saw their crop fields, however, faced problems due to shortage of belg rains. Nevertheless, it worth's to note that the 2008/09 Belg crops harvest was fair and good in irrigated and in dried marshy areas as well as in some belg rain fed cropping pocket areas located in the regions mentioned above. .

Despite the facts mentioned above, the results of the 2008/09 (2001 E.C.), Belg season crop production sample survey revealed that about **1,209.57** thousand hectares of land was estimated to be covered by major Belg crops from which a total production of **7,748.45** thousand quintals to be harvested at country level, during the 2008/09 (2001 E.C.) Belg season.

Out of the above mentioned total Belg season cropland area and total volume of production, **cereals** contributed the lion both in cropland area and volume of production i.e. about **996.24** thousand hectares (82.36% of the country total Belg cropland area) and about **6,942.00** thousand quintals (89.58 % of the country total Production), followed by **Pulses** that covered about **205.60** thousand hectares (17%), with a production of **803.34** thousand quintals (10.37 %). (For details see summary Table 1).

**Summary Table 1: Estimates of Total Area and Production of Major Belg Season Crops for Private Peasant Holdings in Ethiopia, 2008/09 (2001 E.C.).**

| Crop Type | Total Cropland Area | | Total Production | |
|---|---|---|---|---|
| | In thousands (ha.) | % | In thousands (Ql.) | % |
| ***Cereal*** | **996.24** | 82.36 | **6,942.00** | 89.58 |
| ***Pulses*** | **205.60** | 16.99 | **803.34** | 10.37 |
| ***Oilseeds*** | **7.73** | 0.64 | * | * |
| ***Total*** | **1,209.57** | 100.00 | **7,749.44** | 100.00 |

## 3.1 Estimates of the 2007/09(2001 E.C) Total Cropland Area and Production of Major Crops Both Seasons (Meher and Belg)

The year 2008/09 (2001 E.C.), total cropland area and production of major crops during both seasons, was estimated to be 12,420.08 thousand hectares and 178,916.84 thousand quintals, respectively. Out of the above mentioned totals, cereals covered about 9,766.36 thousand hectares (78.63% the total cropland area covered during both seasons) with a production of 151,909.06 thousand quintals (84.90% of the total volume of production of the year) (For the details see Summary Tables 2 and 3).

**Summary Table 2. Estimated Total Cropland Area under Major Crops; Private Peasant Holdings,2008/09 (2001 E.C.), Both Seasons: Ethiopia**

| | *Total Cropland Area in thousand Hectares* | | | | | |
|---|---|---|---|---|---|---|
| | *Seasons* | | | | | |
| | *Meher* | | *Belg* | | *Both* | |
| ***Crop Type*** | *in (000)Ha* | *%* | *in (000)Ha* | *%* | *in (000) Ha* | *%* |
| ***Cereal*** | *8,770.12* | *78.23* | *996.24* | *82.36* | *9,766.36* | *78.63* |
| ***Pulse*** | *1,585.24* | *14.14* | *205.60* | *17* | *1,790.84* | *14.42* |
| ***Oilseeds*** | *855.15* | *7.63* | *7.73* | *0.64* | *862.88* | *6.95* |
| ***Total*** | *11,210.51* | *100.00* | *1,209.57* | *100.00* | *12,420.08* | *100.00* |

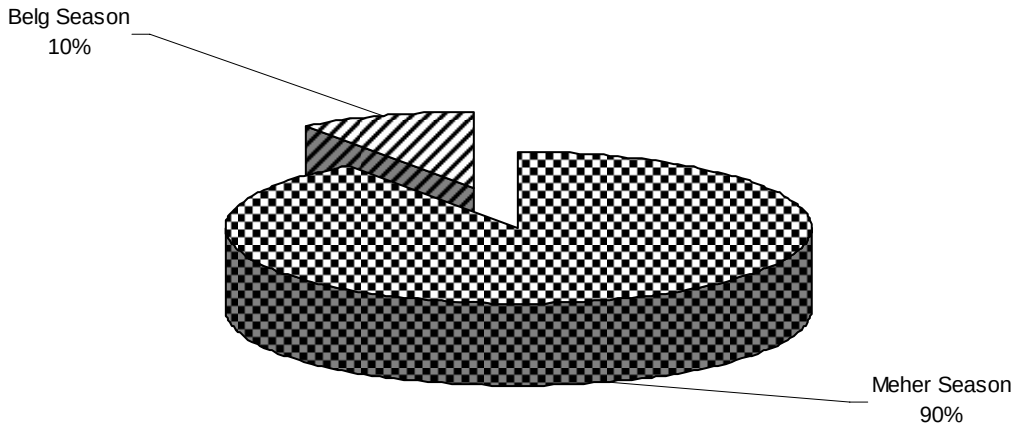
While Pulses and Oilseeds covered about 1,790.84; 862.88 thousand hectares which accounted for about 14.42% and 6.95% of the total cropland area, respectively.

**Summary Table 3. Estimated Total Production of Major Crops; Private Peasant Holdings,2008/09 (2001 E.C.), Both Seasons: Ethiopia**

| | *Total Production in Million Quintals* | | | | | |
|---|---|---|---|---|---|---|
| | *Seasons* | | | | | |
| | *Meher* | | *Belg* | | *Both* | |
| ***Crop Type*** | *in (000) Qts* | *%* | *in (000) Qts* | *%* | *in (000) Qts* | *%* |
| ***Cereal*** | *144,964.06* | *84.69* | *6,942.00* | *89.58* | *151,906.06* | *84.90* |
| ***Pulse*** | *19,646.30* | *11.48* | *803.34* | *10.37* | *20,449.64* | *11.43* |
| ***Oilseeds*** | *6,557.04* | *3.83* | * | * | * | * |
| ***Total*** | *171,167.40* | *100.00* | *7,749.44* | *100.00* | *178,916.84* | *100.00* |

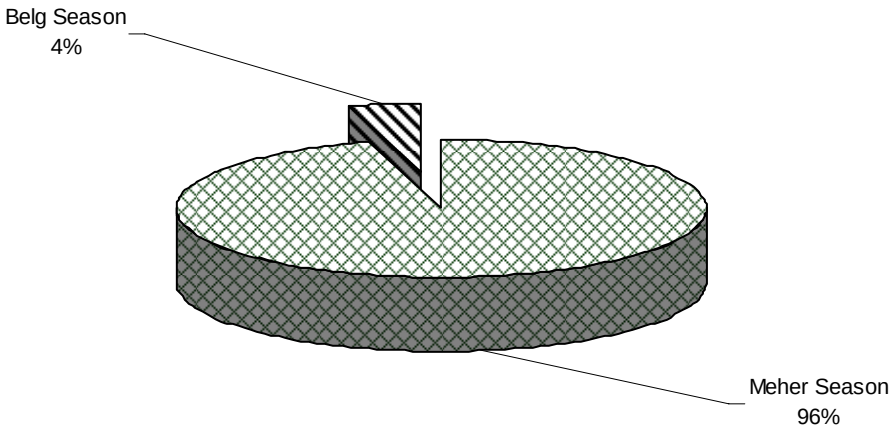
Moreover, since Meher is a long rainy season almost 80 to 90 % of the private peasant farmers perform their crop production activities during this season. As a matter this fact, out of the total cropland area cultivated under major crops during the 2008/09(2001 E.C.) production year, Cropland area cultivated under major crops during Meher Season was found to be the highest i.e 11,210.51 thousand hectares,

**Figure 1. Estimate of total area under major crops for private holdings in Ethiopia for both seasons 2008/09 (2001 E.C)**




contributing about 90% to the total cropland area coverage, with a total production of 171,167.40 thousand quintals at country level. While Belg season contributes the remaining about 10%( i.e.1,209.57 thousand hectares) to the total cropland area with about 4 % (i.e.7,749.44 thousand quintal) share from the total production volume reported at country level (For the details see Figs 1 and 2).

**Figure 2. Estimates of total production of major crops for private holdings in Ethiopia for both seasons 2008/09 (2001 E.C)**




NOTES: -

1. *Some estimates in all reporting levels are excluded due to high coefficient of variations. Nevertheless, they are incorporated in the total estimates. Hence the sum of the specific estimates may not be equal to the total estimates.*

2. *Users are also advised to use those estimates with 30-50% coefficient of variation* (CV) *cautiously*

3. *Even though area is reported for some crops in some reporting levels, no production data is available such cases are designated by Not Stated* (NS). *On the other hand, in all tables* "-" *labeled for data not available totally.*

# National and Regional Statistical Tables

**Table 4. Cropland Area, Production and Yield of Major Belg Crops For Private Peasant Holdings For Belg Season 2008/09 (2001 E.C.)**

**Ethiopia**

| Crop Name | Number Of Holders | Cropland Area In Hectares | % | Production In Quintals | % | Yield QT/HA |
|---|---|---|---|---|---|---|
| **Grain Crops ..... .** | 4,745,063 | 1,209,570.51 | 100 | 7,749,436.46 | 100 | 6.41 |
| **Cereals..... .** | 4,446,751 | 996,244.70 | 82.36 | 6,942,004.78 | 89.58 | |
| Teff..... . | 343,553 | 91,429.79 | 7.56 | 404,327.52 | 5.22 | 4.42 |
| Barley..... . | 973,972 | 205,938.06 | 17.03 | 1,307,690.00 | 16.87 | 6.35 |
| Wheat..... . | 339,357 | 81,421.72 | 6.73 | 713,381.34 | 9.21 | 8.76 |
| Maize..... . | 3,590,034 | 537,692.65 | 44.45 | 4,003,057.92 | 51.66 | 7.44 |
| Sorghum..... . | 320,775 | 64,230.09 | 5.31 | 375,042.84 | 4.84 | 5.84 |
| Finger millet..... . | 12,314 | 1,041.84 | 0.09 | * | * | * |
| Oats/'Aja'..... . | 81,683 | 12,950.72 | 1.07 | 101,170.27 | 1.31 | 7.81 |
| Rice..... . | * | * | * | * | * | * |
| **Pulses..... .** | 2,457,515 | 205,597.21 | 17 | 803,340.98 | 10.37 | |
| Faba Beans | 88,980 | 5,803.39 | 0.48 | 27,587.25 | 0.36 | 4.75 |
| Field peas..... . | 139,389 | 21,832.66 | 1.8 | 78,230.41 | 1.01 | 3.58 |
| Haricot beans..... . | 2,226,471 | 154,694.10 | 12.79 | 648,232.14 | 8.36 | 4.19 |
| Chick-peas..... . | 57,674 | 8,918.29 | 0.74 | * | * | * |
| Lentils..... . | 49,431 | 8,371.07 | 0.69 | * | * | * |
| Grass Peas | 22,239 | * | * | * | * | * |
| Soya beans..... . | 1,382 | 42.67 | * | - | - | - |
| Fenugreek..... . | 17,006 | * | * | * | * | * |
| Gibto..... . | * | * | * | - | - | - |
| **Oilseeds..... .** | 84,287 | 7,728.60 | 0.64 | * | * | |
| Neug..... . | * | * | * | - | - | - |
| Linseed..... . | 10,566 | 774.5 | 0.06 | * | * | * |
| Groundnuts..... . | 34,550 | 3,021.37 | 0.25 | * | * | * |
| Sufflower..... . | 3,705 | 103.57 | 0.01 | - | - | - |
| Sesame..... . | 12,799 | 2,591.62 | 0.21 | * | * | * |
| Rapeseed..... . | 19,825 | 441.04 | 0.04 | * | * | * |

**Table 5. Cropland Area, Production and Yield of Major Belg Crops For Private Peasant Holdings For Belg Season 208/09 (2001 E.C.)**

**Tigray Region**

| Crop Name | Number Of Holders | Cropland Area In Hectares | % | Production In Quintals | % | Yield QT/HA |
|---|---|---|---|---|---|---|
| **Grain Crops ..... .** | 71,318 | 14,308.52 | 100 | 42,841.31 | 100 | 2.99 |
| **Cereals..... .** | 66,999 | 13,127.32 | 91.74 | 41,148.19 | 96.05 | |
| Teff..... . | 18,915 | 8,559.82 | 59.82 | * | * | * |
| Barley..... . | 9,940 | 1,018.12 | 7.12 | 5,955.10 | 13.9 | 5.85 |
| Wheat..... . | * | * | * | * | * | * |
| Maize..... . | 40,262 | 3,165.98 | 22.13 | 21,840.09 | 50.98 | 6.9 |
| Sorghum..... . | * | * | * | - | - | - |
| Finger millet..... . | - | - | - | - | - | - |
| Oats/'Aja'..... . | - | - | - | - | - | - |
| Rice..... . | - | - | - | - | - | - |
| **Pulses..... .** | 8,881 | * | * | * | * | |
| Faba Beans | - | - | - | - | - | - |
| Field peas..... . | - | - | - | - | - | - |
| Haricot beans..... . | - | - | - | - | - | - |
| Chick-peas..... . | 7,193 | * | * | * | * | * |
| Lentils..... . | * | * | * | - | - | - |
| Grass Peas | * | * | * | - | - | - |
| Soya beans..... . | * | * | * | - | - | - |
| Fenugreek..... . | * | * | * | - | - | - |
| Gibto..... . | - | - | - | - | - | - |
| **Oilseeds..... .** | * | * | * | - | - | |
| Neug..... . | - | - | - | - | - | - |
| Linseed..... . | - | - | - | - | - | - |
| Groundnuts..... . | - | - | - | - | - | - |
| Sufflower..... . | - | - | - | - | - | - |
| Sesame..... . | - | - | - | - | - | - |
| Rapeseed..... . | * | * | * | - | - | - |

**Holdings For Belg Season 2008/09 (2001 E.C.)**

Afar Region

| Crop Name | Number Of Holders | Cropland Area In Hectares | % | Production In Quintals | % | Yield QT/HA |
|---|---|---|---|---|---|---|
| **Grain Crops ..... .** | 5,771 | 4,149.36 | 100 | 72,355.15 | 100 | 17.44 |
| **Cereals..... .** | 5,734 | 4,116.20 | 99.2 | 72,355.15 | 100 | |
| Teff..... . | * | * | * | - | - | - |
| Barley..... . | * | * | * | - | - | - |
| Wheat..... . | - | - | - | - | - | - |
| Maize..... . | 5,686 | 4,024.28 | 96.99 | 70,456.59 | 97.38 | 17.51 |
| Sorghum..... . | * | * | * | * | * | * |
| Finger millet..... . | - | - | - | - | - | - |
| Oats/'Aja'..... . | - | - | - | - | - | - |
| Rice..... . | - | - | - | - | - | - |
| **Pulses..... .** | 65 | 13.67 | 0.33 | - | - | |
| Faba Beans | - | - | - | - | - | - |
| Field peas..... . | - | - | - | - | - | - |
| Haricot beans..... . | * | * | * | - | - | - |
| Chick-peas..... . | - | - | - | - | - | - |
| Lentils..... . | - | - | - | - | - | - |
| Grass Peas | - | - | - | - | - | - |
| Soya beans..... . | 37 | 13.34 | 0.32 | - | - | - |
| Fenugreek..... . | - | - | - | - | - | - |
| Gibto..... . | - | - | - | - | - | - |
| **Oilseeds..... .** | * | * | * | - | - | |
| Neug..... . | - | - | - | - | - | - |
| Linseed..... . | - | - | - | - | - | - |
| Groundnuts..... . | - | - | - | - | - | - |
| Sufflower..... . | - | - | - | - | - | - |
| Sesame..... . | * | * | * | - | - | - |
| Rapeseed..... . | - | - | - | - | - | - |

**Table 7. Cropland Area, Production and Yield of Major Belg Crops For Private Peasant Holdings For Belg Season 2008/09 (2001 E.C.)**

Amhara Region

| Crop Name | Number Of Holders | Cropland Area In Hectares | % | Production In Quintals | % | Yield QT/HA |
|---|---|---|---|---|---|---|
| **Grain Crops ..... .** | 516,995 | 137,090.13 | 100 | 574,776.67 | 100 | 4.19 |
| **Cereals..... .** | 468,456 | 102,504.94 | 74.77 | 497,027.26 | 86.47 | |
| Teff..... . | 75,878 | 10,409.12 | 7.59 | 29,493.15 | 5.13 | 2.83 |
| Barley..... . | 268,294 | 61,288.51 | 44.71 | 286,443.61 | 49.84 | 4.67 |
| Wheat..... . | 96,370 | 10,882.94 | 7.94 | 48,436.92 | 8.43 | 4.45 |
| Maize..... . | 138,153 | 17,544.38 | 12.8 | 124,170.65 | 21.6 | 7.08 |
| Sorghum..... . | * | * | * | - | - | - |
| Finger millet..... . | - | - | - | - | - | - |
| Oats/'Aja'..... . | 20,899 | 2,167.10 | 1.58 | * | * | * |
| Rice..... . | * | * | * | - | - | - |
| **Pulses..... .** | 149,258 | 34,495.64 | 25.16 | 77,749.42 | 13.53 | |
| Faba beans..... . | * | * | * | - | - | - |
| Field peas..... . | 32,018 | 3,034.47 | 2.21 | * | * | * |
| Haricot beans..... . | 39,851 | * | * | * | * | * |
| Chick-peas..... . | 41,726 | 6,709.30 | 4.89 | * | * | * |
| Lentils..... . | 36,502 | * | * | * | * | * |
| Grass Peas | 20,850 | * | * | * | * | * |
| Soya beans..... . | - | - | - | - | - | - |
| Fenugreek..... . | 4,406 | 221.06 | 0.16 | * | * | * |
| Gibto..... . | - | - | - | - | - | - |
| **Oilseeds..... .** | 3,666 | 89.55 | 0.07 | - | - | |
| Neug..... . | - | - | - | - | - | - |
| Linseed..... . | 2,640 | 71.91 | 0.05 | - | - | - |
| Groundnuts..... . | - | - | - | - | - | - |
| Sufflower..... . | * | * | * | - | - | - |
| Sesame..... . | - | - | - | - | - | - |
| Rapeseed..... . | * | * | * | - | - | - |

**Table 8. Cropland Area, Production and Yield of Major Belg Crops For Private Peasant Holdings For Belg Season 2008/09 (2001 E.C.)**

**Oromia Region**

| Crop Name | Number Of Holders | Cropland Area In Hectares | % | Production In Quintals | % | Yield QT/HA |
|---|---|---|---|---|---|---|
| **Grain Crops ..... .** | 2,172,933 | 659,023.61 | 100 | 4,879,379.69 | 100 | 7.4 |
| **Cereals..... .** | 2,046,302 | 566,906.22 | 86.02 | 4,479,557.09 | 91.81 | |
| Teff..... . | 179,974 | 55,676.65 | 8.45 | 259,979.09 | 5.33 | 4.67 |
| Barley..... . | 521,643 | 124,797.56 | 18.94 | 895,641.09 | 18.36 | 7.18 |
| Wheat..... . | 222,638 | 68,766.77 | 10.43 | 658,333.87 | 13.49 | 9.57 |
| Maize..... . | 1,625,196 | 269,230.58 | 40.85 | 2,333,044.13 | 47.81 | 8.67 |
| Sorghum..... . | 154,691 | 37,311.70 | 5.66 | 239,871.57 | 4.92 | 6.43 |
| Finger millet..... . | 2,756 | * | * | - | - | - |
| Oats/'Aja'..... . | 58,979 | 10,739.77 | 1.63 | 92,687.34 | 1.9 | 8.63 |
| Rice..... . | * | * | * | - | - | - |
| **Pulses..... .** | 1,044,462 | 88,143.37 | 13.37 | 397,383.29 | 8.14 | |
| Faba beans..... . | 59,454 | 4,576.92 | 0.69 | 25,069.00 | 0.51 | 5.48 |
| Field peas..... . | 83,537 | 17,903.69 | 2.72 | 73,459.07 | 1.51 | 4.1 |
| Haricot beans..... . | 947,160 | 62,365.26 | 9.46 | 298,490.20 | 6.12 | 4.79 |
| Chick-peas..... . | 6,595 | 891.03 | 0.14 | - | - | - |
| Lentils..... . | 10,320 | 998.29 | 0.15 | * | * | * |
| Grass Peas | - | - | - | - | - | - |
| Soya beans..... . | * | * | * | - | - | - |
| Fenugreek..... . | 6,835 | * | * | - | - | - |
| Gibto..... . | * | * | * | - | - | - |
| **Oilseeds..... .** | 39,767 | 3,974.02 | 0.6 | * | * | |
| Neug..... . | * | * | * | - | - | - |
| Linseed..... . | 5,627 | 647.35 | 0.1 | * | * | * |
| Groundnuts..... . | * | * | * | - | - | - |
| Sufflower..... . | - | - | - | - | - | - |
| Sesame..... . | 6,966 | * | * | - | - | - |
| Rapeseed..... . | * | * | * | - | - | - |

**Table 9. Cropland Area, Production and Yield of Major Belg Crops For Private Peasant Holdings For Belg Season 2008/09 (2001 E.C.)**

**Somale Region**

| Crop Name | Number Of Holders | Cropland Area In Hectares | % | Production In Quintals | % | Yield QT/HA |
|---|---|---|---|---|---|---|
| **Grain Crops ..... .** | 7,449 | 2,558.84 | 100 | 46,102.74 | 100 | 18.02 |
| **Cereals..... .** | 7,259 | 2,529.57 | 98.86 | 46,069.23 | 99.93 | |
| Teff..... . | - | - | - | - | - | - |
| Barley..... . | - | - | - | - | - | - |
| Wheat..... . | 47 | - | - | - | - | - |
| Maize..... . | 7,259 | 2,529.57 | 98.86 | 46,069.23 | 99.93 | 18.21 |
| Sorghum..... . | - | - | - | - | - | - |
| Finger millet..... . | - | - | - | - | - | - |
| Oats/'Aja'..... . | - | - | - | - | - | - |
| Rice..... . | - | - | - | - | - | - |
| **Pulses..... .** | 1,234 | 24.48 | 0.96 | 33.5 | 0.07 | |
| Faba beans..... . | - | - | - | - | - | - |
| Field peas..... . | - | - | - | - | - | - |
| Haricot beans..... . | 1,234 | 24.48 | 0.96 | 33.5 | 0.07 | 1.37 |
| Chick-peas..... . | - | - | - | - | - | - |
| Lentils..... . | - | - | - | - | - | - |
| Grass Peas | - | - | - | - | - | - |
| Soya beans..... . | - | - | - | - | - | - |
| Fenugreek..... . | - | - | - | - | - | - |
| Gibto..... . | - | - | - | - | - | - |
| **Oilseeds..... .** | 117 | 4.79 | 0.19 | - | - | |
| Neug..... . | - | - | - | - | - | - |
| Linseed..... . | - | - | - | - | - | - |
| Groundnuts..... . | - | - | - | - | - | - |
| Sufflower..... . | - | - | - | - | - | - |
| Sesame..... . | 117 | 4.79 | 0.19 | - | - | - |
| Rapeseed..... . | - | - | - | - | - | - |

**Table 10. Cropland Area, Production and Yield of Major Belg Crops For Private peasant Holdings For Belg Season 2008/09 (2001 E.C.)**

**Benshangul-Gumuz Region**

| Crop Name | Number Of Holders | Cropland Area In Hectares | % | Production In Quintals | % | Yield QT/HA |
|---|---|---|---|---|---|---|
| **Grain Crops ..... .** | 22,248 | 3,287.08 | 100 | 24,421.83 | 100 | 7.43 |
| **Cereals..... .** | 19,228 | 1,548.39 | 47.11 | 17,445.22 | 71.43 | |
| Teff..... . | - | - | - | - | - | - |
| Barley..... . | 765 | 98.95 | 3.01 | 872.37 | 3.57 | 8.82 |
| Wheat..... . | - | - | - | - | - | - |
| Maize..... . | 19,023 | 1,331.20 | 40.5 | 16,572.85 | 67.86 | 12.45 |
| Sorghum..... . | 1,134 | 117.09 | 3.56 | - | - | - |
| Finger millet..... . | * | * | * | - | - | - |
| Oats/'Aja'..... . | * | * | * | - | - | - |
| Rice..... . | - | - | - | - | - | - |
| **Pulses..... .** | 19,813 | 1,738.69 | 52.89 | 6,976.62 | 28.57 | |
| Faba beans..... . | 378 | 16.8 | 0.51 | 230.91 | 0.95 | 13.74 |
| Field peas..... . | * | * | * | - | - | - |
| Haricot beans..... . | 19,726 | 1,713.54 | 52.13 | 6,745.71 | 27.62 | 3.94 |
| Chick-peas..... . | * | * | * | - | - | - |
| Lentils..... . | - | - | - | - | - | - |
| Grass Peas | - | - | - | - | - | - |
| Soya beans..... . | - | - | - | - | - | - |
| Fenugreek..... . | - | - | - | - | - | - |
| Gibto..... . | - | - | - | - | - | - |
| **Oilseeds..... .** | - | - | - | - | - | |
| Neug..... . | - | - | - | - | - | - |
| Linseed..... . | - | - | - | - | - | - |
| Groundnuts..... . | - | - | - | - | - | - |
| Sufflower..... . | - | - | - | - | - | - |
| Sesame..... . | - | - | - | - | - | - |
| Rapeseed..... . | - | - | - | - | - | - |

**Table 10. Cropland Area, Production and Yield of Major Belg Crops For Private Peasant Holdings For Belg Season 2008/09 (2001 E.C.)**

**(S.N.N.P.R) Region**

| Crop Name | Number Of Holders | Cropland Area In Hectares | % | Production In Quintals | % | Yield QT/HA |
|---|---|---|---|---|---|---|
| **Grain Crops ..... .** | 1,924,556 | 384,871.96 | 100 | 2,075,501.17 | 100 | 5.39 |
| **Cereals..... .** | 1,809,138 | 301,620.78 | 78.37 | 1,756,141.95 | 84.61 | |
| Teff..... . | 68,706 | 16,755.97 | 4.35 | 104,128.83 | 5.02 | 6.21 |
| Barley..... . | 173,222 | 18,717.02 | 4.86 | 118,777.84 | 5.72 | 6.35 |
| Wheat..... . | 17,429 | 1,556.29 | 0.4 | 3,984.01 | 0.19 | 2.56 |
| Maize..... . | 1,733,480 | 236,357.57 | 61.41 | 1,359,112.96 | 65.48 | 5.75 |
| Sorghum..... . | 155,829 | 25,996.60 | 6.75 | 132,803.44 | 6.4 | 5.11 |
| Finger millet..... . | 9,522 | 700.32 | 0.18 | * | * | * |
| Oats/'Aja'..... . | 1,792 | 43.39 | 0.01 | - | - | - |
| Rice..... . | * | * | * | * | * | * |
| **Pulses..... .** | 1,228,237 | 79,723.02 | 20.71 | 318,896.36 | 15.36 | |
| Faba beans..... . | 28,644 | 1,186.73 | 0.31 | 2,287.34 | 0.11 | 1.93 |
| Field peas..... . | 23,795 | 893.67 | 0.23 | * | * | * |
| Haricot beans..... . | 1,212,908 | 77,315.91 | 20.09 | 314,630.90 | 15.16 | 4.07 |
| Chick-peas..... . | 2,107 | 221.52 | 0.06 | - | - | - |
| Lentils..... . | 2,412 | 48.19 | 0.01 | - | - | - |
| Grass Peas | * | * | * | - | - | - |
| Soya beans..... . | 437 | * | * | - | - | - |
| Fenugreek..... . | 5,302 | 36.86 | 0.01 | - | - | - |
| Gibto..... . | * | * | * | - | - | - |
| **Oilseeds..... .** | 40,096 | 3,528.17 | 0.92 | * | * | |
| Neug..... . | - | - | - | - | - | - |
| Linseed..... . | 2,299 | 55.24 | 0.01 | - | - | - |
| Groundnuts..... . | 20,337 | 1,816.08 | 0.47 | * | * | * |
| Sufflower..... . | 3,313 | 93.21 | 0.02 | - | - | - |
| Sesame..... . | 5,569 | * | * | - | - | - |
| Rapeseed..... . | 9,592 | 199.21 | 0.05 | * | * | * |

**Table 11. Cropland Area, Production and Yield of Major Belg Crops For Private Peasant Holdings For Belg Season 2008/09 (2001 E.C.)**

**Gambela Region**

| Crop Name | Number Of Holders | Cropland Area In Hectares | % | Production In Quintals | % | Yield QT/HA |
|---|---|---|---|---|---|---|
| **Grain Crops ..... .** | 13,646 | 3,199.63 | 100 | 28,578.10 | 100 | 8.93 |
| **Cereals..... .** | 13,575 | 3,026.52 | 94.59 | 27,291.16 | 95.5 | |
| Teff..... . | * | * | * | - | - | - |
| Barley..... . | 80 | 9.87 | 0.31 | - | - | - |
| Wheat..... . | - | - | - | - | - | - |
| Maize..... . | 13,525 | 3,012.41 | 94.15 | 27,291.16 | 95.5 | 9.06 |
| Sorghum..... . | * | * | * | - | - | - |
| Finger millet..... . | * | * | * | - | - | - |
| Oats/'Aja'..... . | - | - | - | - | - | - |
| Rice..... . | - | - | - | - | - | - |
| **Pulses..... .** | 788 | * | * | * | * | |
| Faba beans..... . | - | - | - | - | - | - |
| Field peas..... . | - | - | - | - | - | - |
| Haricot beans..... . | 788 | * | * | * | * | * |
| Chick-peas..... . | - | - | - | - | - | - |
| Lentils..... . | - | - | - | - | - | - |
| Grass Peas | - | - | - | - | - | - |
| Soya beans..... . | - | - | - | - | - | - |
| Fenugreek..... . | - | - | - | - | - | - |
| Gibto..... . | - | - | - | - | - | - |
| **Oilseeds..... .** | * | * | * | * | * | |
| Neug..... . | - | - | - | - | - | - |
| Linseed..... . | - | - | - | - | - | - |
| Groundnuts..... . | * | * | * | - | - | - |
| Sufflower..... . | - | - | - | - | - | - |
| Sesame..... . | * | * | * | * | * | * |
| Rapeseed..... . | - | - | - | - | - | - |

**Table 12. Cropland Area, Production and Yield of Major Belg Crops For Private Peasant Holdings For Belg Season 2008/09 (2001 E.C.)**

**Harari Region**

| Crop Name | Number Of Holders | Cropland Area In Hectares | % | Production In Quintals | % | Yield QT/HA |
|---|---|---|---|---|---|---|
| **Grain Crops ..... .** | 5,811 | 786.17 | 100 | 3,595.05 | 100 | 4.57 |
| **Cereals..... .** | 5,725 | 571.26 | 72.66 | 3,084.78 | 85.81 | |
| Teff..... . | * | * | * | - | - | - |
| Barley..... . | - | - | - | - | - | - |
| Wheat..... . | - | - | - | - | - | - |
| Maize..... . | 4,296 | 289.49 | 36.82 | 3,084.78 | 85.81 | 10.66 |
| Sorghum..... . | 2,648 | 281.16 | 35.76 | - | - | - |
| Finger millet..... . | - | - | - | - | - | - |
| Oats/'Aja'..... . | - | - | - | - | - | - |
| Rice..... . | - | - | - | - | - | - |
| **Pulses..... .** | 4,606 | 204.74 | 26.04 | * | * | |
| Faba beans..... . | - | - | - | - | - | - |
| Field peas..... . | - | - | - | - | - | - |
| Haricot beans..... . | 4,606 | 204.49 | 26.01 | * | * | * |
| Chick-peas..... . | - | - | - | - | - | - |
| Lentils..... . | - | - | - | - | - | - |
| Grass Peas | - | - | - | - | - | - |
| Soya beans..... . | - | - | - | - | - | - |
| Fenugreek..... . | * | * | * | - | - | - |
| Gibto..... . | - | - | - | - | - | - |
| **Oilseeds..... .** | 265 | 10.17 | 1.29 | - | - | |
| Neug..... . | - | - | - | - | - | - |
| Linseed..... . | - | - | - | - | - | - |
| Groundnuts..... . | * | * | * | - | - | - |
| Sufflower..... . | - | - | - | - | - | - |
| Sesame..... . | - | - | - | - | - | - |
| Rapeseed..... . | * | * | * | - | - | - |

**Table 13. Cropland Area, Production and Yield of Major Belg Crops For Private Peasant Holdings For Belg Season 2008/09 (2001 E.C.)**

**Dire Dawa Adminstration**

| Crop Name | Number Of Holders | Cropland Area In Hectares | % | Production In Quintals | % | Yield QT/HA |
|---|---|---|---|---|---|---|
| **Grain Crops ..... .** | 4,336 | 295.2 | 100 | 1,884.75 | 100 | 6.38 |
| **Cereals..... .** | 4,336 | 293.51 | 99.43 | 1,884.75 | 100 | |
| Teff..... . | - | - | - | - | - | - |
| Barley..... . | - | - | - | - | - | - |
| Wheat..... . | - | - | - | - | - | - |
| Maize..... . | 3,152 | 207.19 | 70.19 | 1,415.47 | 75.1 | 6.83 |
| Sorghum..... . | 1,848 | 86.32 | 29.24 | * | * | * |
| Finger millet..... . | - | - | - | - | - | - |
| Oats/'Aja'..... . | - | - | - | - | - | - |
| Rice..... . | - | - | - | - | - | - |
| **Pulses..... .** | 170 | 1.69 | 0.57 | - | - | |
| Faba beans..... . | - | - | - | - | - | - |
| Field peas..... . | - | - | - | - | - | - |
| Haricot beans..... . | 170 | 1.69 | 0.57 | - | - | - |
| Chick-peas..... . | - | - | - | - | - | - |
| Lentils..... . | - | - | - | - | - | - |
| Grass Peas…… | - | - | - | - | - | - |
| Soya beans..... . | - | - | - | - | - | - |
| Fenugreek..... . | - | - | - | - | - | - |
| Gibto..... . | - | - | - | - | - | - |
| **Oilseeds..... .** | - | - | - | - | - | |
| Neug..... . | - | - | - | - | - | - |
| Linseed..... . | - | - | - | - | - | - |
| Groundnuts..... | - | - | - | - | - | - |
| Sufflower..... . | - | - | - | - | - | - |
| Sesame..... . | - | - | - | - | - | - |
| Rapeseed..... . | - | - | - | - | - | - |

# APPENDIX I

# Estimation Procedures of Totals, Ratios and Sampling Errors

**APPENDIX I** Estimation Procedures of Totals, Ratios and Sampling Errors

The following formulas were used to estimate total area of land under specific crop and production of specific crop in a stratum.

**1. For estimating Total Area of Land under Specific Crop:**

$$\hat{A}_h = \sum_{i=1}^{n_h} W_{hi} \sum_{j=1}^{h_{hi}} a_{hij} = \sum_{i=1}^{n_h} W_{hi} a_{hi}$$

in which, $W_{hi} = \frac{M_h H_{hi}}{n_h m_{hi} h_{hi}}$ is the basic weight.

Where:

$h$ represents the stratum

$n_h$ is the total number of sample EAs successfully covered in the h$^{th}$ stratum.

$M_h$ is the measure of size of the h$^{th}$ stratum as obtained from the sampling frame.

$m_{hi}$ is the measure of size of the i$^{th}$ sample EA in the h$^{th}$ stratum obtained from the sampling frame.

$H_{hi}$ is the total number of agricultural households of the i$^{th}$ sample EA in the h$^{th}$ stratum.

$h_{hi}$ is the number of sample agricultural households successfully covered in the i$^{th}$ sample EA in the h$^{th}$ stratum.

$a_{hij}$ is the value of area for agricultural household j, in the i$^{th}$ EA in the h$^{th}$ strtatum under a specific crop.

$a_{hi}$ is the sample total area under specific crop for EA i in stratum h

$\hat{A}_h$ estimate of total area under specific crop in stratum h

**2. For estimating Total Production under Specific Crop:**

$$\hat{P}_h = \sum_{i=1}^{n_h} W_{hi} P_{hi}$$

in which, $P_{hi} = a_{hi} * \overline{Y}_{hi}$

Where,

$\overline{Y}_{hi}$ is average yield per square meter of a specific crop in the i[th] EA in the h[th] stratum.

$\hat{P}_h$ is estimate of total quantity of production of a specific crop in the h[th] stratum.

$P_{hi}$ is estimate of total quantity of production under specific crop for EA i in stratum h.

**3. Sampling Variance of Estimates:**

Sampling variance for the estimate of stratum total of area, production and yield for a specific crop are estimated by the following formulas.

$$Var(\hat{A}_h) = (1 - f_h) \frac{n_h}{n_h - 1} \sum_{i=1}^{n_h} \left( \hat{A}_{hi} - \frac{\hat{A}_h}{n_h} \right)^2 + f_h \sum_{i=1}^{n_h} (1 - f_{hi}) \left( \frac{h_{hi}}{h_{hi} - 1} \right) \sum_{j=1}^{h_{hi}} \left( \hat{A}_{hij} - \frac{\hat{A}_{hi}}{h_{hi}} \right)^2$$

$$Var(\hat{P}_h) = (1 - f_h) \frac{n_h}{n_h - 1} \sum_{i=1}^{n_h} \left( \hat{P}_{hi} - \frac{\hat{P}_h}{n_h} \right)^2 + f_h \sum_{i=1}^{n_h} (1 - f_{hi}) \left( \frac{h_{hi}}{h_{hi} - 1} \right) \sum_{j=1}^{h_{hi}} \left( \hat{P}_{hij} - \frac{\hat{P}_{hi}}{h_{hi}} \right)^2$$

Where,

$f_h$ = average first stage probability of selection of EAs within stratum *h*.

$f_{hi} = \frac{h_{hi}}{H_{hi}}$ = average second stage probability of selection within the *i*[th] sample EA in stratum *h*.

$\hat{A}_{hi}, \hat{P}_{hi}$ are weighted total area and production, respectively, of a specific crop in the i[th] EA and h[th]

stratum.

$\hat{A}_{hij}, \hat{P}_{hij}$ are weighted values of area and production, respectively, from j$^{th}$ agricultural household in the

i$^{th}$ EA and h$^{th}$ stratum under a specific crop.

Since all strata are independent, the total variance at regional and country level is computed by aggregating the result obtained at Zone/Special Wereda level, i.e.

$$Var(\hat{A}) = \sum_{h}^{L} Var(\hat{A}_h), Var(\hat{P}) = \sum_{h}^{L} Var(\hat{P}_h)$$

Where, *L* is the number of strata (Zone/Special Wereda).

In estimating the sampling variance by the above formula, selection of EAs within a stratum is assumed to be with replacement. By so doing the variance estimate may be slightly over estimated but it greatly simplifies the estimation procedure.

**5. Coefficient of Variation (CV) of Estimates:**

Coefficient of Variation (CV) in percentage of estimate of stratum total of area and production for a specific crop are given by:

$$CV(\hat{A}_h) = \frac{\sqrt{Var(\hat{A}_h)}}{\hat{A}_h} * 100, CV(\hat{P}_h) = \frac{\sqrt{Var(\hat{P}_h)}}{\hat{P}_h} * 100,$$

**6. Ninety-five percent confidence interval (CI) of stratum total of area:**

$$\hat{A}_h \pm 1.96 * SE(\hat{A}_h) \quad ,$$

Where $SE(\hat{A}_h) = \sqrt{Var(\hat{A}_h)}$ is standard error of the estimate of the stratum total of area.

Estimates of standard error and confidence interval for the other estimates can also be calculated by adopting the above formulas.

# Appendix II

# Standard Error and Coefficient of Variation for Area and Expected Production

Appendix **Standard errors and coefficient of variation for the estimates of number of holders, area and production of major crops, 2001 E.C agricultural sample survey, belg season.**

Ethiopia

| Crop | Holders | | | Area | | | Production | | |
|---|---|---|---|---|---|---|---|---|---|
| | Estimate | S.E. | C.V. In % | Hectares | S.E. | C.V. In % | Quintals | S.E | C.V. In % |
| **TOTAL . . . . . .** | 4,745,063 | 62,855.31 | 1.32 | 1,209,570.51 | 37,938.32 | 3.14 | 7,749,436.46 | 354,089.70 | 4.57 |
| **Cereals..... .** | 4,446,751 | 65,246.16 | 1.47 | 996,244.70 | 33,252.46 | 3.34 | 6,942,004.78 | 338,875.31 | 4.88 |
| Teff..... . | 343,553 | 30,076.59 | 8.75 | 91,429.79 | 9,829.35 | 10.75 | 404,327.52 | 62,215.94 | 15.39 |
| Barley..... . | 973,972 | 50,777.83 | 5.21 | 205,938.06 | 18,199.33 | 8.84 | 1,307,690.00 | 154,950.30 | 11.85 |
| Wheat..... . | 339,357 | 29,767.93 | 8.77 | 81,421.72 | 12,858.13 | 15.79 | 713,381.34 | 160,415.43 | 22.49 |
| Maize..... . | 3,590,034 | 66,105.74 | 1.84 | 537,692.65 | 21,632.12 | 4.02 | 4,003,057.92 | 218,104.19 | 5.45 |
| Sorghum..... . | 320,775 | 23,185.19 | 7.23 | 64,230.09 | 8,325.00 | 12.96 | 375,042.84 | 104,916.51 | 27.97 |
| Finger millet..... . | 12,314 | 2,559.27 | 20.78 | 1,041.84 | 289.21 | 27.76 | 24.07 | 24.02 | 99.8 |
| Oats/'Aja'..... . | 81,683 | 13,275.80 | 16.25 | 12,950.72 | 2,716.39 | 20.97 | 101,170.27 | 30,143.25 | 29.79 |
| Rice..... . | 4,500 | 2,594.56 | 57.66 | 1,539.83 | 1,185.07 | 76.96 | 37,310.81 | 36,351.59 | 97.43 |
| **Pulses..... .** | 2,457,515 | 60,140.05 | 2.45 | 205,597.21 | 11,612.29 | 5.65 | 803,340.98 | 65,152.22 | 8.11 |
| Horse beans..... . | 88,980 | 11,448.59 | 12.87 | 5,803.39 | 1,390.23 | 23.96 | 27,587.25 | 12,524.14 | 45.4 |
| Field peas..... . | 139,389 | 19,259.68 | 13.82 | 21,832.66 | 4,137.06 | 18.95 | 78,230.41 | 34,223.65 | 43.75 |
| Haricot beans..... . | 2,226,471 | 56,004.62 | 2.52 | 154,694.10 | 9,517.13 | 6.15 | 648,232.14 | 48,352.12 | 7.46 |
| Chick-peas..... . | 57,674 | 9,168.42 | 15.9 | 8,918.29 | 1,874.80 | 21.02 | 27,745.61 | 15,695.08 | 56.57 |
| Lentils..... . | 49,431 | 12,218.93 | 24.72 | 8,371.07 | 3,679.02 | 43.95 | 526.57 | 350.91 | 66.64 |
| Vetch..... . | 22,239 | 8,781.04 | 39.49 | 4,267.95 | 2,256.99 | 52.88 | 20,077.89 | 13,291.27 | 66.2 |
| Soya beans..... . | 1,382 | 496.63 | 35.94 | 42.67 | 11.75 | 27.55 | - | - | - |
| Fenugreek..... . | 17,006 | 3,738.59 | 21.98 | 1,662.07 | 1,117.39 | 67.23 | 941.11 | 726 | 77.14 |
| Gibto..... . | 876 | 529.27 | 60.45 | 5.02 | 3.13 | 62.22 | - | - | - |
| **Oilseeds..... .** | 84,287 | 12,412.16 | 14.73 | 7,728.60 | 1,717.82 | 22.23 | 4,090.71 | 2,133.02 | 52.14 |
| Neug..... . | 4,489 | 2,611.69 | 58.18 | 796.5 | 494.85 | 62.13 | - | - | - |
| Linseed..... . | 10,566 | 1,962.19 | 18.57 | 774.5 | 273.49 | 35.31 | 2,439.31 | 1,808.71 | 74.15 |
| Groundnuts..... . | 34,550 | 9,726.28 | 28.15 | 3,021.37 | 1,174.55 | 38.87 | 462.3 | 445.65 | 96.4 |
| Sunflower..... . | 3,705 | 852.18 | 23 | 103.57 | 40.21 | 38.82 | - | - | - |
| Sesame..... . | 12,799 | 4,011.70 | 31.34 | 2,591.62 | 1,097.37 | 42.34 | 1,188.54 | 1,039.11 | 87.43 |
| Rapeseed..... . | 19,825 | 5,689.29 | 28.7 | 441.04 | 171.67 | 38.92 | 0.56 | 0.5 | 88.14 |

Tigray Region

**Standard errors and coefficient of variation for the estimates of number of holders, area and production of major crops, 2001 E.C agricultural sample survey, belg season.**

| Crop | Holders | | | Area | | | Production | | |
|---|---|---|---|---|---|---|---|---|---|
| | Estimate | S.E. | C.V. In % | Hectares | S.E. | C.V. In % | Quintals | S.E | C.V. In % |
| **TOTAL . . . . . .** | 71,318 | 9,326.53 | 13.08 | 14,308.52 | 4,211.77 | 29.44 | 42,841.31 | 9,409.26 | 21.96 |
| **Cereals..... .** | 66,999 | 9,125.67 | 13.62 | 13,127.32 | 4,205.62 | 32.04 | 41,148.19 | 9,135.39 | 22.2 |
| Teff..... . | 18,915 | 6,640.08 | 35.1 | 8,559.82 | 4,235.95 | 49.49 | 10,726.45 | 5,440.14 | 50.72 |
| Barley..... . | 9,940 | 3,916.57 | 39.4 | 1,018.12 | 326.05 | 32.02 | 5,955.10 | 2,665.73 | 44.76 |
| Wheat..... . | 2,872 | 1,863.45 | 64.88 | 215.72 | 152.1 | 70.51 | 2,626.54 | 1,916.64 | 72.97 |
| Maize..... . | 40,262 | 8,277.08 | 20.56 | 3,165.98 | 659.92 | 20.84 | 21,840.09 | 6,113.97 | 27.99 |
| Sorghum..... . | 1,982 | 1,582.00 | 79.84 | 167.67 | 158.5 | 94.53 | - | - | - |
| Finger millet..... . | - | - | - | - | - | - | - | - | - |
| Oats/'Aja'..... . | - | - | - | - | - | - | - | - | - |
| Rice..... . | - | - | - | - | - | - | - | - | - |
| **Pulses..... .** | 8,881 | 3,372.16 | 37.97 | 1,175.64 | 637.29 | 54.21 | 1,693.12 | 1,267.95 | 74.89 |
| Horse beans..... . | - | - | - | - | - | - | - | - | - |
| Field peas..... . | - | - | - | - | - | - | - | - | - |
| Haricot beans..... . | - | - | - | - | - | - | - | - | - |
| Chick-peas..... . | 7,193 | 3,328.93 | 46.28 | 1,088.92 | 625.58 | 57.45 | 1,693.12 | 1,267.95 | 74.89 |
| Lentils..... . | 196 | 195.54 | 99.75 | 32.77 | 32.69 | 99.75 | - | - | - |
| Vetch..... . | 853 | 514.26 | 60.28 | 42.95 | 35.81 | 83.37 | - | - | - |
| Soya beans..... . | 230 | 228.8 | 99.35 | 3.78 | 3.76 | 99.35 | - | - | - |
| Fenugreek..... . | 408 | 405.18 | 99.24 | 7.21 | 7.17 | 99.54 | - | - | - |
| Gibto..... . | - | - | - | - | - | - | - | - | - |
| **Oilseeds..... .** | 204 | 204.35 | 100.11 | 5.57 | 5.57 | 100.11 | - | - | - |
| Neug..... . | - | - | - | - | - | - | - | - | - |
| Linseed..... . | - | - | - | - | - | - | - | - | - |
| Groundnuts..... . | - | - | - | - | - | - | - | - | - |
| Sunflower..... . | - | - | - | - | - | - | - | - | - |
| Sesame..... . | - | - | - | - | - | - | - | - | - |
| Rapeseed..... . | 204 | 204.35 | 100.11 | 5.57 | 5.57 | 100.11 | - | - | - |

Afar Region

**Standard errors and coefficient of variation for the estimates of number of holders, area and production of major crops, 2001 E.C agricultural sample survey, belg season.**

| Crop | Holders | | | Area | | | Production | | |
|---|---|---|---|---|---|---|---|---|---|
| | Estimate | S.E. | C.V. In % | Hectares | S.E. | C.V. In % | Quintals | S.E | C.V. In % |
| **TOTAL . . . . . .** | 5,771 | 636.87 | 11.04 | 4,149.36 | 512.87 | 12.36 | 72,355.15 | 14,065.79 | 19.44 |
| **Cereals..... .** | 5,734 | 636.87 | 11.11 | 4,116.20 | 513.64 | 12.48 | 72,355.15 | 14,065.79 | 19.44 |
| Teff..... . | 28 | 27.31 | 98.65 | 26.23 | 25.88 | 98.65 | - | - | - |
| Barley..... . | 28 | 27.31 | 98.65 | 8.02 | 7.92 | 98.65 | - | - | - |
| Wheat..... . | - | - | - | - | - | - | - | - | - |
| Maize..... . | 5,686 | 641.83 | 11.29 | 4,024.28 | 508.57 | 12.64 | 70,456.59 | 13,301.06 | 18.88 |
| Sorghum..... . | 130 | 101.14 | 77.6 | 57.66 | 52.33 | 90.76 | 1,898.56 | 1,735.76 | 91.43 |
| Finger millet..... . | - | - | - | - | - | - | - | - | - |
| Oats/'Aja'..... . | - | - | - | - | - | - | - | - | - |
| Rice..... . | - | - | - | - | - | - | - | - | - |
| **Pulses..... .** | 65 | 26.54 | 41.14 | 13.67 | 0.32 | 2.38 | - | - | - |
| Horse beans..... . | - | - | - | - | - | - | - | - | - |
| Field peas..... . | - | - | - | - | - | - | - | - | - |
| Haricot beans..... . | 28 | 26.54 | 95.92 | 0.34 | 0.32 | 95.92 | - | - | - |
| Chick-peas..... . | - | - | - | - | - | - | - | - | - |
| Lentils..... . | - | - | - | - | - | - | - | - | - |
| Vetch..... . | - | - | - | - | - | - | - | - | - |
| Soya beans..... . | 37 | - | - | 13.34 | - | - | - | - | - |
| Fenugreek..... . | - | - | - | - | - | - | - | - | - |
| Gibto..... . | - | - | - | - | - | - | - | - | - |
| **Oilseeds..... .** | 28 | 26.54 | 95.92 | 19.49 | 18.7 | 95.92 | - | - | - |
| Neug..... . | - | - | - | - | - | - | - | - | - |
| Linseed..... . | - | - | - | - | - | - | - | - | - |
| Groundnuts..... . | - | - | - | - | - | - | - | - | - |
| Sunflower..... . | - | - | - | - | - | - | - | - | - |
| Sesame..... . | 28 | 26.54 | 95.92 | 19.49 | 18.7 | 95.92 | - | - | - |
| Rapeseed..... . | - | - | - | - | - | - | - | - | - |

Amhara Region

**Standard errors and coefficient of variation for the estimates of number of holders, area and production of major crops, 2001 E.C agricultural sample survey, belg season.**

| Crop | Holders | | | Area | | | Production | | |
|---|---|---|---|---|---|---|---|---|---|
| | Estimate | S.E. | C.V. In % | Hectares | S.E. | C.V. In % | Quintals | S.E | C.V. In % |
| **TOTAL . . . . . .** | 516,995 | 31,639.89 | 6.12 | 137,090.13 | 15,471.31 | 11.29 | 574,776.67 | 87,872.37 | 15.29 |
| **Cereals..... .** | 468,456 | 31,588.34 | 6.74 | 102,504.94 | 11,554.56 | 11.27 | 497,027.26 | 82,332.96 | 16.57 |
| Teff..... . | 75,878 | 18,172.66 | 23.95 | 10,409.12 | 2,603.13 | 25.01 | 29,493.15 | 9,203.18 | 31.2 |
| Barley..... . | 268,294 | 29,198.32 | 10.88 | 61,288.51 | 11,160.63 | 18.21 | 286,443.61 | 73,043.15 | 25.5 |
| Wheat..... . | 96,370 | 17,720.98 | 18.39 | 10,882.94 | 2,609.94 | 23.98 | 48,436.92 | 18,466.43 | 38.12 |
| Maize..... . | 138,153 | 22,958.00 | 16.62 | 17,544.38 | 3,537.68 | 20.16 | 124,170.65 | 31,192.27 | 25.12 |
| Sorghum..... . | 2,404 | 1,497.65 | 62.31 | 209.35 | 166.52 | 79.54 | - | - | - |
| Finger millet..... . | - | - | - | - | - | - | - | - | - |
| Oats/'Aja'..... . | 20,899 | 7,460.51 | 35.7 | 2,167.10 | 842.24 | 38.86 | 8,482.93 | 4,618.85 | 54.45 |
| Rice..... . | 299 | 298.85 | 99.87 | 3.53 | 3.53 | 99.87 | - | - | - |
| **Pulses..... .** | 149,258 | 20,579.60 | 13.79 | 34,495.64 | 8,435.24 | 24.45 | 77,749.42 | 27,024.09 | 34.76 |
| Horse beans..... . | 504 | 363.99 | 72.27 | 22.93 | 20.23 | 88.21 | - | - | - |
| Field peas..... . | 32,018 | 9,253.31 | 28.9 | 3,034.47 | 1,104.46 | 36.4 | 2,793.23 | 2,461.99 | 88.14 |
| Haricot beans..... . | 39,851 | 11,155.48 | 27.99 | 12,992.13 | 6,981.57 | 53.74 | 27,723.15 | 14,553.41 | 52.5 |
| Chick-peas..... . | 41,726 | 8,326.44 | 19.95 | 6,709.30 | 1,725.65 | 25.72 | 26,052.49 | 15,643.78 | 60.05 |
| Lentils..... . | 36,502 | 11,908.80 | 32.62 | 7,291.81 | 3,648.19 | 50.03 | 161.55 | 160.18 | 99.15 |
| Vetch..... . | 20,850 | 8,760.28 | 42.02 | 4,223.93 | 2,256.71 | 53.43 | 20,077.89 | 13,291.27 | 66.2 |
| Soya beans..... . | - | - | - | - | - | - | - | - | - |
| Fenugreek..... . | 4,406 | 1,352.88 | 30.7 | 221.06 | 88.14 | 39.87 | 941.11 | 726 | 77.14 |
| Gibto..... . | - | - | - | - | - | - | - | - | - |
| **Oilseeds..... .** | 3,666 | 1,106.00 | 30.17 | 89.55 | 32.52 | 36.32 | - | - | - |
| Neug..... . | - | - | - | - | - | - | - | - | - |
| Linseed..... . | 2,640 | 932.69 | 35.32 | 71.91 | 29.99 | 41.71 | - | - | - |
| Groundnuts..... . | - | - | - | - | - | - | - | - | - |
| Sunflower..... . | 392 | 390.65 | 99.77 | 10.36 | 10.33 | 99.77 | - | - | - |
| Sesame..... . | - | - | - | - | - | - | - | - | - |
| Rapeseed..... . | 634 | 448.02 | 70.63 | 7.28 | 7.15 | 98.18 | - | - | - |

Oromia Region

**Standard errors and coefficient of variation for the estimates of number of holders, area and production of major crops, 2001 E.C agricultural sample survey, belg season.**

| Crop | Holders | | | Area | | | Production | | |
|---|---|---|---|---|---|---|---|---|---|
| | Estimate | S.E. | C.V. In % | Hectares | S.E. | C.V. In % | Quintals | S.E | C.V. In % |
| **TOTAL . . . . . .** | 2,172,933 | 38,813.29 | 1.79 | 659,023.61 | 29,737.37 | 4.51 | 4,879,379.69 | 309,286.76 | 6.34 |
| **Cereals..... .** | 2,046,302 | 41,086.50 | 2.01 | 566,906.22 | 26,621.13 | 4.7 | 4,479,557.09 | 298,253.98 | 6.66 |
| Teff..... . | 179,974 | 21,353.62 | 11.86 | 55,676.65 | 8,129.89 | 14.6 | 259,979.09 | 57,746.80 | 22.21 |
| Barley..... . | 521,643 | 38,397.63 | 7.36 | 124,797.56 | 14,199.97 | 11.38 | 895,641.09 | 134,583.02 | 15.03 |
| Wheat..... . | 222,638 | 23,482.75 | 10.55 | 68,766.77 | 12,585.06 | 18.3 | 658,333.87 | 159,333.09 | 24.2 |
| Maize..... . | 1,625,196 | 45,957.61 | 2.83 | 269,230.58 | 16,166.72 | 6 | 2,333,044.13 | 182,260.32 | 7.81 |
| Sorghum..... . | 154,691 | 20,030.64 | 12.95 | 37,311.70 | 7,773.01 | 20.83 | 239,871.57 | 102,510.00 | 42.74 |
| Finger millet..... . | 2,756 | 1,204.70 | 43.7 | 340.49 | 210.27 | 61.75 | - | - | - |
| Oats/'Aja'..... . | 58,979 | 10,961.94 | 18.59 | 10,739.77 | 2,582.44 | 24.05 | 92,687.34 | 29,787.27 | 32.14 |
| Rice..... . | 356 | 256.9 | 72.25 | 42.7 | 42.42 | 99.34 | - | - | - |
| **Pulses..... .** | 1,044,462 | 40,149.62 | 3.84 | 88,143.37 | 6,798.54 | 7.71 | 397,383.29 | 51,847.87 | 13.05 |
| Horse beans..... . | 59,454 | 10,636.14 | 17.89 | 4,576.92 | 1,361.29 | 29.74 | 25,069.00 | 12,492.18 | 49.83 |
| Field peas..... . | 83,537 | 15,347.22 | 18.37 | 17,903.69 | 3,982.00 | 22.24 | 73,459.07 | 34,114.40 | 46.44 |
| Haricot beans..... . | 947,160 | 37,841.56 | 4 | 62,365.26 | 5,018.31 | 8.05 | 298,490.20 | 36,143.23 | 12.11 |
| Chick-peas..... . | 6,595 | 1,761.53 | 26.71 | 891.03 | 371.14 | 41.65 | - | - | - |
| Lentils..... . | 10,320 | 2,564.96 | 24.85 | 998.29 | 473.83 | 47.46 | 365.02 | 312.22 | 85.53 |
| Vetch..... . | - | - | - | - | - | - | - | - | - |
| Soya beans..... . | 678 | 406.15 | 59.92 | 8.51 | 5.72 | 67.22 | - | - | - |
| Fenugreek..... . | 6,835 | 2,863.83 | 41.9 | 1,396.68 | 1,113.77 | 79.74 | - | - | - |
| Gibto..... . | 556 | 421.33 | 75.84 | 2.99 | 2.37 | 79.34 | - | - | - |
| **Oilseeds..... .** | 39,767 | 10,507.37 | 26.42 | 3,974.02 | 1,276.23 | 32.11 | 2,439.31 | 1,808.71 | 74.15 |
| Neug..... . | 4,489 | 2,611.69 | 58.18 | 796.5 | 494.85 | 62.13 | - | - | - |
| Linseed..... . | 5,627 | 1,573.87 | 27.97 | 647.35 | 270.68 | 41.81 | 2,439.31 | 1,808.71 | 74.15 |
| Groundnuts..... . | 14,094 | 8,116.46 | 57.59 | 1,200.30 | 847.26 | 70.59 | - | - | - |
| Sunflower..... . | - | - | - | - | - | - | - | - | - |
| Sesame..... . | 6,966 | 3,387.24 | 48.62 | 1,106.14 | 730.94 | 66.08 | - | - | - |
| Rapeseed..... . | 9,225 | 4,894.42 | 53.05 | 223.73 | 147.76 | 66.05 | - | - | - |

Somale Region

**Standard errors and coefficient of variation for the estimates of number of holders, area and production of major crops, 2001 E.C agricultural sample survey, belg season.**

| Crop | Holders | | | Area | | | Production | | |
|---|---|---|---|---|---|---|---|---|---|
| | Estimate | S.E. | C.V. In % | Hectares | S.E. | C.V. In % | Quintals | S.E | C.V. In % |
| **TOTAL . . . . . .** | 7,449 | - | - | 2,558.84 | - | - | 46,102.74 | - | - |
| **Cereals..... .** | 7,259 | - | - | 2,529.57 | - | - | 46,069.23 | - | - |
| Teff..... . | - | - | - | - | - | - | - | - | - |
| Barley..... . | - | - | - | - | - | - | - | - | - |
| Wheat..... . | 47 | - | - | - | - | - | - | - | - |
| Maize..... . | 7,259 | - | - | 2,529.57 | - | - | 46,069.23 | - | - |
| Sorghum..... . | - | - | - | - | - | - | - | - | - |
| Finger millet..... . | - | - | - | - | - | - | - | - | - |
| Oats/'Aja'..... . | - | - | - | - | - | - | - | - | - |
| Rice..... . | - | - | - | - | - | - | - | - | - |
| **Pulses..... .** | 1,234 | - | - | 24.48 | - | - | 33.5 | - | - |
| Horse beans..... . | - | - | - | - | - | - | - | - | - |
| Field peas..... . | - | - | - | - | - | - | - | - | - |
| Haricot beans..... . | 1,234 | - | - | 24.48 | - | - | 33.5 | - | - |
| Chick-peas..... . | - | - | - | - | - | - | - | - | - |
| Lentils..... . | - | - | - | - | - | - | - | - | - |
| Vetch..... . | - | - | - | - | - | - | - | - | - |
| Soya beans..... . | - | - | - | - | - | - | - | - | - |
| Fenugreek..... . | - | - | - | - | - | - | - | - | - |
| Gibto..... . | - | - | - | - | - | - | - | - | - |
| **Oilseeds..... .** | 117 | - | - | 4.79 | - | - | - | - | - |
| Neug..... . | - | - | - | - | - | - | - | - | - |
| Linseed..... . | - | - | - | - | - | - | - | - | - |
| Groundnuts..... . | - | - | - | - | - | - | - | - | - |
| Sunflower..... . | - | - | - | - | - | - | - | - | - |
| Sesame..... . | 117 | - | - | 4.79 | - | - | - | - | - |
| Rapeseed..... . | - | - | - | - | - | - | - | - | - |

Benshangul-Gumuz Region

**Standard errors and coefficient of variation for the estimates of number of holders, area and production of major crops, 2001 E.C agricultural sample survey, belg season.**

| Crop | Holders | | | Area | | | Production | | |
|---|---|---|---|---|---|---|---|---|---|
| | Estimate | S.E. | C.V. In % | Hectares | S.E. | C.V. In % | Quintals | S.E | C.V. In % |
| **TOTAL . . . . . .** | 22,248 | 1,248.34 | 5.61 | 3,287.08 | 396.36 | 12.06 | 24,421.83 | 3,105.77 | 12.72 |
| **Cereals..... .** | 19,228 | 1,422.98 | 7.4 | 1,548.39 | 153.56 | 9.92 | 17,445.22 | 1,806.23 | 10.35 |
| Teff..... . | - | - | - | - | - | - | - | - | - |
| Barley..... . | 765 | 204.27 | 26.7 | 98.95 | 30.31 | 30.64 | 872.37 | 259.36 | 29.73 |
| Wheat..... . | - | - | - | - | - | - | - | - | - |
| Maize..... . | 19,023 | 1,415.05 | 7.44 | 1,331.20 | 130.49 | 9.8 | 16,572.85 | 1,746.88 | 10.54 |
| Sorghum..... . | 1,134 | 388.48 | 34.26 | 117.09 | 39.4 | 33.65 | - | - | - |
| Finger millet..... . | 26 | 17.73 | 68.4 | 0.69 | 0.59 | 85.38 | - | - | - |
| Oats/'Aja'..... . | 13 | 11.97 | 92.5 | 0.45 | 0.42 | 92.5 | - | - | - |
| Rice..... . | - | - | - | - | - | - | - | - | - |
| **Pulses..... .** | 19,813 | 1,608.42 | 8.12 | 1,738.69 | 381.32 | 21.93 | 6,976.62 | 2,916.94 | 41.81 |
| Horse beans..... . | 378 | 151.56 | 40.1 | 16.8 | 6.56 | 39.03 | 230.91 | 102.45 | 44.37 |
| Field peas..... . | 39 | 31.28 | 80.57 | 0.83 | 0.67 | 80.89 | - | - | - |
| Haricot beans..... . | 19,726 | 1,608.87 | 8.16 | 1,713.54 | 381.64 | 22.27 | 6,745.71 | 2,918.71 | 43.27 |
| Chick-peas..... . | 53 | 34.66 | 65.05 | 7.52 | 5.52 | 73.45 | - | - | - |
| Lentils..... . | - | - | - | - | - | - | - | - | - |
| Vetch..... . | - | - | - | - | - | - | - | - | - |
| Soya beans..... . | - | - | - | - | - | - | - | - | - |
| Fenugreek..... . | - | - | - | - | - | - | - | - | - |
| Gibto..... . | - | - | - | - | - | - | - | - | - |
| **Oilseeds..... .** | - | - | - | - | - | - | - | - | - |
| Neug..... . | - | - | - | - | - | - | - | - | - |
| Linseed..... . | - | - | - | - | - | - | - | - | - |
| Groundnuts..... . | - | - | - | - | - | - | - | - | - |
| Sunflower..... . | - | - | - | - | - | - | - | - | - |
| Sesame..... . | - | - | - | - | - | - | - | - | - |
| Rapeseed..... . | - | - | - | - | - | - | - | - | - |

S.N.N.P. Region

**Standard errors and coefficient of variation for the estimates of number of holders, area and production of major crops, 2001 E.C agricultural sample survey, belg season.**

| Crop | Holders | | | Area | | | Production | | |
|---|---|---|---|---|---|---|---|---|---|
| | Estimate | S.E. | C.V. In % | Hectares | S.E. | C.V. In % | Quintals | S.E | C.V. In % |
| **TOTAL . . . . . .** | 1,924,556 | 36,766.34 | 1.91 | 384,871.96 | 17,242.61 | 4.48 | 2,075,501.17 | 147,068.20 | 7.09 |
| **Cereals..... .** | 1,809,138 | 38,508.41 | 2.13 | 301,620.78 | 15,665.76 | 5.19 | 1,756,141.95 | 136,916.78 | 7.8 |
| Teff..... . | 68,706 | 8,618.92 | 12.54 | 16,755.97 | 2,408.50 | 14.37 | 104,128.83 | 20,538.66 | 19.72 |
| Barley..... . | 173,222 | 15,365.02 | 8.87 | 18,717.02 | 2,215.71 | 11.84 | 118,777.84 | 23,548.52 | 19.83 |
| Wheat..... . | 17,429 | 4,145.44 | 23.78 | 1,556.29 | 336.18 | 21.6 | 3,984.01 | 1,180.66 | 29.63 |
| Maize..... . | 1,733,480 | 40,710.38 | 2.35 | 236,357.57 | 13,900.61 | 5.88 | 1,359,112.96 | 114,406.25 | 8.42 |
| Sorghum..... . | 155,829 | 11,437.76 | 7.34 | 25,996.60 | 2,969.94 | 11.42 | 132,803.44 | 22,273.03 | 16.77 |
| Finger millet..... . | 9,522 | 2,257.92 | 23.71 | 700.32 | 198.56 | 28.35 | 24.07 | 24.02 | 99.8 |
| Oats/'Aja'..... . | 1,792 | 650.52 | 36.29 | 43.39 | 19.85 | 45.74 | - | - | - |
| Rice..... . | 3,845 | 2,564.46 | 66.7 | 1,493.59 | 1,184.30 | 79.29 | 37,310.81 | 36,351.59 | 97.43 |
| **Pulses..... .** | 1,228,237 | 39,582.51 | 3.22 | 79,723.02 | 4,112.82 | 5.16 | 318,896.36 | 28,567.48 | 8.96 |
| Horse beans..... . | 28,644 | 4,217.50 | 14.72 | 1,186.73 | 281.37 | 23.71 | 2,287.34 | 888.24 | 38.83 |
| Field peas..... . | 23,795 | 7,055.03 | 29.65 | 893.67 | 197.75 | 22.13 | 1,978.11 | 1,185.08 | 59.91 |
| Haricot beans..... . | 1,212,908 | 39,710.46 | 3.27 | 77,315.91 | 4,061.94 | 5.25 | 314,630.90 | 28,481.25 | 9.05 |
| Chick-peas..... . | 2,107 | 737.75 | 35.02 | 221.52 | 88.94 | 40.15 | - | - | - |
| Lentils..... . | 2,412 | 930.29 | 38.57 | 48.19 | 17.45 | 36.22 | - | - | - |
| Vetch..... . | 536 | 315.79 | 58.92 | 1.07 | 0.81 | 75.75 | - | - | - |
| Soya beans..... . | 437 | 171.27 | 39.21 | 17.04 | 9.56 | 56.07 | - | - | - |
| Fenugreek..... . | 5,302 | 1,944.18 | 36.67 | 36.86 | 15.88 | 43.08 | - | - | - |
| Gibto..... . | 320 | 320.32 | 100.1 | 2.03 | 2.04 | 100.1 | - | - | - |
| **Oilseeds..... .** | 40,096 | 6,508.64 | 16.23 | 3,528.17 | 1,146.09 | 32.48 | 462.86 | 445.65 | 96.28 |
| Neug..... . | - | - | - | - | - | - | - | - | - |
| Linseed..... . | 2,299 | 709.36 | 30.86 | 55.24 | 25.13 | 45.49 | - | - | - |
| Groundnuts..... . | 20,337 | 5,359.00 | 26.35 | 1,816.08 | 813.46 | 44.79 | 462.3 | 445.65 | 96.4 |
| Sunflower..... . | 3,313 | 757.37 | 22.86 | 93.21 | 38.86 | 41.69 | - | - | - |
| Sesame..... . | 5,569 | 2,146.99 | 38.55 | 1,364.42 | 813.91 | 59.65 | - | - | - |
| Rapeseed..... . | 9,592 | 2,856.24 | 29.78 | 199.21 | 86.83 | 43.59 | 0.56 | 0.5 | 88.14 |

Gambela Region

**Standard errors and coefficient of variation for the estimates of number of holders, area and production of major crops, 2001 E.C agricultural sample survey, belg season.**

| Crop | Holders | | | Area | | | Production | | |
|---|---|---|---|---|---|---|---|---|---|
| | Estimate | S.E. | C.V. In % | Hectares | S.E. | C.V. In % | Quintals | S.E | C.V. In % |
| **TOTAL . . . . . .** | 13,646 | 1,332.36 | 9.76 | 3,199.63 | 382.01 | 11.94 | 28,578.10 | 8,578.17 | 30.02 |
| **Cereals..... .** | 13,575 | 1,332.91 | 9.82 | 3,026.52 | 352.02 | 11.63 | 27,291.16 | 8,419.83 | 30.85 |
| Teff..... . | 24 | 23.27 | 97.87 | 1.38 | 1.35 | 97.87 | - | - | - |
| Barley..... . | 80 | 38.34 | 47.83 | 9.87 | 4.79 | 48.56 | - | - | - |
| Wheat..... . | - | - | - | - | - | - | - | - | - |
| Maize..... . | 13,525 | 1,333.79 | 9.86 | 3,012.41 | 351.8 | 11.68 | 27,291.16 | 8,419.83 | 30.85 |
| Sorghum..... . | 109 | 56.88 | 52.36 | 2.52 | 1.92 | 76.06 | - | - | - |
| Finger millet..... . | 10 | 8.57 | 86.31 | 0.34 | 0.29 | 86.31 | - | - | - |
| Oats/'Aja'..... . | - | - | - | - | - | - | - | - | - |
| Rice..... . | - | - | - | - | - | - | - | - | - |
| **Pulses..... .** | 788 | 388.23 | 49.26 | 76.26 | 55.29 | 72.5 | 98.41 | 79.72 | 81.01 |
| Horse beans..... . | - | - | - | - | - | - | - | - | - |
| Field peas..... . | - | - | - | - | - | - | - | - | - |
| Haricot beans..... . | 788 | 388.23 | 49.26 | 76.26 | 55.29 | 72.5 | 98.41 | 79.72 | 81.01 |
| Chick-peas..... . | - | - | - | - | - | - | - | - | - |
| Lentils..... . | - | - | - | - | - | - | - | - | - |
| Vetch..... . | - | - | - | - | - | - | - | - | - |
| Soya beans..... . | - | - | - | - | - | - | - | - | - |
| Fenugreek..... . | - | - | - | - | - | - | - | - | - |
| Gibto..... . | - | - | - | - | - | - | - | - | - |
| **Oilseeds..... .** | 143 | 119.58 | 83.91 | 96.84 | 84.66 | 87.42 | 1,188.54 | 1,039.11 | 87.43 |
| Neug..... . | - | - | - | - | - | - | - | - | - |
| Linseed..... . | - | - | - | - | - | - | - | - | - |
| Groundnuts..... . | 24 | 22.98 | 96.75 | 0.07 | 0.07 | 96.75 | - | - | - |
| Sunflower..... . | - | - | - | - | - | - | - | - | - |
| Sesame..... . | 119 | 100.3 | 84.46 | 96.77 | 84.6 | 87.43 | 1,188.54 | 1,039.11 | 87.43 |
| Rapeseed..... . | - | - | - | - | - | - | - | - | - |

Harari Region

**Standard errors and coefficient of variation for the estimates of number of holders, area and production of major crops, 2001 E.C agricultural sample survey, belg season.**

| Crop | Holders | | | Area | | | Production | | |
|---|---|---|---|---|---|---|---|---|---|
| | Estimate | S.E. | C.V. In % | Hectares | S.E. | C.V. In % | Quintals | S.E | C.V. In % |
| **TOTAL . . . . . .** | 5,811 | 463.95 | 7.98 | 786.17 | 156.8 | 19.95 | 3,595.05 | 867.28 | 24.12 |
| **Cereals..... .** | 5,725 | 470.67 | 8.22 | 571.26 | 116.37 | 20.37 | 3,084.78 | 646.22 | 20.95 |
| Teff..... . | 28 | 27.32 | 97.83 | 0.61 | 0.6 | 97.83 | - | - | - |
| Barley..... . | - | - | - | - | - | - | - | - | - |
| Wheat..... . | - | - | - | - | - | - | - | - | - |
| Maize..... . | 4,296 | 500.13 | 11.64 | 289.49 | 57.14 | 19.74 | 3,084.78 | 646.22 | 20.95 |
| Sorghum..... . | 2,648 | 590.43 | 22.3 | 281.16 | 86.22 | 30.67 | - | - | - |
| Finger millet..... . | - | - | - | - | - | - | - | - | - |
| Oats/'Aja'..... . | - | - | - | - | - | - | - | - | - |
| Rice..... . | - | - | - | - | - | - | - | - | - |
| **Pulses..... .** | 4,606 | 650.69 | 14.13 | 204.74 | 44.04 | 21.51 | 510.27 | 292.31 | 57.29 |
| Horse beans..... . | - | - | - | - | - | - | - | - | - |
| Field peas..... . | - | - | - | - | - | - | - | - | - |
| Haricot beans..... . | 4,606 | 650.69 | 14.13 | 204.49 | 44.03 | 21.53 | 510.27 | 292.31 | 57.29 |
| Chick-peas..... . | - | - | - | - | - | - | - | - | - |
| Lentils..... . | - | - | - | - | - | - | - | - | - |
| Vetch..... . | - | - | - | - | - | - | - | - | - |
| Soya beans..... . | - | - | - | - | - | - | - | - | - |
| Fenugreek..... . | 54 | 35.64 | 66.11 | 0.26 | 0.17 | 66.7 | - | - | - |
| Gibto..... . | - | - | - | - | - | - | - | - | - |
| **Oilseeds..... .** | 265 | 121.15 | 45.67 | 10.17 | 4.64 | 45.6 | - | - | - |
| Neug..... . | - | - | - | - | - | - | - | - | - |
| Linseed..... . | - | - | - | - | - | - | - | - | - |
| Groundnuts..... . | 95 | 64.83 | 67.91 | 4.92 | 3.13 | 63.56 | - | - | - |
| Sunflower..... . | - | - | - | - | - | - | - | - | - |
| Sesame..... . | - | - | - | - | - | - | - | - | - |
| Rapeseed..... . | 170 | 110.13 | 64.86 | 5.25 | 3.79 | 72.19 | - | - | - |

# Appendix III – Questionnaires

Form CPSS 2001/8

# Crop Production Sample Survey
## List of Fields Under Mixed Crops (Including Vegetables and Root Crops) and Agricultural Practices
## (Belg Season) – 2008/09 (2001 E.C)

### Part I – Identification Particulars

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Region | Zone | W ereda | Farmers' Assocation | Enumeration Area | House hold ID Number | Holder ID Number | Sex of head of House hold M = 1 F = 2 | Holders Name | Age | Sex M = 1 F = 2 | Educational Status | House hold Size | Type of Holding Crop = 1 Livestock = 2 Both = 3 |
| | | | | | | | | | | | | | |

### Part II. Area Under Temporary Crops and Agricultural Practices and Area Measurement Result

| 1 | | 2 | 3 | | | | | | 4 | | 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sr. No. | | Questions | Parcel No. | | Field No. | | | | Date of Measurement | | Area in Sq. m. | |
| | | | Crop Name | | Crop Name | | Crop Name | | Date | Month | | |
| | | | code | | cod | | cod | | | | **Closure Error** | |
| 0 | 1 | Type of Holding<br>Private = 1<br>Rented/Contract= 2<br>Others | | | | | | | Side ID | 1 - 2 | 2 - 3 | 3 - |
| 0 | 2 | Have the field been included in the extension package program<br>Yes = 1 No= 2 | | | | | | | Bearing | | | |
| 0 | 3 | Was the field irrigated ?<br>Yes = 1 No = 2 | | | | | | | Distances of | | | |
| 0 | 4 | Area in percentage share for each crop | | | | | | | Side ID | 4 - | 5 - | 6 - |
| 0 | 5 | Varity of seeds used<br>Improved = 1<br>Indigenous = 2 | | | | | | | Bearing | | | |
| 0 | 6 | (For Cereals, Pulses and oil seeds only)<br>If indigenous seed was used,<br>What was the total Quantity | Kg | gram | Kg | gram | Kg | gram | Distances of | | | |
| 0 | 7 | (For Cereals, Pulses and oil seeds only)<br>If improved seed was used<br>What was the total quantity | Kg | gram | Kg | gram | Kg | gram | Side ID | 7 - | 8 - | 9 - |
| 0 | 8 | (For Cereals, Pulses and oil seeds only)<br>If improved seed was used<br>What was the cost/price | Birr | cent. | Birr | cent. | Birr | cent. | Bearing | | | |
| 0 | 9 | Was the crop damage<br>Yes = 1<br>No = 2 | | | | | | | Distances of | | | |
| 1 | 0 | If you, what was the major censes of damage<br>Percentage of damage | Reas on | co de | Reas on | co de | Reaso n | c o | Side ID | 10 - | 11 - | 12 - |
| 1 | 1 | Percentage of damage | | | | | | | Bearing | | | |
| 1 | 2 | Any control/prevention measure taken for crop damage?<br>Yes = 1 No = 2 | | | | | | | Distances of | | | |
| 1 | 3 | If Yes, What type of measure ?<br>Chemical = 1 Both = 3<br>Non Chemical = 2 | | | | | | | Side ID | 13 - | 14 - | 15 - |
| 1 | 4 | If Chemical<br>Insecticide = 1 1&3 = 5<br>Herbicides = 2 2&3 = 6<br>fungicide = 3 All = 7<br>1&2 = 4 | | | | | | | Bearing | | | |
| 1 | 5 | What was field fertilized ?<br>Yes = 1 No = 2 | | | | | | | Distances of | | | |
| 1 | 6 | If fertilized What type ?<br>Natural 1 Both = 3<br>Chemical = 2 | | | | | | | Side ID | 19 - | 20 - | 21 - |
| 1 | 7 | If chemical fertilizer used<br>17.1 Type<br>Urea = 1 Both = 3 | | | | | | | Bearing | | | |
| | | 17.2 Quantity in Kg. | Kg | | gram | | | | Distances of | | | |
| 1 | 8 | If Natural fertilizer used mainly what type ?<br>Manure = 1 1 & 3 = 5<br>Compost = 2 2 & 3 = 6<br>Orga = 3 All = 7<br>1 & 2 = 4 Other | | | | | | | Side ID | 22 - | 23 - | 24 - |
| 1 | 9 | Production in local unit | Local unit | | Code | | quantity | | Bearing | | | |
| | | | | | | | | | Distances of | | | |

Reason if Area measurement not condacted →

| Local unit | Code | quantity | Local unit | Code | quantity | Local unit | Code | quantity |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

**Form CPSS 2001/3A**

# APPENDIX_IV: Questionnaires used for the 2008/09 (2001 E.C) Belg Season Crop Production Sample Servey

## Crop Production Sample Survey

**NOTE:- This Form Should be Filled Out For Mixed Crops According to their Type in pure Stands**

## Assessment of Belg Season Crop Conditions- 2008/09 (2001 E.C)

### Part I – Identification Particulars

| *1* | *2* | *3* | *4* | *5* | *6* |
|---|---|---|---|---|---|
| **Region** | **Zone** | **wereda** | **Farmers' Association** | **Enumeration Area** | **Crop Name** |
| | | | | | |

### Part II - Assessment of Crop Conditions (For Belg Season)

| *1* | | *2* | *3* | *4* | *5* | | *6* | | *7* | | *8* | | *9* | | *10* | | *11* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sr. No.** | | **Name of Holder** | **Household ID Numb** | **Holder ID Number** | **Number Of Fields** | | **Crop Productivity Compared to Last Year** | | | | | | | | | | **Change In Percent** |
| | | | | | | | **Increase = 1 Equal/ No change = 2 Decrease = 3** | | **If Increase** | | | | **If Decrease** | | | | |
| | | | | | | | | **Code** | **Quantity in Percent** | | **One Major Reason for Increase** | **Code** | **Quantity in Percent** | | **One Major Reason for Decrease** | **Code** | |
| *0* | *1* | | | | | | | | | | | | | | | | |
| *0* | *2* | | | | | | | | | | | | | | | | |
| *0* | *3* | | | | | | | | | | | | | | | | |
| *0* | *4* | | | | | | | | | | | | | | | | |
| *0* | *5* | | | | | | | | | | | | | | | | |
| *0* | *6* | | | | | | | | | | | | | | | | |
| *0* | *7* | | | | | | | | | | | | | | | | |
| *0* | *8* | | | | | | | | | | | | | | | | |
| *0* | *9* | | | | | | | | | | | | | | | | |
| *1* | *0* | | | | | | | | | | | | | | | | |
| *1* | *1* | | | | | | | | | | | | | | | | |
| *1* | *2* | | | | | | | | | | | | | | | | |
| *1* | *3* | | | | | | | | | | | | | | | | |
| *1* | *4* | | | | | | | | | | | | | | | | |
| *1* | *5* | | | | | | | | | | | | | | | | |

**Form CPSS 2001/3B**

# Questionnaires used for the 2008/09(2001 E.C)
# Belg Season Crop Production Sample Survey
# Assessment of crop condition

**Part I –Identification Particulars**

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Region | Zone | Wereda | Farmers' Association | Enumeration Area |
| | | | | |

**Part II - Assessment of Crop Conditions (For Belg Season)**

| 1 | 2 | 3 | | 4 | | | 5 | | |
|---|---|---|---|---|---|---|---|---|---|
| Crop Name | Code | Expected Crop Productivity Compared to Last Year | | | | | | | |
| | | Increase = 1 Equal/No Change = 2 Decrease = 3 | | If increase/Decrease Quantity of increase/Decrease In percent | | | Expected Quantity of Productivity Change In Percent | | |
| | | | Code | | | | | | |
| Teff | 07 | | | | | | | | |
| Barley | 01 | | | | | | | | |
| Wheat | 08 | | | | | | | | |
| Maize | 02 | | | | | | | | |
| Sorghum | 06 | | | | | | | | |
| Finger millet | 03 | | | | | | | | |
| Oats/'aja' | 04 | | | | | | | | |
| Rice | 05 | | | | | | | | |
| Horse beans | 13 | | | | | | | | |
| Field peas | 15 | | | | | | | | |
| Haricot beans | 12 | | | | | | | | |
| Chick peas | 11 | | | | | | | | |
| Lentils | 14 | | | | | | | | |
| Grass peas/vetch | 16 | | | | | | | | |
| Fenugreek | 36 | | | | | | | | |
| Gibto | 17 | | | | | | | | |
| Niger seed | 25 | | | | | | | | |
| Lin seed/flax | 23 | | | | | | | | |
| Ground nuts | 24 | | | | | | | | |
| Sufflower | 28 | | | | | | | | |
| Sesame | 27 | | | | | | | | |
| Rape seed | 26 | | | | | | | | |
| Soya beans | 18 | | | | | | | | |

| | Name | Date | Signature |
|---|---|---|---|
| **Development Agent (Respondent)** | | | |
| **Data Collector** | | | |
| **Supervisor** | | | |

✹ Data in this questionnaire should be collected from the Development Agent only by interview method.

**Form CPSS 2001/3C**

**Questionnaires used for the 2008/09(2001 E.C)**
**Belg Season Crop Production Sample Survey**
**Assessment of crop condition**

## Part I –Identification Particulars

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Region | Zone | Wereda | Farmers' Association | Enumeration Area |
| | | | | |

## Part II - Assessment of Crop Conditions (For Belg Season)

| 1 | 2 | 3 | 4 | 5 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Crop Name | Code | Expected Crop Productivity Compared to Last Year | | | | | | | |
| | | Increase = 1 Equal/No change = 2 Decrease = 3 | | If increase/Decrease Quantity of increase/Decrease In percent | | | Expected Quantity of Productivity Change In Percent | | |
| | | | Code | | | | | | |
| Teff | 07 | | | | | | | | |
| Barley | 01 | | | | | | | | |
| Wheat | 08 | | | | | | | | |
| Maize | 02 | | | | | | | | |
| Sorghum | 06 | | | | | | | | |
| Finger millet | 03 | | | | | | | | |
| Oats/'aja' | 04 | | | | | | | | |
| Rice | 05 | | | | | | | | |
| Horse beans | 13 | | | | | | | | |
| Field peas | 15 | | | | | | | | |
| Haricot beans | 12 | | | | | | | | |
| Chick peas | 11 | | | | | | | | |
| Lentils | 14 | | | | | | | | |
| Grass peas/vetch | 16 | | | | | | | | |
| Fenugreek | 36 | | | | | | | | |
| Gibto | 17 | | | | | | | | |
| Niger seed | 25 | | | | | | | | |
| Lin seed/flax | 23 | | | | | | | | |
| Ground nuts | 24 | | | | | | | | |
| Sufflower | 28 | | | | | | | | |
| Sesame | 27 | | | | | | | | |
| Rape seed | 26 | | | | | | | | |
| Soya beans | 18 | | | | | | | | |

| | Name | Date | Signature |
|---|---|---|---|
| Chairman of Farmers' Association / Settlement (Respondent) | | | |
| Data Collector | | | |
| Supervisor | | | |

✹ Data in this questionnaire should be collected from the Farmers' Association chair person by interview method.