

**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**

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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 programmes. 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 moisture 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:

Belg Season Crops were 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 sowing 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 sow 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.)	%
<i>Cereal</i>	996.24	82.36	6,942.00	89.58
<i>Pulses</i>	205.60	16.99	803.34	10.37
<i>Oilseeds</i>	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

Crop Type	Total Cropland Area in thousand Hectares					
	Seasons					
	Meher		Belg		Both	
	in (000)Ha	%	in (000)Ha	%	in (000) Ha	%
<i>Cereal</i>	8,770.12	78.23	996.24	82.36	9,766.36	78.63
<i>Pulse</i>	1,585.24	14.14	205.60	17	1,790.84	14.42
<i>Oilseeds</i>	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

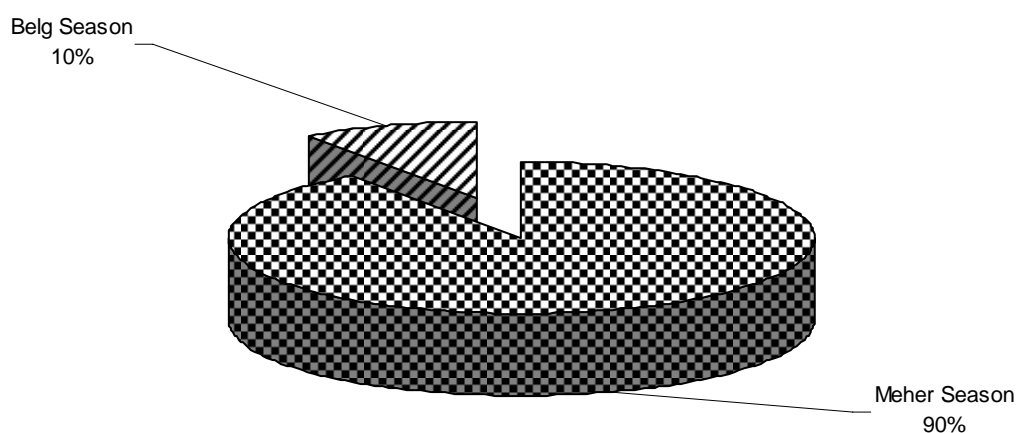
While Pulses and Oilseeds covered about 1,790.84; 862.88 thousand hectares which accounted for about 14.42% and 6.95% of the total cropland area, respectively.

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

Crop Type	Total Production in Million Quintals					
	Meher		Belg		Both	
	<i>in (000) Qts</i>	<i>%</i>	<i>in (000) Qts</i>	<i>%</i>	<i>in (000) Qts</i>	<i>%</i>
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

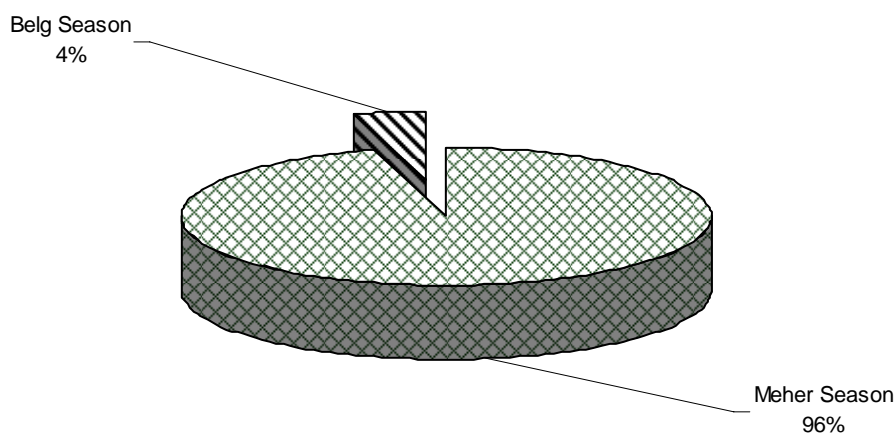
Moreover, since Meher is a long rainy season almost 80 to 90 % of the private peasant farmers perform their crop production activities during this season. As a matter this fact, out of the total cropland area cultivated under major crops during the 2008/09(2001 E.C.) production year, Cropland area cultivated 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		Production In		Yield QT/HA
		Hectares	%	Quintals	%	
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		Production In		Yield QT/HA
		Hectares	%	Quintals	%	
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		Production In		Yield QT/HA
		Hectares	%	Quintals	%	
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		Production In		Yield QT/HA
		Hectares	%	Quintals	%	
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		Production In		Yield QT/HA
		Hectares	%	Quintals	%	
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		Production In		Yield QT/HA
		Hectares	%	Quintals	%	
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		Production In		Yield QT/HA
		Hectares	%	Quintals	%	
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	Cropland Area		Production		Yield
	Of Holders	In Hectares	%	In Quintals	%	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		Production In		Yield QT/HA
		Hectares	%	Quintals	%	
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		Production In		Yield QT/HA
		Hectares	%	Quintals	%	
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 Administration

Crop Name	Number Of Holders	Cropland Area In		Production In		Yield QT/HA
		Hectares	%	Quintals	%	
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} stratum 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, $P_{hi} = a_{hi} * \bar{Y}_{hi}$

Where,

\bar{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	-	-	-

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	-	-	-

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

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

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	Wereda	Farmers' Association	Enumeration Area	House hold ID Number	Holder ID Number	Sex of head of House hold M = 1 F = 2	Holders			Educational Status	House hold Size	Type of Holding Crop = 1 Livestock = 2 Both = 3
							Name	Age	Sex M = 1 F = 2				

Part II. Area Under Temporary Crops and Agricultural Practices

and Area Measurement Result

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

Reason if Area measurement not conducted →

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.

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	If increase/Decrease Quantity of increase/Decrease In percent	Expected Quantity of Productivity Change In Percent
		Equal/No change = 2		
		Decrease = 3	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.

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' Association	Enumeration Area	House hold ID Number	Holder ID Number	Sex of head of House hold M = 1 F = 2	Holders			Educational Status	House hold Size	Type of Holding Crop = 1 Livestock = 2 Both = 3
								Name	Age	Sex M = 1 F = 2			

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	Closure Error									
				code		cod		cod												
0	1	Type of Holding Private = 1 Rented/Contract = 2 Others																		
0	2	Have the field been included in the extension package program Yes = 1 No = 2																		
0	3	Was the field irrigated? Yes = 1 No = 2																		
0	4	Area in percentage share for each crop																		
0	5	Variety of seeds used Improved = 1 Indigenous = 2																		
0	6	(For Cereals, Pulses and oil seeds only) If indigenous seed was used, What was the total Quantity																		
					Kg	gram	Kg	gram	Kg	gram										
0	7	(For Cereals, Pulses and oil seeds only) If improved seed was used What was the total quantity																		
0	8	(For Cereals, Pulses and oil seeds only) If improved seed was used What was the cost/price																		
							Birr	cent.	Birr	cent.	Birr	cent.								
0	9	Was the crop damage Yes = 1 No = 2																		
1	0	If you, what was the major causes of damage Percentage of damage																		
					Reas on	co de	Reas on	co de	Reaso n	c o										
1	1	Percentage of damage																		
1	2	Any control/prevention measure taken for crop damage? Yes = 1 No = 2																		
1	3	If Yes, What type of measure? Chemical = 1 Both = 3 Non Chemical = 2																		
1	4	If Chemical Insecticide = 1 1&3 = 5 Herbicides = 2 2&3 = 6 fungicide = 3 All = 7 1&2 = 4																		
1	5	What was field fertilized? Yes = 1 No = 2																		
1	6	If fertilized What type? Natural = 1 Both = 3 Chemical = 2																		
1	7	If chemical fertilizer used 17.1 Type Urea = 1 Both = 3																		
		17.2 Quantity in Kg.																		
							Kg	gram												
1	8	If Natural fertilizer used mainly what type? Manure = 1 1 & 3 = 5 Compost = 2 2 & 3 = 6 Orga = 3 All = 7 1 & 2 = 4 Other																		
1	9	Production in local unit																		
					Local unit	Code	quantity	Local unit	Code	quantity	Local unit	Code	quantity	Local unit	Code	quantity				

Reason if Area measurement not conducted →