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THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
CENTRAL STATISTICAL AUTHORITY

AGRICULTURAL SAMPLE SURVEY
1999/2000 (1992 E.C.)

(September 1999 – February 2000)

VOLUME I



REPORT ON

**AREA AND PRODUCTION
FOR
MAJOR CROPS**

(PRIVATE PEASANT HOLDINGS, MEHER SEASON)

Addis Ababa
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227

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ABBREVIATIONS

CSA -	CENTRAL STATISTICAL AUTHORITY
CV -	COEFFICIENT OF VARIATION
EC -	ETHIOPIAN CALENDAR
HA -	HECTARE
QT -	QUINTAL
SE -	STANDARD ERROR
SNNPR -	SOUTHERN NATIONS, NATIONALITIES AND PEOPLES REGION

PART I

INTRODUCTION AND OBJECTIVES OF THE SURVEY

I. INTRODUCTION

The issue of food security has continual national importance in Ethiopia. To achieve social and political stability, the government has to be able to create and maintain food security by issuing an appropriate agricultural policy. Agricultural statistics is just one element that enters into this policy process to formulate, monitor, assess and evaluate the policy. The collection of reliable, comprehensive and timely data on agriculture is thus essential for the above purpose. In this regard, the Central Statistical Authority (CSA) has exerted effort to provide policy makers and users with reliable and timely agricultural data.

This bulletin contains one of the series of the 1999/2000 (1992 E.C) Agricultural Sample Survey (AgSS) results, i.e. area and production of Meher Season, for the major crops produced within the private peasant holdings sector of the economy. The report consists of three parts: Part I includes the objectives of this annual survey, Part II deals with coverage and content of the survey, sample design, field organization, training of field staff, method of data collection and Part III encompasses survey estimates of area, production and yield of major crops. Estimation procedures and formulation for estimates of totals, ratios, and variance are presented in Appendix I.

Estimates of the standard errors with the corresponding coefficients of variations for area and production of the major crops are presented in Appendix II, the number of agricultural households covered, parcels, fields measured, and number of crop cuttings performed are presented in Appendix III and the survey questionnaires in Appendix IV.

2. Objectives of the survey

The general objective of CSA's Agricultural Sample Survey (AgSS) is to collect basic quantitative information on the country's agriculture that is considered essential for development planning, socio-economic policy formulation, food security, etc. The AgSS is composed of four components: Crop Production Forecast Survey, Meher Season Survey, Livestock Survey, and Survey of the Belg season crop area and production.

The specific objectives of the Meher season area and production survey are to estimate the total cultivated land area, production and yield per hectare of major crops (temporary). Companion reports are published separately with estimates of land use and quantity of agricultural inputs applied by type for the Meher and Belg seasons. All reports are based on the private peasant holdings in sedentary rural areas of the nation, further subdivided by regions and zones.

PART II

SURVEY METHODOLOGY, DATA COLLECTION AND PROCESSING

1. Scope, Coverage and Content of the Survey

The 1999/2000 (1992 E.C) annual Agricultural Sample Survey used a sampling frame which was designed to cover the sedentary rural agricultural population in all regions of the country (urban and nomadic areas were not included in the survey). Illustrated in Table A is a breakdown of the sample distribution as expressed by regions, zones and weredas. A total of 56 zones and 415 weredas were actually covered by the survey.

The area sampling unit used for this survey is defined as an Enumeration Areas (EAs) as defined for the 1994 Population and Housing Census. For the 1999/2000 AgSS a total of 1450 enumeration areas were selected from all regions of the country. Due to various reasons, 5 EAs were not covered in the survey which resulted in the survey actually covering 1445 Enumeration Areas (EAs). From each of the selected EAs a representative sample of forty agricultural households were selected to represent the agricultural population of the sampled EA.

Of these forty agricultural households, the first twenty-five were used for obtaining information on area under crops, Meher and Belg seasons' production of crops, land use, agricultural practices, crop damage, and quantity of agricultural inputs used. It is important to note that of the total forty agricultural households sampled in each of the selected EAs, data on

crop cutting were collected for only the fifteen (11th -25th) households selected.

Table A: Area Coverage of the 1999/2000 Agricultural Sample Survey

REGION	NUMBER OF ZONES / SP. WEREDAS			NUMBER OF WEREDAS		
	TOTAL	COVERED	NOT COVERED	³ TOTAL	COVERED	NOT COVERED
TIGRAY ¹	5	4	1	33	33	-
AFAR ²	5	3	2	8	8	-
AMHARA ¹	11	10	1	93	92	1
OROMIYA	12	12	-	171	170	1
SOMALIE ²	9	3	6	9	9	-
BENISHANGUL_GUMUZ	3	3	-	18	18	-
SNNP	14	14	-	73	73	-
GAMBELA ²	4	3	1	5	5	-
HARARI	1	1	-	1	1	-
ADDIS ABABA ¹	6	2	4	5	5	-
DIRE DAWA	1	1	-	1	1	-
TOTAL	71	56	15	417	415	2

Note

1= Zones not covered in these regions are urban.

2 = Zones not covered in these regions are not inhabited by significant number of sedentary population.

3 = Numbers of total weredas signify those weredas in covered zones of the respective regions.

SNNP = Southern Nations, Nationalities and Peoples.

2. Concepts and Definitions

In order to collect standardized data of acceptable quality the same concepts and definitions must be used by all field enumerators during data collection.

Below are defined some of the more important concepts and terms used in the survey.

Enumeration Area (EA) an enumeration area in the rural parts of the country is a locality that is less than or equal to a farmers' association in geographical area and usually consists of 150-200 households.

Household : a household may be either,

a) a one person household, that is a person who makes provisions for his own 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 provisions for food and other essentials of living. The persons in the group may pool their incomes and have a common budget to greater or lesser extent. They may be related or unrelated persons, or a combination of both. These persons are taken as members of the household.

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 combination with others.

Holder : a holder is a person who exercises management control over the operations of the agricultural holding and makes the major decision regarding the utilization of the available resources. He has primary 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 the help of others, operates land /or raises livestock in his own right, i.e. the person who decides on which, where, when, and how to grow crops or raise livestock and has the right to determine the utilization of the products.

Holding : a holding is all the land and/or livestock kept which is used wholly or partly for agricultural production and is operated as one legal entity by one person alone, or with others without regard to management, organization, size, or location.

Parcel : a parcel of holding is any piece of land entirely surrounded by land and / or water and / or road and /or forestetc. which is not part of the holding. It may consist of one or more cadastral units, plots or fields 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 or mixed crops or any other form of private holding.

Meher (main) season crop : any crop harvested between Meskerem (September) and Yekatit (February) is considered as Meher season crop.

Belg season crop : any crop harvested between the months of Megabit (March) and Nehase (August).

Temporary crops : temporary crops are crops which are grown in less than a year's time, sometimes only a few months with an objective to sow or replant again for additional production following the current harvest. Continuously grown crops planted in rotation are also considered temporary crops since each is harvested and destroyed by ploughing in preparation for each successive crop.

Permanent crops are crops which are grown and occupy land for a long period of time, not requiring replanting for several years after each harvest, are considered permanent crops. All fruit trees (i.e. oranges, mandarins, banana, etc.) and tree crops (i.e. coffee, tea, etc.) are considered permanent crops, but meadows and pastures are excluded.

3. Sample Design

The 1999/2000 (1992 E.C.) Meher season Agricultural Sample Survey covered the rural part of the country except two zones in Afar region and six zones in Somalie region that are predominantly nomadic. A two-stage stratified sample design was used to select the sample. Each zone/special wereda was adopted as stratum for which major findings of the survey are reported except the four regions; namely, Gambela, Harari, Addis Ababa and Dire Dawa which were considered as strata/reporting levels. The primary sampling units (PSUs) were enumeration areas (EAs) and agricultural households were the secondary sampling units.

The survey questionnaires were administered to all agricultural holders within the sample households. A fixed number of sample EAs was

determined for each stratum/reporting level based on precision of major estimates and cost considerations. Within each stratum EAs were selected using probability proportional to size; size being total number of households in the EAs as obtained from the 1994 Population and Housing Census. From each sample EA, 40 agricultural households were systematically selected for the annual agricultural sample survey from a fresh list of households prepared at the beginning of the field work of the annual agricultural survey. Of the forty agricultural households, the first twenty five were used for obtaining information on area under crops, Meher and Belg season production of crops, land use, agricultural practices, crop damage, and quantity of agricultural inputs used. It is important to note that of the total forty agricultural households sampled in each of the selected EAs, data on crop cutting were collected for only the fifteen households (11th-25th households selected).

A total of 1,450 EAs (2.9 % of the total EAs in the rural areas of the country) were selected for the survey. However 5 EAs were closed for various reasons beyond the control of the Authority and the survey succeeded in covering 1445 (99.7 %) EAs. With respect to ultimate sampling units, for the Meher season agricultural sample survey, it was planned to cover 36,250 agricultural households. The response rate was found to be 98.5 %. Estimation procedures of parameters of interest (total and ratio) and their sampling error is presented in Appendix I. Distribution of the number of sampling units sampled and covered by strata is given in Appendix III.

4. Field Organization

All the 22 branch offices of the CSA participated in the survey undertaking, especially in organizing the second stage training, in deploying the field staff to their respective sites of assignment, in supervising the data collection, and retrieving completed questionnaires and submitting them to the head office for data processing. They were also responsible in administering the financial and logistic aspect of the survey within the areas of their assignment. In the data collection of the survey, a total of 1559 enumerators and 331 field supervisors were involved with an average supervisor-enumerator ratio of 1-to-5. To accomplish the data collection operation, all the enumerators were supplied with the necessary survey equipments at the completion of the training. To assist the data collection activities in deployment, supervision and retrieval of completed questionnaires, a total of 123 four-wheel vehicles were used. The following table shows distribution of the field staff and vehicles by branch offices.

**TABLE B : DISTRIBUTION OF FIELD STAFF AND VEHICLES
BY BRANCH OFFICES**

Branch office	Number of		
	Enumerators	Supervisors	Vehicles
Mekele	103	22	7
Asayita	66	15	5
Gondar	75	16	6
Debre Markos	94	20	8
Dessie	94	20	7
Debre Birhan	61	13	5
Nazreth	50	11	4
Ambo	66	15	5
Nekemte	66	15	6
Jima	66	15	7
Goba	49	12	4
Asebe Teferi	50	11	4
Jijiga	66	15	4
Asosa	84	19	6
Awasa	112	22	8
Mizan Teferi	66	14	6
Arba Minch	122	22	8
Hosana	127	25	7
Gambela	33	7	5
Harar	49	10	4
Addis Ababa	28	6	4
Dire Dawa	33	6	3
Total	1559	331	123

5. Training of Field Staff

The field staff training program was carried out in two stages. The first stage consisted of training of staff from the head office, Branch Statistical Office Heads and senior field supervisors. This training was given for a period of one week at CSA's headquarters in Addis Ababa. Many of these personnel trained in the first stage were assigned to conduct similar training for field supervisors and enumerators for fifteen days in all the twenty-two CSA Branch Statistical Offices which are distributed all over the country. During this second stage of training, the field staff were given detailed classroom instruction on the objectives and uses of the AgSS, concepts and definitions of terms used, the method of area measurement, method of crop cutting, correct interviewing procedures, ... etc. The training of the enumerators and supervisors also included field practice to reinforce the understanding of the concepts, definitions and theories discussed in the classroom with regard to field measurement and crop cutting methods.

6 .Method of Data Collection

In the 1999/2000 AgSS data on area and production were recorded on questionnaires using both subjective and objective enumeration methods. Information on agricultural practices (application of fertilizers, pesticides, use of improved seeds and irrigation) were collected both subjectively and objectively by interviewing the holders and measuring items in each sampled household.

The objective measurement procedures for area measurement were carried out for the twenty-five selected agricultural households from each sampled EA. This required that all separate fields by land area utilization be physically measured using compass and measuring tape. In addition, for all fields under temporary crops of each holder of the last fifteen sampled households, each was classified by type of crop and for selected major crops a field was randomly selected for each crop for crop cutting to be performed. Crop cutting procedures consist of demarcation of a sixteen square meter plot randomly located in the selected field for which the crop in the field is to be harvested.

Following the field enumerator's harvest of the crop cutting plot and threshing, the crop is stored in bags with identification information (i.e. name of the crop, holder's number, parcel and field numbers). The crop placed in the bag is weighed immediately (green weight) after threshing, and weighed again after two weeks of drying to simulate normal holder harvesting and drying practices. The green and dry weights are recorded on the respective forms.

7. Data Processing

7.1 Editing, Coding and Verification

In order to insure the quality of the collected survey data an editing, coding and verification instruction manual was prepared and printed. Then 35 editors-coders and 20 verifiers were trained for two days in the editing, coding and verification operation using the aforementioned manual as a

reference and teaching aid. The completed questionnaires were edited, coded and later verified on a 100% basis before the questionnaires were passed over to the data entry unit. The editing, coding and verification exercise of all questionnaires was completed in about 40 days.

7.2 Data Entry, Cleaning and Tabulation

Before starting data entry, professional staff of Agricultural Statistics Department prepared edit specifications for use on personal computers utilizing the Integrated Microcomputer Processing System (IMPS) software for data consistency checking purposes. The data on the coded questionnaires were then entered into personal computers using IMPS software. The data were then checked and cleaned using the edit specifications prepared earlier for this purpose. The data entry operation involved about 35 data encoders and it took 30 days to complete the job. Finally, tabulation was done on personal computers to produce results as indicated in the tabulation plan.

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PART III

SUMMARY OF THE SURVEY RESULTS

1. Area and Production

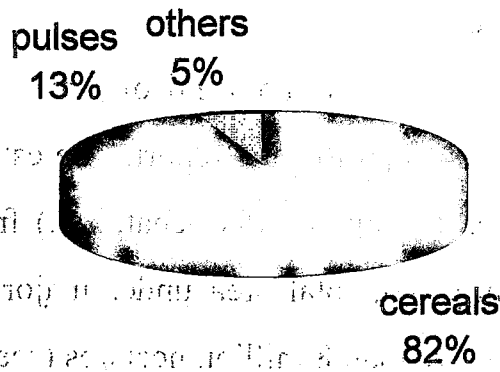
The results for area, production and yield of major crops (temporary or annual) are presented in this part of the report. The estimates for the major twenty crops exclude cash crops (coffee, chat, etc.) fruits, vegetables and root crops. Consequently, the total area under major temporary crops is estimated to be a little more than 8 million hectares (see Table C) at country level for the Meher season of 1999/2000 (1992 E.C).

Out of the total crop area, cereals accounted for about 6.7 million hectares (82.1%), while pulses and other crops (nueg, linseed, rapeseed, ground nuts, sunflower, sesame and fenugreek) accounted for about 1.0 million hectares (12.7%) and 0.4 million hectares (5.2%), respectively. Looking at specific crops, the largest area, or about 2.1 million hectares, is reported for Teff followed by maize and sorghum. For details refer to Table 1.

Table C Summary Estimates of Area, Production and Yield of Major Crops for the Year 1999/2000 (1992 E.C)

Crop type	Area in million hectares		Production in million quintals		Yield
	number	percent	number	percent	qt / hectare
Cereals	6.75	82	77.41	87	11.47
Pulses	1.04	13	9.59	11	9.18
Other crops	0.42	5	1.90	2	4.49
Total	8.21	100	88.90	100	-

**Fig.1 Estimates of Area Under Major Crops For Private Peasant Holdings:
National 1999/2000 (1992 E.C)**



**Fig.2 Estimates of Production for Major Crops for Private Peasant Holdings:
National 1999/2000 (1992 E.C)**

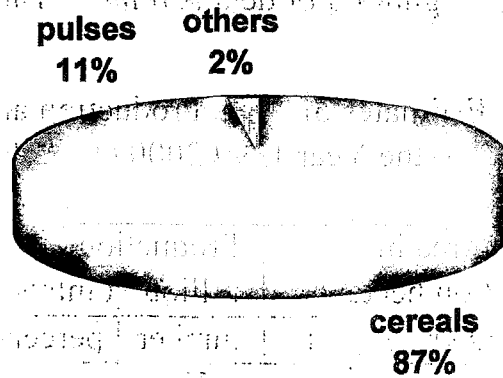


Table 1. Estimates of Area, Production and Yield of Major Crops for Private Peasant Holdings 1999/2000 (1992 E.C.)

National

CROP TYPE	TOTAL AREA		TOTAL PRODUCTION		YIELD (QT/HA)
	('000 hectare)	%	('000 quintal)	%	
Cereals	6,747.47	82.12	77,412.63	87.07	11.47
Teff	2,123.47	25.84	17,175.62	19.32	8.09
Barley	794.10	9.66	7,419.28	8.34	9.34
Wheat	1,025.31	12.48	12,126.25	13.64	11.83
Maize	1,407.27	17.13	25,254.71	28.40	17.95
Sorghum	995.41	12.11	11,811.43	13.28	11.87
Millet	360.23	4.38	3,195.09	3.59	8.87
Oats	41.67	.51	430.25	.48	10.33
Pulses	1,044.97	12.72	9,594.49	10.79	9.18
Horse Beans	359.15	4.37	3,886.82	4.37	10.82
Field Peas	152.20	1.85	1,159.98	1.30	7.62
Haricot Beans	166.04	2.02	1,328.88	1.49	8.00
Chick Peas	184.79	2.25	1,646.27	1.85	8.91
Lentils	72.22	.88	497.71	.56	6.89
Vetch	110.58	1.35	1,074.83	1.21	9.72
Others	424.26	5.16	1,902.84	2.14	4.49
Neug	256.53	3.12	1,021.70	1.15	3.98
Linseed	74.12	.90	321.38	.36	4.34
Rapeseed	20.38	.25	139.05	.16	6.82
Ground Nuts	13.55	.16	119.29	.13	8.80
Sunflower	5.23	.06	37.15	.04	7.10
Sesame	38.19	.46	156.34	.18	4.09
Fenugreek	16.26	.20	107.93	.12	6.64
All Crops	8,216.70	100.00	88,909.96	100.00	-

The total production estimate at country level is about 88.90 million quintals, of which cereals accounted for 77.41 million quintals, pulses accounted for about 9.59 million quintals, and other crops (mentioned above) totaled to 1.9 million quintals. (see Table C).

The survey results also indicate that the yield of cereals was 11.47 quintals per hectare, the yield of pulses was 9.18 quintals per hectare and the yield of other crops (mentioned above) was 4.49 quintals per hectare. In Table 1 it is also shown that the highest yield is reported for maize, which was 17.95 quintals per hectare, and the lowest is for nueg at 3.98 quintals per hectare.

As shown in Table 2 total area cultivated and total production have increased by 2.50% and 3.58%, respectively compared to last crop season, i.e. 1998/99.

The 1999/2000 AgSS design increased the number of sampling units in some of the reporting levels in order to come up with relatively more reliable survey estimates at the regional and zonal levels. Comparing the AgSS estimates at the regional level the data in Table 3 illustrates the variation in yield of Ethiopian agriculture.