

**THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA  
CENTRAL STATISTICAL AUTHORITY**

**AGRICULTURAL SAMPLE SURVEY  
1997/98 (1990 E.C.)**

**VOLUME III**

REPORT ON  
**FARM MANAGEMENT PRACTICES**

(PRIVATE PEASANT HOLDINGS, MEHER SEASON)

ADDIS ABABA

SEPTEMBER, 1998

---

193

STATISTICAL BULLETIN

193

---

**PREPARED AND PRINTED BY  
CENTRAL STATISTICAL AUTHORITY  
P.O.BOX 1143 ADDIS ABABA  
Tel. 55-30-11**

## TABLE OF CONTENTS

	<u>Page</u>
List of Tables.....	iii
List of Figures.....	xiii
<b>PART I. INTRODUCTION AND OBJECTIVES OF THE SURVEY</b>	
1. Introduction.....	1
2. Objective of the Survey .....	2
<b>PART II. SURVEY METHODOLOGY, DATA COLLECTION AND PROCESSING</b>	
1. Scope, Coverage and Content of the Survey .....	3
2. Concepts and Definitions.....	5
3. Sample Design .....	7
4. Field Organization .....	8
5. Training of Field Staff .....	9
6. Method of Data Collection .....	9
7. Data Processing.....	10
a) Editing, Coding and Verification .....	10
b) Data Entry, Cleaning and Tabulation.....	10
<b>PART III. SUMMARY OF THE SURVEY RESULTS.</b>	
1. Area Under Different Farm Management Practices .....	13
1.1 Total Fertilizer Applied Area.....	14
1.2 Total Pesticide Applied Area.....	15
1.3 Total Improved Seed Applied Area.....	15
1.4 Total Irrigated Area.....	16
2. Total Fertilizer Applied Area by Type of Fertilizer and Crop .....	80
2.1 Natural Fertilizer Applied Area .....	81
2.2 DAP Applied Area .....	81
2.3 UREA Applied Area .....	81
2.4 Area with a Combination of DAP and UREA Applied.....	82
2.5 Area with a Combination of Natural and Commercial Fertilizer Applied .....	82
3. Quantity of Commercial Fertilizer Applied by Type .....	144
3.1 Quantity of DAP Applied .....	144
3.2 Quantity of UREA Applied .....	145
3.3 Quantity of DAP and UREA Applied in Mix.....	145
3.4 Quantity of Commercial and Natural Fertilizers Applied in Mix....	145

4. Quantity of Local and Improved Seeds used by Type of Crop..... 205

5. Number of Holders Who Applied Agricultural Inputs on their fields by their Educational Attainment..... 238

Appendix I. Estimation Procedures and Formulations for Estimates of Totals and Variance.....301

Appendix II. Estimates of the Standard Errors with the Corresponding Coefficient of Variations ..... 307

Appendix III. Survey Questionnaires.....357

## LIST OF TABLES

	<u>Page</u>
Estimates of Improved Seed, Irrigation, Pesticides and Fertilizer applied area and their percentage distribution by crop for Meher season of private peasant holdings, 1997/98 (1990 E.C)	
Table 1.1 NATIONAL.....	17
Table 1.2 NATIONAL - REGION.....	18
Table 1.3 TIGRAY.....	20
Table 1.3.1 West Tigray Zone.....	21
Table 1.3.2 Central Tigray Zone.....	22
Table 1.3.3 East Tigray Zone.....	23
Table 1.3.4 South Tigray Zone.....	24
Table 1.4 AFAR.....	25
Table 1.4.1 Zone 1 Zone.....	26
Table 1.4.2 Zone 3 Zone.....	27
Table 1.4.3 Zone 5 Zone.....	28
Table 1.5 AMHARA.....	29
Table 1.5.1 North Gonder Zone.....	30
Table 1.5.2 South Gonder Zone.....	31
Table 1.5.3 North Wolo Zone.....	32
Table 1.5.4 South Wolo Zone.....	33
Table 1.5.5 North Shewa Zone.....	34
Table 1.5.6 East Gojam Zone.....	35
Table 1.5.7 West Gojam Zone.....	36
Table 1.5.8 Waghamera Zone.....	37
Table 1.5.9 Agewawi Zone.....	38
Table 1.5.10 Oromiya Zone.....	39
Table 1.6 OROMIYA.....	40
Table 1.6.1 West Welega Zone.....	41
Table 1.6.2 East Welega Zone.....	42
Table 1.6.3 Ilibabor Zone.....	43
Table 1.6.4 Jimma Zone.....	44
Table 1.6.5 West Shewa Zone.....	45
Table 1.6.6 North Shewa Zone.....	46
Table 1.6.7 East Sheawa Zone.....	47
Table 1.6.8 Arsi Zone.....	48

	<u>Page</u>
Table 1.6.9 West Harerge Zone .....	49
Table 1.6.10 East Harerge Zone .....	50
Table 1.6.11 Bale Zone .....	51
Table 1.6.12 Borena Zone .....	52
Table 1.7 SOMALE .....	53
Table 1.7.1 Shinele Zone .....	54
Table 1.7.2 Jijiga Zone.....	55
Table 1.7.3 Moyale Zone .....	56
Table 1.8 BENSHANGUL - GUMUZ .....	57
Table 1.8.1 Metekel Zone .....	58
Table 1.8.2 Asosa Zone .....	59
Table 1.8.3 Kemeshi Zone.....	60
Table 1.9 S.N.N.P.R.....	61
Table 1.9.1 Gurage Zone .....	62
Table 1.9.2 Hadiya Zone.....	63
Table 1.9.3 Kembata Alaba Tembaro Zone.....	64
Table 1.9.4 Sidama Zone .....	65
Table 1.9.5 Gedio Zone .....	66
Table 1.9.6 North Omo Zone.....	67
Table 1.9.7 South Omo Zone.....	68
Table 1.9.8 Keficho- Shekicho Zone.....	69
Table 1.9.9 Bench-Maje Zone .....	70
Table 1.9.10 Yem Special Wereda Zone.....	71
Table 1.9.11 Amaro Special Wereda Zone.....	72
Table 1.9.12 Burji Special Wereda Zone.....	73
Table 1.9.13 Konso Special Wereda Zone .....	74
Table 1.9.14 Derashe Special Wereda Zone.....	75
Table 1.10. GAMBELA.....	76
Table 1.11. HARARI .....	77
Table 1.12. ADDIS ABABA .....	78
Table 1.13. DIRE DAWA.....	79

Estimates of Fertilizer Applied Area by  
Type of Fertilizer for Meher Season  
Crops of Private Peasant Holdings.

Table 2.1	NATIONAL .....	83
Table 2.2	NATIONAL - REGION .....	84
Table 2.3	TIGRAY.....	86
Table 2.3.1	West Tigray Zone .....	87
Table 2.3.2	Central Tigray Zone.....	88
Table 2.3.3	East Tigray Zone.....	89
Table 2.3.4	South Tigray Zone .....	90
Table 2.4	AFAR.....	91
Table 2.4.1	Zone 1 Zone .....	92
Table 2.5	AMHARA.....	93
Table 2.5.1	North Gonder Zone.....	94
Table 2.5.2	South Gonder Zone.....	95
Table 2.5.3	North Wolo Zone.....	96
Table 2.5.4	South Wolo Zone.....	97
Table 2.5.5	North Shewa Zone .....	98
Table 2.5.6	East Gojam Zone .....	99
Table 2.5.7	West Gojam Zone.....	100
Table 2.5.8	Waghamera Zone.....	101
Table 2.5.9	Agewawi Zone.....	102
Table 2.5.10	Oromiya Zone.....	103
Table 2.6	OROMIYA.....	104
Table 2.6.1	West Welega Zone.....	105
Table 2.6.2	East Welega Zone .....	106
Table 2.6.3	Ilibabor Zone.....	107
Table 2.6.4	Jimma Zone.....	108
Table 2.6.5	West Shewa Zone .....	109
Table 2.6.6	North Shewa Zone.....	110
Table 2.6.7	East Sheawa Zone.....	111
Table 2.6.8	Arsi Zone .....	112
Table 2.6.9	West Harerge Zone .....	113
Table 2.6.10	East Harerge Zone .....	114

	<u>Page</u>
Table 2.6.11 Bale Zone.....	115
Table 2.6.12 Borena Zone.....	116
Table 2.7 SOMALE.....	117
Table 2.7.1 Shinele Zone.....	118
Table 2.7.2 Jijiga Zone.....	119
Table 2.7.3 Moyale Zone.....	120
Table 2.8 BENSHANGUL - GUMUZ.....	121
Table 2.8.1 Metekel Zone.....	122
Table 2.8.2 Asosa Zone.....	123
Table 2.8.3 Kemeshi Zone.....	124
Table 2.9 S.N.N.P.R.....	125
Table 2.9.1 Gurage Zone.....	126
Table 2.9.2 Hadiya Zone.....	127
Table 2.9.3 Kembata Alaba Tembaro Zone.....	128
Table 2.9.4 Sidama Zone.....	129
Table 2.9.5 Gedio Zone.....	130
Table 2.9.6 North Omo Zone.....	131
Table 2.9.7 South Omo Zone.....	132
Table 2.9.8 Keficho- Shekicho Zone.....	133
Table 2.9.9 Bench-Maje Zone.....	134
Table 2.9.10 Yem Special Wereda Zone.....	135
Table 2.9.11 Amaro Special Wereda Zone.....	136
Table 2.9.12 Burji Special Wereda Zone.....	137
Table 2.9.13 Konso Special Wereda Zone.....	138
Table 2.9.14 Derashe Special Wereda Zone.....	139
Table 2.10. GAMBELA.....	140
Table 2.11. HARARI.....	141
Table 2.12. ADDIS ABABA.....	142
Table 2.13. DIRE DAWA.....	143

**Estimates of Quantity of Commercial Fertilizer  
by Type of Fertilizer for Meher Season  
Crops of Private Peasant Holdings**

Table 3.1	NATIONAL.....	146
Table 3.2	NATIONAL - REGION.....	148
Table 3.3	TIGRAY.....	150
Table 3.3.1	West Tigray Zone.....	151
Table 3.3.2	Central Tigray Zone.....	152
Table 3.3.3	East Tigray Zone.....	153
Table 3.3.4	South Tigray Zone.....	154
Table 3.4	AMHARA.....	155
Table 3.4.1	North Gonder Zone.....	156
Table 3.4.2	South Gonder Zone.....	157
Table 3.4.3	North Wolo Zone.....	158
Table 3.4.4	South Wolo Zone.....	159
Table 3.4.5	North Shewa Zone.....	160
Table 3.4.6	East Gojam Zone.....	161
Table 3.4.7	West Gojam Zone.....	162
Table 3.4.8	Waghamera Zone.....	163
Table 3.4.9	Agewawi Zone.....	164
Table 3.4.10	Oromiya Zone.....	165
Table 3.5	OROMIYA.....	166
Table 3.5.1	West Welega Zone.....	167
Table 3.5.2	East Welega Zone.....	168
Table 3.5.3	Ilibabor Zone.....	169
Table 3.5.4	Jimma Zone.....	170
Table 3.5.5	West Shewa Zone.....	171
Table 3.5.6	North Shewa Zone.....	172
Table 3.5.7	East Sheawa Zone.....	173
Table 3.5.8	Arsi Zone.....	174
Table 3.5.9	West Harerge Zone.....	175
Table 3.5.10	East Harerge Zone.....	176
Table 3.5.11	Bale Zone.....	177
Table 3.5.12	Borena Zone.....	178

	<u>Page</u>
Table 3.6 SOMALE .....	179
Table 3.6.1 Shinele Zone .....	180
Table 3.6.2 Jijiga Zone.....	181
Table 3.7 BENSHANGUL - GUMUZ .....	182
Table 3.7.1 Metekel Zone .....	183
Table 3.7.2 Asosa Zone .....	184
Table 3.7.3 Kemeshi Zone .....	185
Table 3.8 S.N.N.P.R.....	186
Table 3.8.1 Gurage Zone .....	187
Table 3.8.2 Hadiya Zone.....	188
Table 3.8.3 Kembata Alaba Tembaro Zone.....	189
Table 3.8.4 Sidama Zone .....	190
Table 3.8.5 Gedio Zone .....	191
Table 3.8.6 North Omo Zone.....	192
Table 3.8.7 South Omo Zone.....	193
Table 3.8.8 Keficho- Shekicho Zone.....	194
Table 3.8.9 Bench-Maje Zone .....	195
Table 3.8.10 Yem Special Wereda Zone .....	196
Table 3.8.11 Amaro Special Wereda Zone.....	197
Table 3.8.12 Burji Special Wereda Zone.....	198
Table 3.8.13 Konso Special Wereda Zone .....	199
Table 3.8.14 Derashe Special Wereda Zone.....	200
Table 3.9. GAMBELA.....	201
Table 3.10. HARARI .....	202
Table 3.11. ADDIS ABABA .....	203
Table 3.12. DIRE DAWA.....	204

Estimates of Quantity of Improved Seed and  
Local Seed by Type of Crops for Private Peasant  
Holdings.

Table 4.1	NATIONAL .....	206
Table 4.2	NATIONAL - REGION .....	206
Table 4.3	TIGRAY .....	208
Table 4.3.1	West Tigray Zone .....	208
Table 4.3.2	Central Tigray Zone .....	209
Table 4.3.3	East Tigray Zone .....	209
Table 4.3.4	South Tigray Zone .....	210
Table 4.4	AFAR .....	210
Table 4.4.1	Zone 1 Zone .....	211
Table 4.4.2	Zone 3 Zone .....	211
Table 4.4.3	Zone 5 Zone .....	212
Table 4.5	AMHARA .....	212
Table 4.5.1	North Gonder Zone .....	213
Table 4.5.2	South Gonder Zone .....	213
Table 4.5.3	North Wolo Zone .....	214
Table 4.5.4	South Wolo Zone .....	214
Table 4.5.5	North Shewa Zone .....	215
Table 4.5.6	East Gojam Zone .....	215
Table 4.5.7	West Gojam Zone .....	216
Table 4.5.8	Waghamera Zone .....	216
Table 4.5.9	Agewawi Zone .....	217
Table 4.5.10	Oromiya Zone .....	217
Table 4.6	OROMIYA .....	218
Table 4.6.1	West Welega Zone .....	218
Table 4.6.2	East Welega Zone .....	219
Table 4.6.3	Ilibabor Zone .....	219
Table 4.6.4	Jimma Zone .....	220
Table 4.6.5	West Shewa Zone .....	220
Table 4.6.6	North Shewa Zone .....	221
Table 4.6.7	East Sheawa Zone .....	221
Table 4.6.8	Arsi Zone .....	222

	<u>Page</u>
Table 4.6.9 West Harerge Zone .....	222
Table 4.6.10 East Harerge Zone .....	223
Table 4.6.11 Bale Zone .....	223
Table 4.6.12 Borena Zone .....	224
Table 4.7 SOMALE .....	224
Table 4.7.1 Shinele Zone .....	225
Table 4.7.2 Jijiga Zone .....	225
Table 4.7.3 Moyale Zone .....	226
Table 4.8 BENSANGUL - GUMUZ .....	226
Table 4.8.1 Metekel Zone .....	227
Table 4.8.2 Asosa Zone .....	227
Table 4.8.3 Kemeshi Zone .....	228
Table 4.9 S.N.N.P.R. ....	228
Table 4.9.1 Gurage Zone .....	229
Table 4.9.2 Hadiya Zone .....	229
Table 4.9.3 Kembata Alaba Tembaro Zone .....	230
Table 4.9.4 Sidama Zone .....	230
Table 4.9.5 Gedio Zone .....	231
Table 4.9.6 North Omo Zone .....	231
Table 4.9.7 South Omo Zone .....	232
Table 4.9.8 Keficho- Shekicho Zone .....	232
Table 4.9.9 Bench-Maje Zone .....	233
Table 4.9.10 Yem Special Wereda Zone .....	233
Table 4.9.11 Amaro Special Wereda Zone .....	234
Table 4.9.12 Burji Special Wereda Zone .....	234
Table 4.9.13 Konso Special Wereda Zone .....	235
Table 4.9.14 Derashe Special Wereda Zone .....	235
Table 4.10. GAMBELA .....	236
Table 4.11. HARARI .....	236
Table 4.12. ADDIS ABABA .....	237
Table 4.13. DIRE DAWA .....	237

Number of Holders who Applied Agricultural Practices on their fields by Educational Attainment for Private Peasant Holdings.

Table 5.1	NATIONAL .....	239
Table 5.2	NATIONAL - REGION .....	240
Table 5.3	TIGRAY.....	241
Table 5.3.1	West Tigray Zone .....	242
Table 5.3.2	Central Tigray Zone.....	243
Table 5.3.3	East Tigray Zone.....	244
Table 5.3.4	South Tigray Zone .....	245
Table 5.4	AFAR.....	246
Table 5.4.1	Zone 1 Zone.....	247
Table 5.4.2	Zone 3 Zone .....	248
Table 5.4.3	Zone 5 Zone .....	249
Table 5.5	AMHARA.....	250
Table 5.5.1	North Gonder Zone.....	251
Table 5.5.2	South Gonder Zone.....	252
Table 5.5.3	North Wolo Zone .....	253
Table 5.5.4	South Wolo Zone.....	254
Table 5.5.5	North Shewa Zone .....	255
Table 5.5.6	East Gojam Zone .....	256
Table 5.5.7	West Gojam Zone.....	257
Table 5.5.8	Waghamera Zone.....	258
Table 5.5.9	Agewawi Zone.....	259
Table 5.5.10	Oromiya Zone.....	260
Table 5.6	OROMIYA.....	261
Table 5.6.1	West Welega Zone.....	262
Table 5.6.2	East Welega Zone .....	263
Table 5.6.3	Ilibabor Zone.....	264
Table 5.6.4	Jimma Zone.....	265
Table 5.6.5	West Shewa Zone .....	266
Table 5.6.6	North Shewa Zone .....	267

	<u>Page</u>
Table 5.6.7 East Sheawa Zone.....	268
Table 5.6.8 Arsi Zone .....	269
Table 5.6.9 West Harerge Zone.....	270
Table 5.6.10 East Harerge Zone .....	271
Table 5.6.11 Bale Zone.....	272
Table 5.6.12 Borena Zone.....	273
Table 5.7 SOMALE .....	274
Table 5.7.1 Shinele Zone .....	275
Table 5.7.2 Jijiga Zone.....	276
Table 5.7.3 Moyale Zone.....	277
Table 5.8 BENSHANGUL - GUMUZ .....	278
Table 5.8.1 Metekel Zone .....	279
Table 5.8.2 Asosa Zone .....	280
Table 5.8.3 Kemeshi Zone.....	281
Table 5.9 S.N.N.P.R.....	282
Table 5.9.1 Gurage Zone .....	283
Table 5.9.2 Hadiya Zone.....	284
Table 5.9.3 Kembata Alaba Tembaro Zone.....	285
Table 5.9.4 Sidama Zone .....	286
Table 5.9.5 Gedio Zone .....	287
Table 5.9.6 North Omo Zone.....	288
Table 5.9.7 South Omo Zone.....	289
Table 5.9.8 Keficho- Shekicho Zone.....	290
Table 5.9.9 Bench-Maje Zone .....	291
Table 5.9.10 Yem Special Wereda Zone .....	292
Table 5.9.11 Amaro Special Wereda Zone.....	293
Table 5.9.12 Burji Special Wereda Zone.....	294
Table 5.9.13 Konso Special Wereda Zone .....	295
Table 5.9.14 Derashe Special Wereda Zone.....	296
Table 5.10. GAMBELA.....	297
Table 5.11. HARARI .....	298
Table 5.12. ADDIS ABABA .....	299
Table 5.13. DIRE DAWA.....	300

## LIST OF FIGURES

	<u>Page</u>
Figure 1. Estimates of Improved Seed, Irrigation, Pesticide and Fertilizer Applied Area for Major Crops of Private Peasant Holdings, NATIONAL, 1997/98 (1990 E.C).....	19
Figure 2. Estimates of Fertilizers Applied Area by Type of Fertilizers for Major Crops of Private Peasant Holdings, NATIONAL, 1997/98 (1990 E.C).....	84
Figure 3. Estimates of Quantity of Commercial Fertilizer Applied by Type for Major Crops of Private Peasant Holdings, NATIONAL, 1997/98 (1990 E.C).....	147
Figure 4. Estimates of Quantity of DAP and UREA used by Region 1997/98 (1990 E.C).....	149
Figure 5. Estimates of Quantity of Seed by Type and Region, 1997/98 (1990 E.C) .....	207

194

... ..  
... ..  
... ..

... ..  
... ..  
... ..

... ..  
... ..  
... ..

... ..  
... ..  
... ..

... ..  
... ..  
... ..

... ..  
... ..  
... ..

... ..  
... ..  
... ..

... ..  
... ..  
... ..

... ..  
... ..  
... ..

... ..  
... ..  
... ..

... ..  
... ..  
... ..

## **PART I**

### **INTRODUCTION AND OBJECTIVES OF THE SURVEY**

#### **1. INTRODUCTION**

Agriculture contributes enormously to the Ethiopian economy. A significant amount of the Gross Domestic Product (GDP) is obtained from the agricultural sector of the economy while engaging the majority of the population. The collection of reliable, comprehensive and timely statistical information is thus essential for policy and decision making, as well as for other uses. In this regard, the Central Statistical Authority (CSA) has exerted every effort to provide policy makers and other users with reliable and timely agricultural data.

This report presents survey results on agricultural practices such as use of improved seeds, irrigation, application of pesticides and fertilizers within the private peasant sector of the economy. The report includes the objectives of this annual survey, while outlining the scope, coverage, and content of the survey; sample design; field organization; training of field staff; method of data collection; survey estimates of farm inputs applied to area as well as the quantity of inputs applied. Estimation procedures and formulations for estimates of totals and variance for the agricultural practices during the main (Meher) season are presented in Appendix I. Estimates of the standard errors with the corresponding coefficient of

variations (CVs) for farm inputs applied to area and quantity of inputs applied are presented in Appendix II and survey questionnaires in Appendix III.

## **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 assistance, etc. The AgSS is composed of four components: a forecast survey of ten households, a Meher season survey of twenty-five households, a livestock survey of forty households, and a survey of the Belg season crop area and production.

In particular, the objectives of the Meher season farm management practices survey are to estimate the total farm inputs applied area and quantity of inputs applied by type for major temporary and permanent crops. This report is based on the private peasant holdings in the sedentary rural areas of the country, further divided by regions and zones.

## **PART II**

### **SURVEY METHODOLOGY, DATA COLLECTION AND PROCESSING**

#### **1. SCOPE, COVERAGE AND CONTENT OF THE SURVEY.**

The 1997/98 (1990 E.C.) annual Agricultural Sample Survey used a sampling frame 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 break down of the sample distribution as expressed by regions, zones and weredas. A total of 56 zones and 409 weredas were actually covered by the survey.

The lowest level sampling unit used for this survey is defined as an Enumeration Area (EA) as identified for the 1994 Population Census. For the AgSS a total of 1420 EAs were selected from all regions of the country. Due to various reasons, 71 of them were incompletely enumerated which resulted in covering 1349 EAs. From each of the selected EAs a representative sample of 40 agricultural households were selected to estimate the various agricultural population items of interest of the sampled EA.

Of these 40 agricultural households, the first 25 were used for obtaining information on area under crops, Meher and Belg season production of major crops, land utilization, agricultural practices, crop damage, and quantity of agricultural inputs used.