THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

CENTRAL STATISTICAL AGENCY

AGRICULTURAL SAMPLE SURVERY

2009/10 (2002 E.C) VOLUME V

REPORT ON AREA AND PRODUCTION OF BELG SEASON CROPS FOR

PRIVATE PEASANT HOLDINGS

ADDIS ABABA
OCTOBER 2010

STATISTICAL BULLETIN

PAGE

CONTENTS

LIST OF TABELS

LIST OF FIGURES

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 about 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. This would be materialized 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, and fertilizers 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 annual 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 2009/10 (2002

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 2009/10 Belg season by private peasant holdings as obtained from the results of the 2009/10 (2002 E.C.), Belg Season Crop Production Sample Survey.

1.2 Objectives of the Survey

The objectives of the **2009/10 (2002 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, 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 2009/10 (2002 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 1,200 Enumeration Areas (EAs) were selected. However, due to various reasons that are beyond control, in 96 EAs the survey could not be successful and hence interrupted. Thus, all in all the survey succeeded to cover 1104 EAs throughout the regions. The Annual Agricultural Sample survey (Belg season) data was collected from 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 2009/10 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 2009/10 (2002 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, …etc). To assist with the field work 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 for12 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 2009/10 (2002 E.C.), Belg crop production by region.

A major characteristic of Ethiopian agriculture is the existence of two well-known crop production seasons referred to as the Meher (or main) and Belg(short rain) Seasons. The generally accepted definition of the Meher season is that of the long rainy season, which normally occurs from June to

September. The Belg Season most often refers to small but timely rainy season, which normally occurs from February to May but in limited areas of the country. Generally, the Meher Season rainy period provides ideal growing conditions for the longer maturing crops. Planting and harvest of Meher crops can extend to December or January in some areas. Most of the time holders rely on short maturing crops for planting during the Belg rainy period and harvest of the crops is in June or July.

A point of contention arises with respect to the pure definition of the Belg crop. Belg cropping practices are heterogeneous across different portions of the country. The nature of the sowing period also overlaps with some of the Meher Season crops. Consequently, the report on Belg Season crops in the past faced a problem of a clearly defined growing period. It is important not to overlook or miss agricultural practices performed all year round due to use of irrigation or soil moister from sufficiently dried areas that from time-to-time are swampy or marshy. To help clarify the two-crop season, the following definition has been in use since 1987/88:

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

This report consists of estimates of area, production and yield of major Belg Season crops for the year 2009/10 (2002 E.C.) The data collection period for obtaining the area, production and agricultural practices of the Belg season crops was from 'Ginbot' 15-30, 2002 E.C. (i.e. From May 23 to June 7, 2010). 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 16 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 manual cleaning of all questionnaires was completed in 24 days.

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 4 supervisors were involved in this total process and it took ten 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 **2009/10 (2002 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, the overall performance of the 2009/10 (2002 E.C.) Belg season crop production activity was found to be good in all Belg Crop producing areas across the country. The timely rain of Belg which was normal and adequate in its amount and distribution coupled with good weather condition among the major factors, had positive effect on the land preparation, and sawing activities, and resulted to the increased Belg crop production as a whole. Consequently, considerable number of Belg season dependent farmers were in better position this year than the previous year . Likewise, it is worth to note that the 2009/10 Belg crops harvest was good in irrigated and in dried marshy areas also .

Based on the facts mentioned above, the results of the 2009/10 (2002 E.C.), Belg season crop production sample survey revealed that about **1,244,408.51** hectares of land was estimated to be covered by major Belg crops from which a total production of **13,165,359.08** quintals was estimated to be harvested at country level, during the 2009/10 (2002 E.C.) Belg season. Out of the above mentioned total Belg season cropland area and total volume of production, **cereals** contributed the lion share both in cropped area coverage and volume of production i.e. about **1,013,667.91** hectares (**81.46%** of the country total Belg cropland area) and about **11,736,424.09** quintals (**89.15 %** of the country total Production), followed by **Pulses** that covered about **221,460.72** hectares (**17.80%**), with a production of **1,427,935.63** quintals (**10.85%).** (For details see Summary Table 1).

Summary Table 1: Cropland Area and Production of Major Belg Crops: Private Peasant Holdings, 2009/10 (2002 E.C.).

Country Level

Crop Category	Total Cropland Area		Total Production	
	in Hectare	%	In Quintals	%
Cereal	*1,013,668*	81.46	***11,736,424***	89.15
Pulses	*221,461*	17.80	***1,427,936***	10.85
Oilseeds	*9,280*	0.75	*	*
Grain Crops	1,244,409	100	***13,165,359***	100

To give bird's eye view on the performance of the 2009/10 Crop production Year, the total estimated Cropland Area and production of Major Crops for all sectors [Private peasant & Commercial Farm holdings] during Main (Meher) and Belg Seasons of the Year is presented as follows;-

	Grain Cropped Area in Ha	Volume of Production obtained in Qts
• **Private holdings in 2009/10 Meher Season**	11,503,249.48	180.758.896
• Private holdings in 2009/10 Belg Season	1,244,408.51	13.165.359.08
• Commercial farms in 2009/10 Meher Season	408,175.26	8.393.447.41
• Commercial farms in 2009/10 Belg Season	7,327.04	138.715.08
Grand Total	***13,163,160.29***	***202,456,417.57***

The details of the above mentioned estimates are presented in Summary Table 4

3.1 Estimates of the 2009/10(2002 E.C) Total Cropland Area and Production of Major Crops Both Seasons (Meher and Belg)

The year 2009/10(2002 E.C.), total cropland area and production of major crops during both seasons, was estimated to be ***12,747,657.99*** hectares and ***193,924,256.08*** quintals, respectively. Out of the above mentioned totals, cereals covered about ***10,246,693.05***hectares (***80.38***% of the total cropland area covered during both seasons) with a production of ***167,078,704.09*** quintals (***86.16***% of the total volume of production of the year); While Pulses and Oilseeds covered about ***1,710,769.17; 790,195.77*** hectares which accounted for about ***13.42***% and ***6.20***% of the total cropland area, respectively. (For the details see Summary Tables 2 and 3).

Summary Table 2. Cropland Area under Major Crops; Private Peasant Holdings 2009/10 (2002 E.C.), Both Seasons:

Country Level

	Total Cropland Area in Hectares during					
	Meher Season		*Belg Season*		*Both seasons Total*	
Crop Type	*Area in Ha*	*%*	*Area in Ha*	*%*	*Area in Ha*	*%*
Cereal	*9,233,025.14*	*80.26*	*1,013,667.91*	*81.46*	*10,246,693.05*	*80.38*
Pulse	*1,489,308.45*	*12.95*	*221,460.72*	*17.80*	*1,710,769.17*	*13.42*
Oilseeds	*780,915.89*	*6.79*	*9,279.88*	*0.75*	*790,195.77*	*6.20*
Total	*11,503,249.48*	*100.00*	*1,244,408.51*	*100.00*	*12,747,657.99*	*100.00*

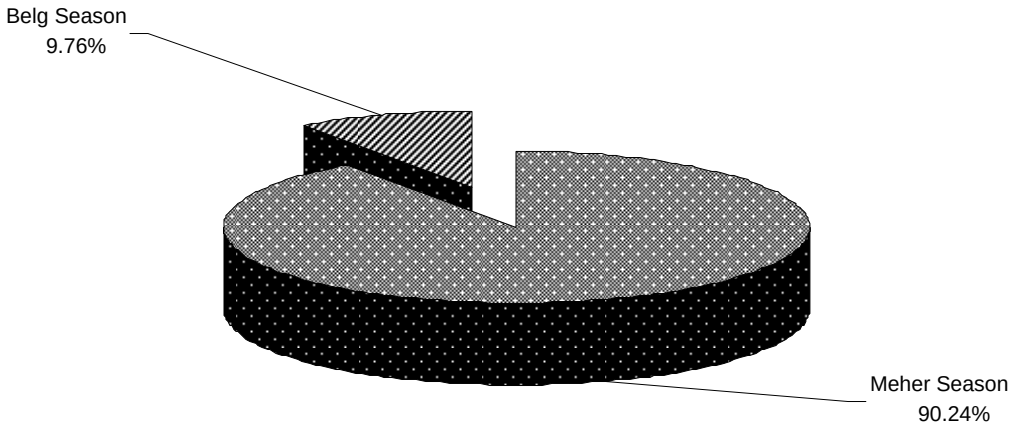
Moreover, since Meher is a long rainy season almost 80 to 90 % of the private peasant farmers perform their crop production activities during this season. As a matter this fact, out of the total cropland area cultivated under major crops during the 2009/10(2002 E.C.) production year, Cropland area cultivated under major crops during Meher Season was found to be the highest i.e, *11,503,249.48* hectares,

Summary Table 3 Total Production of Major Crops Harvested by Private Peasant Holdings; 2009/10 (2002 E.C.), Both Seasons:

Country Level

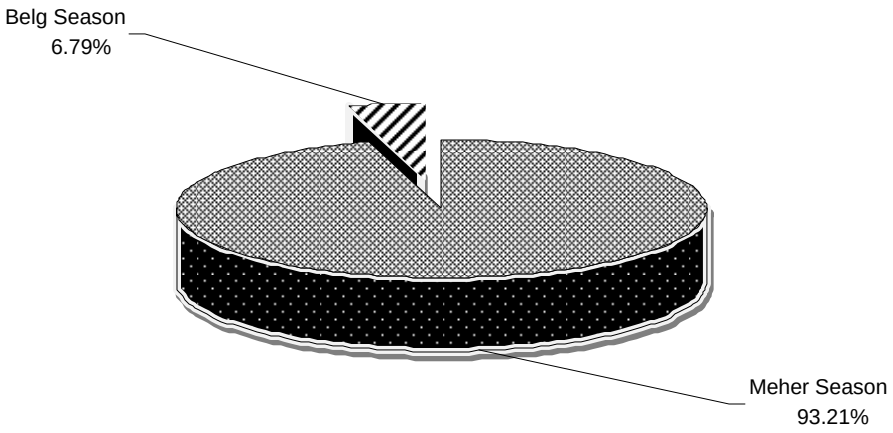
	Total Production in Quintals, Harvested during					
	Meher Season		*Belg Season*		*Both seasons Total*	
Crop Type	*Prod. in Qts*	*%*	*Prod. in Qts*	*%*	*in (000) Qts*	*%*
Cereal	*155,342,280*	*85.94*	1,173,642,4.09	*89.10*	*167,078,704.09*	*86.16*
Pulse	*18,980,473*	*10.50*	1,427,935.63	*10.90*	*20,408,408.63*	*10.52*
Oilseeds	*6,436,144*	*3.56*	*	*	*	*
Total	*180,758,897*	*100.00*	*13,165,359.08*	*100.00*	*193,924,256.08*	*100.00*

Figure 1. Estimate of total area under major crops for private holdings in Ethiopia for both seasons 2009/10 (2002 E.C)



contributing about 90.24% to the total cropland area coverage, with a total production of *180,758,897* quintals(93.21%) at country level. While Belg season contributes the remaining about 9.76%(i.e. ***1,244,408.51*** hectares) to the total cropland area with about 6.79 % (i.e***13,165,359.08*** 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 2009/10 (2002 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.*

THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

CENTRAL STATISTICAL AGENCY

AGRICULTURAL SAMPLE SURVERY

2009/10(2002 E.C), **VOLUME VI**

REPORT ON

FARM MANAGEMENT PRACTICES

FOR BELG/SECOND SEASON CROPS

PRIVATE PEASANT HOLDINGS

ADDIS ABABA
OCTOBER 2010

CONTENTS PAGE

LIST OF TABELS

LIST OF FIGURES

1. INTRODUCTION AND OBJECTIVES OF THE SURVEY

1.1 Introduction

Country's experience showed that farmers' attitude and tendency to adopte and accept new innovations, modern agricultural techniques and technologies, such as use of fertilizers, irrigation, improved seeds and pesticides that help to improve their living standards through attaining enhanced productivity, do have positive impact on the development of the agricultural sector as a whole.

The extent of adopting modern agricultural practices, such as utilization of fertilizer, irrigation, pesticides and improved seeds, by the peasant farmers can be considered as important indicators for estimating the rate of adoption of modern technologies.

This report which is Volume VI of the seven series reports, presents quantitative information about the use of modern agricultural inputs for Belg season crops of 2009/10 (2002 E.C.) of the private peasant holdings for the country and regions as it was obtained from the results of the Belg Season Crop Production Sample Survey conducted in May, 2010 by the Central Statistical Agency (CSA).

1.2 Objectives of the 2008/09 Belg Season Crop Production Sample Survey

The objectives of the 2009/10 (2002 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:-

- 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 cropland area under improved seed, pesticide treated cropland area … etc.

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

CHAPTER II

2. SURVEY METHODOLOGY, FIELD ORGANIZATION, METHOD OF DATA COLLECTION AND PROCESSING

2.1 COVERAGE

The 2009/10 (2002 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 1,200 Enumeration Areas (EAs) were selected. However, due to various reasons that are beyond control, in 94 EAs the survey could not be successful and hence interrupted. Thus, all in all the survey succeeded to cover 1104 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 2009/10 (2002 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 25 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 2009/10 (2002 E.C.), Belg crop production by region.

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

A point of contention arises with respect to the pure definition of the Belg crop. Belg cropping practices are heterogeneous across different portions of the country. The nature of the sowing period also overlaps with some of the Meher Season crops. Consequently, the report on Belg Season crops in the past faced a problem of a clearly defined growing period. It is important not to overlook or miss agricultural practices performed all year round due to use of irrigation or soil moister from sufficiently dried areas that from time-to-time are swampy or marshy. To help clarify the two-crop season, the following definition has been in use since 1987/88:

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

This report consists of estimates of area, production and yield of major Belg Season crops for the year 2009/10 (2002 E.C.) The data collection period for obtaining the area, production and agricultural

practices of the Belg season crops was from 'Ginbot' 15-30, 2002 E.C. (i.e. From May 23 to June 7, 2010). 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 **2009/10 (2002 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

III. SUMMARY OF THE RESULTS OF THE 2009/10 (2002 E.C.) FARM MANAGEMENT PRACTICES OF BELG SEASON SURVEY

In this part of the report, the results of the 2009/10 (2002 E.C.), Belg Season Crop Production Sample Survey on the extent and use of Belg season farm management practices are presented. The following are brief desscusions on the major findings of the survey.

According to 2009/10 (2002 E.C.), Belg Season Crop Production Sample Survey results, it was estimated that Belg season major crops covered **1,244,409** hectares of land, where **4,173,450** holders were engaged in the production activity. Of this total area under Belg season crops 663,786 hectares **(53.34%)** was under the use of improved farm management practices in which **3,315,290** (79.44%) agricultural holders reported for utilizing different agricultural inputs. Moreover, in 2009/10 (2002 E.C.) it was estimated that a total of 126,216 quintals of commercial fertilizer was utilized for Belg season crop production.

Summary Table A: Total Cropland Area and Number of holders engaged in 2009/10 (2002 E.C.) belg season crop production activities

• *Belg crop Area in Hectare*	*1,244,409*
• *Number of Belg Crop Producing Holders*	*4,173,450*
• *Improved Farm Management practices in Hectare*	*663,786*
• *Number of holders reporting the use of farm management practices*	*3,315,290*
• *Quantity of commercial fertilizer applied in Quintals*	*126,216*

3.1 Total Area under Different Farm Management Practices

According to the 2009/10 (2002 E.C.), Belg season Crop Production Sample Survey results, it was estimated that Belg season crops covered about 1209.57 thousands hectares of land. Of this total, about 544.59 hectares (45%) was under the use of improved farm management practices. Moreover, of the above mentioned total cropland area under improved farm inputs, about 375.15 thousand hectares (68.87%) was under fertilizer (Both Natural and Commercial), 71.37 thousand hectares (13.11%) was under irrigation, 81.23 thousand hectares (14.91%) was treated with pesticides and 16.85 thousand hectares (3.09%) was under improved seeds. The coverage of the above mentioned

farm management practices accounted for 31.01%, 5.91%, 6.75% and 1.39% of the total area under Belg season crops, respectively. (See Summary Table B).

Summary Table B. Total Area Under Improved Farm Management Practices For Belg Season Crops of Private Holdings in Ethiopia 2009/10 (2002 E.C.)

TYPE OF FARM MANAGEMENT PRACTICES	*TOTAL AREA IN '000HA.*	*%*	*% FROM TOTAL BELG CROP AREA*
IRRIGATION	71.37	13.11	5.91
IMPROVED SEEDS	16.85	3.10	1.39
FERTILIZER	375.15	68.88	31.01
PESTICIDES	81.23	14.91	6.71
TOTAL	**544.6**	**100.00**	**45.02**

The estimate of total cropland area under different farm management practices for Belg season crops of 2009/10 (2002 E.C.) is presented in Summary Table C. As it is indicated in this summary Table, the highest proportion of cropland area under different farm management practices was reported to be covered by Cereals, which accounted for 996,245 thousand hectares (82.36%). Furthermore, 205,597 thousand hectares about (17%) was accounted for Belg Pulses and the remaining about 7,729 thousands hectares (0.64%) was reported as Belg Oilseed crops.

Summary Table C. Total Area under Improved Farm Management Practices for Belg Season Crops of Private Holdings in Ethiopia, 2009/10 (2002 E.C.)

	TOTAL BELG CROP AREA		***CROPLAND AREA UNDER IMP. FARM MANAGEMENT PRAC.***	
CROP TYPE	***`000 HA.***	***%***	***`000 HA.***	***%***
CEREALS	*996.24*	*82.36*	*471.48*	*86.571*
PULSES	*205.6*	*17*	*67.08*	*12.31*
OILSEEDS	*7.73*	*0.64*	*	*
GRAINS	***1209.57***	***100.00***	***544.59***	***100.00***

3.2 Fertilizer Applied Cropland Area and Type Fertilizer used

The results of the survey indicate that belg season cropland area under both natural and commercial fertilizers were estimated to be 375,146 thousand hectares, covering 31.01% of the total area under Belg seasons crops of the private holdings. Of the total fertilized area 236,918 thousand hectares (63.15) was reported to be under natural fertilizers. The coverage of commercial fertilizers was estimated to be 138,228 thousand hectares (36.85 %), constituting of 88.98% DAP, 3.39% UREA and 7.63% mixture of the two fertilizers (DAP+UREA). (For details see Summary Table D.)

Summary Table D: Total Cropland Area under Fertilizer by Type of Fertilizer for Private Holdings in Ethiopia, 2009/10 (2002 E.C.)

TYPE OF FERTILIZER	*FERTILIZAER APPLIED AREA IN*		*PERCENTAGE FROM TOTAL BELG CROP AREA*
	000'HA	%	
NATURAL	**236.92**	**63.15**	**19.57**
COMMERCIAL	**138.23**	**36.85**	**11.43**
DAP	122.99	88.98	10.17
UREA	4.68	3.39	0.39
DAP+UREA	10.55	7.63	0.87
TOTAL	**375.15**	**100.00**	**31**

3.3.1 Use of Natural Fertilizers

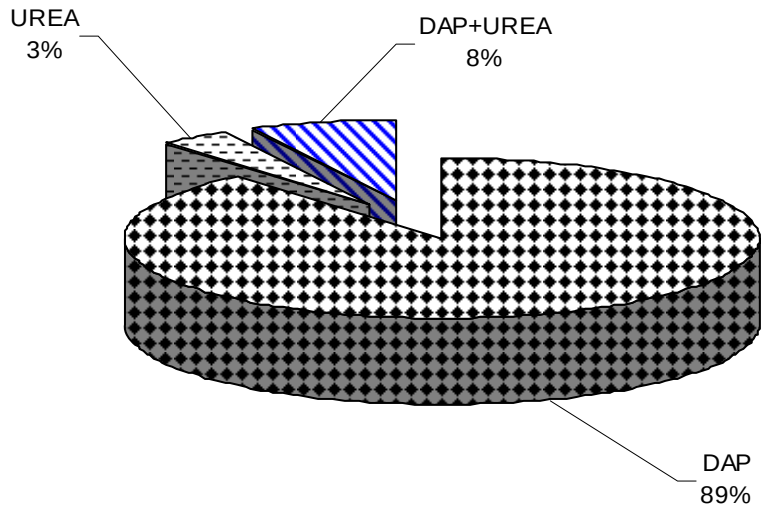
In general, the application of natural fertilizers for Belg season crops in 2009/10 (2002 E.C.), varies from crop to crop. Of the total area under natural fertilizer, the highest proportion was reported for maize crop, which was estimated at 119.38 thousand hectares (50.39%). The fertilized area (natural fertilizer) under haricot beans was the second and estimated to be 35.64 thousand hectares (15.04%), while area under barley stood third i.e. 35.35 thousand hectares, 14.92% (see Table 2.1).

3.3.2 Use of Commercial Fertilizers

Out of the total land area under commercial fertilizers in 2009/10 (2002 E.C.), Belg season, i.e, 138.23 thousand hectare (11.43%)of the total Belg season crop area, the area under DAP was the highest which accounted for 122.99 thousand hectare (88.98%), while the mix of the two fertilizers

(DAP+UREA) and UREA were covering 10.55 thousand hectare (7.63 %) and 4.68 thousand hectare (3.39 %) of the total commercial fertilizer applied area, respectively (see Fig 1.)

Fig.1: Estimate of Total Area of Commercial Fertilizer Applied by Type for Belg Season Crops of Private Holdings in Ethiopia 2008/09 (2001 E.C)



Similarly, the application of commercial fertilizers varied from crop to crop. Of the total area under commercial fertilizers the highest area was reported for barley at 58.14 thousand hectares (42.06%). The second highest area reported under commercial fertilizers was for maize, i.e., 29.03 thousand hectares (21%).

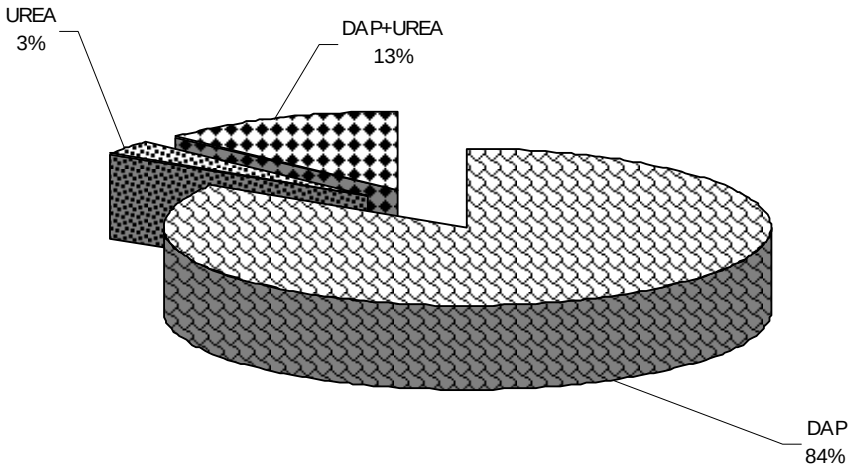
The regional distribution of both natural and commercial fertilizers application varied from region to region. For instance, of the total area under both (Natural + Commercial) fertilizers, the highest was reported for Oromia Region, which accounted for 220,494 hectares (58.78% of the total), S.N.N.P and Amhara Regions were the second and third to report the highest area under both (Natural and Commercial) fertilizers which were estimated to be 107,408 hectares (28.63%) and 38,352 hectares (10.22%), respectively.

3.4 Type and Quantity of Commercial Fertilizer Applied

In 2009/10 (2002 E.C.) the total quantity of commercial fertilizer used for Belg season crop production was estimated at 126,950 quintals. Of this total, the share of DAP was the highest accounting for 83.76% (106,328 quintals). The mixture of the two types of fertilizers

(DAP+UREA) was the second highest accounting for 13.04% (16,553 quintals). The last was the share of the Urea, which accounted for 3.21% (4,069 quintals) (See Fig 2).

Fig.2: Estimates ofTotal Quantity of Commercial Fertilizer Applied by Type for Belg Season Crops of Private Holdings in Ethiopia, 2008/09 (2001 E.C)



3.5 Total number of Belg Crop producing Holders Reporting use of Improved Farm Management Practices by Age

To easily identify the age category of holders who used to practice modern farm management on their holdings, Belg crop producing holders' ages have been categorized into nine groups. These are:

The group categories by age

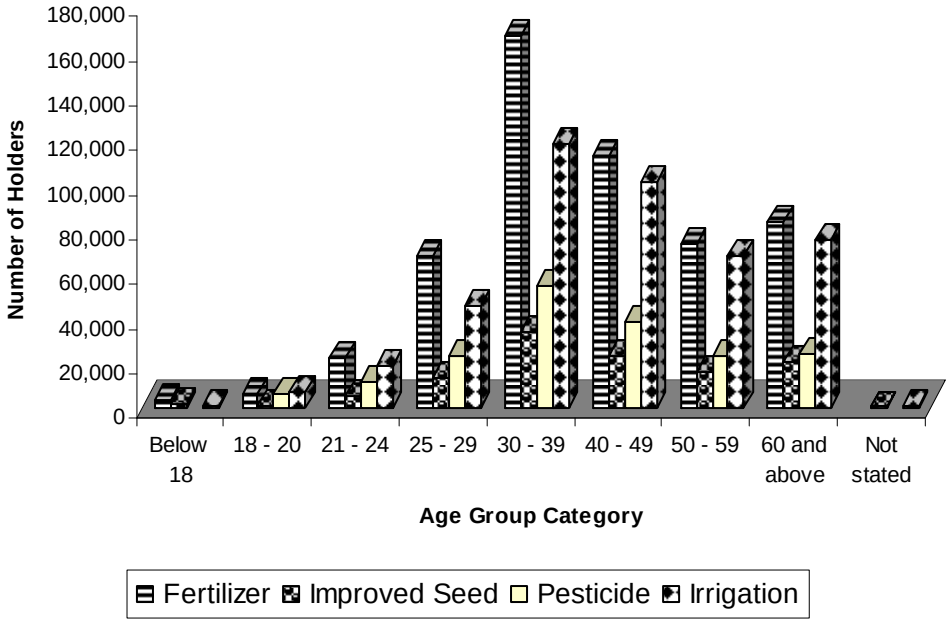
Group	1	-	Under 18 Years
Group	2	-	18-20 Years
Group	3	-	21-24 Years
Group	4	-	25-29 Years
Group	5	-	30-39 Years
Group	6	-	40-49 Years
Group	7	-	50-59 Years
Group	8	-	60 years& above
Group	9	-	not stated

Based on the survey results, a total of 4.71 million holders were engaged in the over all Belg season agricultural activities in 2009/10 (2002 E.C.) Belg season. As mentioned above, these holders are categorized in to nine age groups based on the age of the holder. Accordingly, the highest number 1,339,545 (28.23%) of holders was estimated to fall in the age group 30-39. The second 1,001,864 (21.11%) and third 748,259 (15.77%) highest number of holders fall in the age groups 40-49 and 60 and above, respectively. Moreover, it was estimated that a total of 1,255,914 Belg crop-producing holders (about 26.47% of the total) reported the use of improved farm management practices (See summary Table E)

Summary Table E: Total number of Belg crop producing holders reporting use of Farm Management Practices by age for private holdings in Ethiopia, 2009/10 (2002 E.C.)

Age Group Category	*Total Number of Holders*		*Number of holders Reporting use of Farm Management Practices*	
	Number	*%*	*Number*	*%*
Under 18	24719	0.52	5247	0.42
18-20	106537	2.25	18868	1.50
21-24	239514	5.05	56464	4.50
25-29	622536	13.12	148579	11.83
30-39	1339545	28.23	372451	29.66
40-49	1001864	21.11	274582	21.86
50-59	658872	13.89	178642	14.22
60 & ABOVE	748258	15.77	200936	16.00
NOT STATED	3220	0.07	145	0.01
TOTAL	4745063	100.00	1255914	100.00

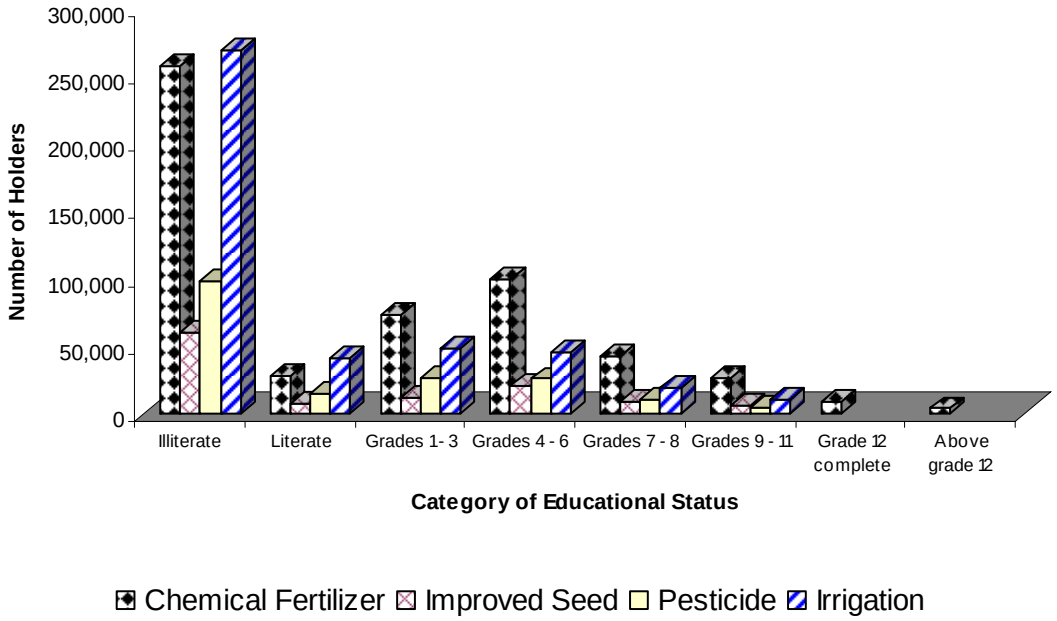
Fig.3: Number of Holders Applying Agricultural Inputs by Age Group, 2008/09 Belg Season



3.6 Total Number of Belg Crop producing Holders reporting use of Improved Farm Management Practices, by Holders' Educational Status

Holders Educational Status plays important role in the adoption new and improved farming technologies, therefore, in this report an attempt is made to categorize holders reporting use of modern farming practice during the 2008/09 Belg Season Crop Production activities depending up on their educational status. According to the results of the 2008/09 Belg Season Crop Production Sample Survey, out of the total number i.e**.** 4.75 million holders, the highest number of holders (about 533.17 thousand holders) used chemical fertilizers, followed by use of irrigation scheme (431.67 thousand holders). It was also estimated that number of illiterate holders were recorded more in all application of agricultural inputs as compared to number of litrate holders.

Fig. 4: Number of Holders Applying Inputs by Educationa Status, 2008/09 Beld Season



3.7 Number of Holders Reporting Damaged Cropland Area by Causes of Damage

The total number of belg crop producing private peasant holders who reported their crops were damaged by different causes of damage during the year 2008/09 Belg Season Crop Production harvest were estimated to be about 2.14 million and the damaged cropland area was estimated to be 192.16 thousand hectares. As indicated in Table 4, the highest cropland area was reported for cereals, that is 115.58 thousand hectares, followed by pulses, which is 52.11 thousand hectares.

With regard to the causes of crop damage, it is reported that 158.55 thousand hectares was damged due to hailstone, the second highest crop damage which is estimated at 8.60 thousand hecares was damaged by Weeds. For details, see Table 4.

Fig. 5: Total Damaged Cropland Area by Cuases of Damage and Crop Category