SEASONAL AGRICULTURAL SURVEY 2013

— VERSION 2 —

National Institute of Statistics of Rwanda

SEASONAL AGRICULTURAL SURVEY 2013

Version 2

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FOREWORD

The Government of Rwanda conducted the Seasonal Agriculture Survey (SAS) from November 2012 to September 2013 to gather up-to-date information for monitoring progress on agriculture programs and policies in Rwanda, including the Economic Development and Poverty Reduction Strategy (EDPRS), the Millennium Development Goals (MDGs) and Vision 2020.

The 2013 SAS covered three agricultural seasons (A, B and C) for the year 2013 in Rwanda. Respondents have been grouped in two categories: Agricultural Operators and Large Scale Farmers (LSF). The survey provides data on background characteristics of the agricultural operators, farm characteristics (area, yield and production), agricultural practices, agricultural equipments, use of crop production by agricultural operators and by large scale farmers.

The 2013 SAS was implemented by the National Institute of Statistics of Rwanda (NISR) in partnership with the Ministry of Agriculture and Animal Resources (MINAGRI), National Agriculture Export Board (NAEB), Rwanda Agricultural Board (RAB), Ministry of Finance and Economic Planning (MINECOFIN), the National Bank of Rwanda, Rwanda Natural Resources Authority (RNRA) and the Rwanda Environmental Management Authority (REMA).

Results of the 2013 SAS indicated key achievements had occurred in the agricultural indicators. The survey results showed that the main crops grown in 2013 Season A, were beans followed by banana cassava and maize, while in season B, the main crops grown were bananas followed by cassava, beans, and sorghum . Season C was quite different as the main crops were Irish potatoes followed beans and vegetables.

This report is therefore an important tool that addresses agricultural concerns and informs policy makers and other stakeholders of priority areas of intervention. Last but not least, we urge all stakeholders, both individuals and organizations, to play an active role in using this valuable information to contribute to a better quality life for the Rwandan population.

The NISR would also like to thank all, but especially the Government of Rwanda, for the invaluable contribution towards the completion of this report. I wish also to register our appreciation to the partner Ministries, Institutions and individuals for their respective great support and inputs throughout the process of implementing this survey.

I am also equally grateful to the staff of the NISR, and the Agricultural Assessment International Corporation (AAIC) team who tirelessly worked so hard to ensure the survey was successfully implemented.

Yusuf Murangwa
Director General, NISR

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ACRONYMS

AAIC	Agricultural Assessment International Corporation
CSPro	Census and Survey Processing System developed by the U.S Census Bureau and ICF International. This software can be used for entering, editing, tabulating, mapping and disseminating census and survey data
GIS	Geographic Information System
GPS	Global Positioning system
Ha	Hectare
Kg	Kilogram
Kg/Ha	Kilogramme per Hectare
LSF	Large Scale Farmers
MFS	Multiple Frame Survey
MINAGRI	Ministry of Agriculture and Animal Resources
MINECOFIN	Ministry of Finance and Economic Planning
MT	Metric Tonnes
NAEB	National Agriculture Export Board
NISR	National Institute of Statistics of Rwanda
PDA	Personal Digital Assistant
PPS	Probability Proportional to Size is a sampling technique for use with surveys or mini-surveys in which the probability of selecting a sampling unit (e.g., village, zone, district, and health center) is proportional to the size of its population. It gives a probability (i.e., random, representative) sample.
PSU	Primary Sampling Unit is a subdivision of the stratum into non-overlapping land with other PSUs. These are areas with recognized physical boundaries formed by segments.
RAB	Rwanda Agricultural Board
REMA	Rwanda Environmental Management Authority
RNRA	Rwanda Natural Resources Authority
RWF	Rwandan Franc (currency)
SAS	Seasonal Agricultural Survey
SPSS	Statistical Package for Social Science.
Sq.m.	Square meter.
SSU	Secondary Sampling Units is a Segment.

EXECUTIVE SUMMARY

The 2013 Seasonal Agriculture Survey (SAS) was conducted by the National Institute of Statistics of Rwanda (NISR), and it covered three agricultural seasons (A, B and C) for the year 2013 in Rwanda. The main objective of the 2013 SAS was to provide timely, accurate, credible and comprehensive agricultural statistics that would not only describe the structure of agriculture in Rwanda in terms of land use, crop production and livestock, and be used for food and agriculture policy formulation and planning, but also which can be used for the compilation of national accounts statistics.

The survey fieldwork commenced on 12 November 2012 and continued up to 28 September 2013, ensuring that all agricultural seasons were covered. The sample was composed of two categories of respondents: Agricultural Operators[1]and Large Scale Farmers[2] (LSF). For the category of Agricultural Operators, the 2013 SAS benefited from a dual frame sampling design (called Multiple Frame Survey or MFS). For the category of LSF, everyone had been enumerated.

The 2013 SAS used imagery from RNRA with a very high resolution of 25 centimeters. The total land of the country was divided into ten strata. Three of these strata were chosen to be used for the survey since they were composed of agricultural land. Thereafter, agricultural land strata were delineated into Segments[3] within the Primary Sampling Units (PSU) with identifiable physical boundaries. The Agricultural Operators within the segments were the Second Stage Sampling (SSU) units.

The 2013 SAS covered 327 segments, spread throughout the country during the two main agricultural seasons (A and B) and 251 segments during the Season C both in mountains and marshlands areas.

The survey covered 15,441 Agricultural Operators and 562 LSF in season A; 15,730 Agricultural Operators and 503 LSF in Season B; and 1,412 Agricultural Operators in Season C. In Season C, LSF were not covered.
The main areas of data analysis include: demographic and social characteristics of Agricultural Operators and LSF; farm characteristics: Area, yield and production; agricultural practices; small agricultural equipments; and use of crop production.

[1] Agricultural operators: These are Small Scale Farmers within the Segments
[2] Farmer: (holder or operator) is a civil or juridical person who makes major decisions regarding resource use and exercises management control over the farm.
[3] Segment: is a piece of land with boundaries delineated on a map. In area sampling, the total area for the population to be sampled is divided into segments. These Segments are Secondary Sampling Units.

Characteristics of Agricultural operators

Almost two thirds of the total Agricultural Operators during three seasons were men. During all three seasons, the modal age of men, with agricultural holdings was observed to be between 25 years and 34 years. They represent 28% of all men with agricultural holdings. The modal age of women was between 45 years and 54 years. They represent 24% of all women with agricultural holdings. Over 63% of all Agricultural Operators had completed primary level education while 25 % had no education.

Crop land

The main crops grown in 2013 Season A, were Beans (25.9% of the total cultivated area), Banana (21.3%), Cassava (13.7%) and Maize (11.3%); while in season B, the main crops grown were Banana (27.7%), Beans (13.3%), Cassava (20.0%) and Sorghum (11.2%). Season C was quite different as the main crops were Irish Potatoes (70.9%), Beans (14.4%) and Vegetables (11.8%).

The average holding of agricultural land was 0.24 Hectares in Season A, 0.28 Hectares in Season B, and 0.10 Hectares in Season C for each Agricultural Operator. However, potential land was still remarkable, as fallow land represented almost one third of the total arable land of Rwanda (33.5% in season A and 30.0% in season B) with 50 % of fallow land in Eastern Province.

Agricultural Inputs

Between 82-92% of Agricultural Operators used traditional seeds. 48-71% of Agricultural Operators used organic fertilizers during all seasons while inorganic fertilizers were used only by 17% to 20% of Agricultural Operators in season A and B. Between 7% and 9% of Agricultural Operators used pesticides in Seasons A and B, but in season C, 64% of Agricultural Operators used pesticides.

Agricultural practices

This Seasonal Agriculture Survey showed that only 36.2% of the total agricultural land during season A and 20.8% of the total agricultural land during season B was used by Agricultural Operators to grow crops in pure stand in Rwanda. Nonetheless, for Large Scale Farmers, the percentage of the land cultivated in pure stand was 66.3-84.2%.

In seasons A and B, between 2% - 3% of all agriculture operators practiced irrigation but in season C, their percentage was 11.7%. Finally, Agricultural Operators having plots with anti-erosion activities were63.2 in Season A, 65.7 in Season B and 78.8 in Season C.

Chapter 1: Introduction

1.1 Need for Agricultural Statistics

During the last decades, Rwanda has impressively achieved a lot in poverty reduction, and agriculture sector played an important role. To continue in this effort to eradicate poverty and hunger, policy makers and planners will continuously need accurate and timely statistics of agriculture sector.

In recognition of above achievements, the National Institute of Statistics of Rwanda (NISR) in collaboration with the Ministry of Agriculture and Animal Resources (MINAGRI) introduced a new program of agriculture surveys that uses a multiple frame sampling techniques, based on probability sampling and estimation methods combining an area frame and a list frame. This is a Seasonal Agriculture Survey (SAS) designed and implemented since 2013 agricultural year. It is the only way that could regularly provide timely and credible statistics to be used in various planning processes for agriculture development in Rwanda.
This 2013 SAS report is an improved version based on experiences gained in the 2014 SAS.

1.2 Objectives of the survey

The main objective of the new agricultural statistics program is to provide timely, accurate, credible and comprehensive agricultural statistics that would not only describe the structure of agriculture in Rwanda in terms of land use, crop production and livestock and can be used for food and agriculture policy formulation and planning, but also which can be used for the compilation of national accounts statistics.

1.3 Time frame

This pilot survey was conducted from 09th to 21st July 2012 and the main Seasonal Agriculture Survey was conducted from 12th November 2012 to 28th September 2013.

1.4 Agricultural Seasons in Rwanda

The agricultural year in Rwanda has three seasons:

- Agricultural Season A: starts in September of one calendar year and ends in February of the following calendar year;
- Agricultural Season B: starts in March and ends in July of the same calendar year; and

- Agricultural Season C starts in August and ends with September of the same calendar year).

These seasons can sometimes be subject to climate uncertainties and present some differences from one Province to another.

1.5 Institutions Involved

Figure 1: Participants who endorsed the MFS Survey design

The survey was conducted by NISR in collaboration with MINAGRI and other institutions involved in agricultural programs.

The survey design was endorsed at a workshop that was held at Centre de Pastoral Notre Dame de Fatima in Musanze district from 27th to 29th February, 2012. Figure 1 shows persons who attended the workshop.

The following institutions were represented: NISR, MINAGRI, National Agriculture Export Board (NAEB), Rwanda Agricultural Board (RAB), Ministry of Finance and Economic Planning (MINECOFIN), the National Bank of Rwanda, Rwanda Natural Resources Authority (RNRA) and the Rwanda Environmental Management Authority (REMA). All participants committed to work together in order to build a strong National Agricultural Statistical System for Rwanda.

Chapter 2: Methodology of the Survey

2.0 Introduction

2.1 Coverage of the Survey

The survey covered the entire country. A sampling frame of Large Scale Farmers (LSF) was prepared to be used for enumeration. At the same time, the sampling units of an area frame called segments were constructed by professionals in Geographic Information System (GIS) from both NISR and MINAGRI using orthophotos from the Rwanda Natural Resource Authority (RNRA). Within segments; small scale Agricultural Operators were identified and enumerated using instruments previously prepared for the survey.

2.2 Multiple Frame Survey Design

The design of the Multiple Frame Survey (MFS) combined a probability sample of segments which were selected from the area sampling[4] frame, with a list of LSF to be totally enumerated during the data collection period.

2.3 Area Frame and List Frame Construction

2.3.1 Area Frame Construction

The area frames were constructed using satellite imagery and dividing the land into land-use and domain strata.

Within each of the 30 districts, land was stratified into homogeneous strata according to crop intensity. It means that land totally or almost totally under crops (Cropland) was separated from land that had very few crops or was mostly pasture land.

The land-use strata were defined by proportion of cultivated land, or other land-use characteristics. Unless otherwise stated, when referring to an area sample, the word stratum will be used to denote land-use and domain definition strata.

[4] Area sampling: A method in which an area to be sampled is sub-divided into smaller blocks that are then selected at random and then again sub-sampled or fully surveyed. This method is typically used when a complete frame of reference is not available to be used.

During the construction of the area sampling frame, the entire land area of Rwanda was subdivided into 10 non-overlapping land-use strata defined by proportion of cultivated land or other land-use characteristics, as shown in Table 1.

Table 1. Land Stratification

Strata	Description	Land Area (Km^2)
1	Intensive Hillside Cropland (50-100% cultivated)	15,350
2	Intensive Marshland Cropland (50-100% cultivated)	551
3	Extensive Cropland (15-50% cultivated)	1,928
4	Non-Cropland (0-15% cultivated)	739
5	Cities & Towns (0-15% cultivated)	477
6	Water	1,302
7	National Parks (defined by political boundaries)	2,190
8	Marshland, riverbeds with potential for rice (0-15% cultivated)	792
9	Forest	1,722
10	Tea Plantation	232

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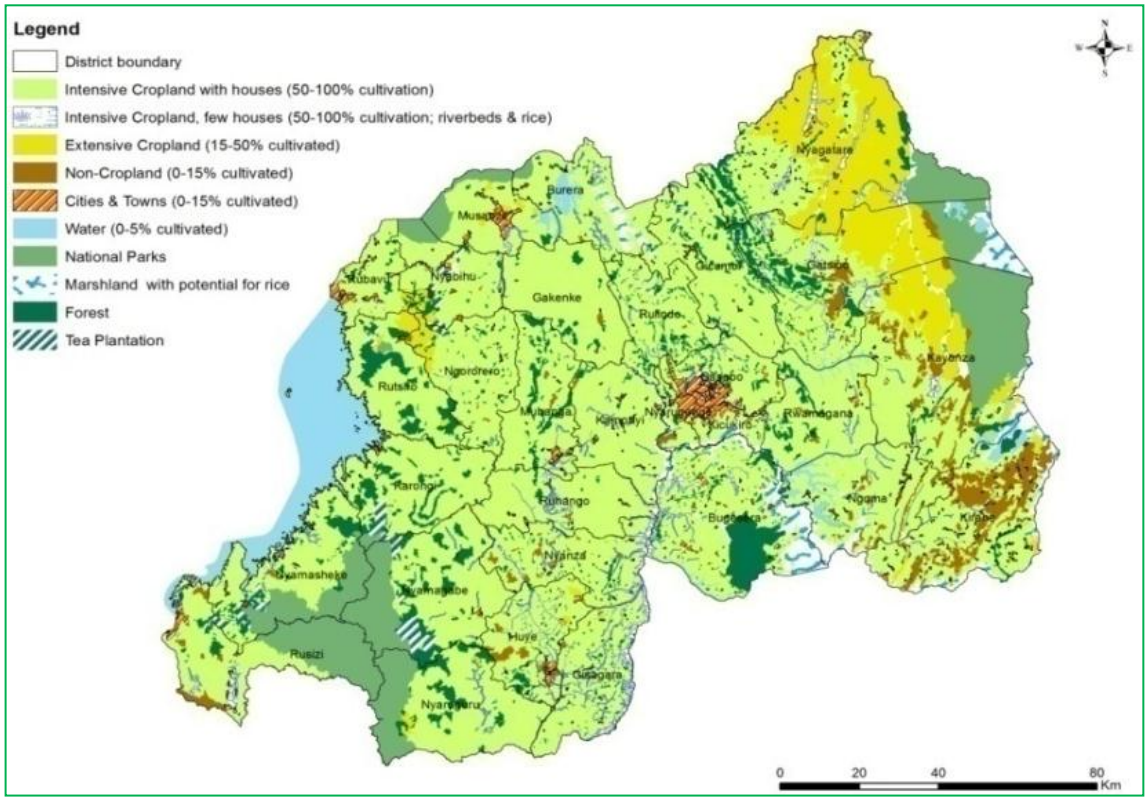
The strata land areas above are represented on the following map (Figure 2):

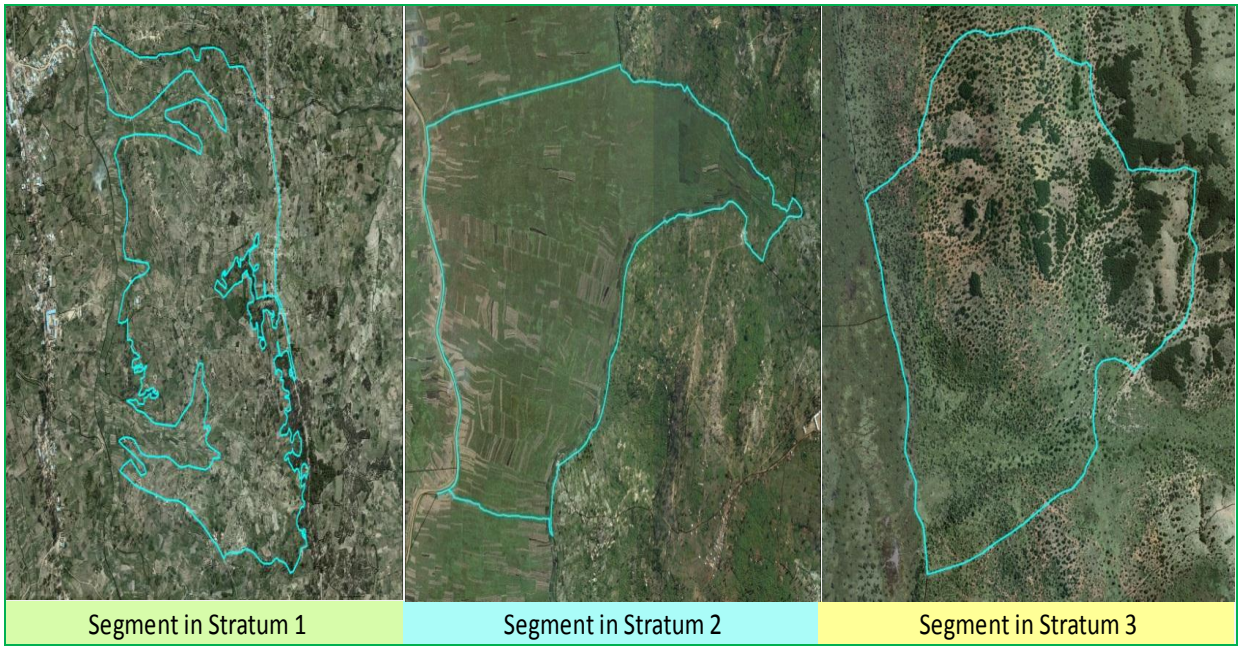
Figure 2: Land Stratification



Once the stratum is defined, its boundaries and segment boundaries within the stratum are physical features such as roads, paths, rivers, etc. which can be located on the ground. Among the 10 strata described in Table 1, only the first three strata were used for sampling in the Seasonal Agricultural Survey. The land areas were subdivided into sampling units so that the entire land area did not have to be divided unless it was selected into the sample.

The following Figure 3 with three maps shows imagery of segments for the first three strata subject for data collection of the 2013 Seasonal Agricultural Survey.

Figure 3: Example of Segments in Different Strata



2.3.2 List Frame Construction

The list of LSF (sometimes called Big Farmers[5]) included those farms with the largest area for a given crop or those with the largest number of livestock as reporting unit is the farm.

[5] The person, institution or agricultural or livestock cooperatives, that satisfies the unit measurements defined by survey rules e.g. farmer growing crops on ten hectare of land or more or any farmer raising 70 or more cattle, 350 goats and sheep, 140 pigs, 1,500 chicken or managing 50 bee hives.

Chapter 3: Sampling and Data Collection Methodology

3.1 Sampling

3.1.1 Sampling Design and Selection of Segments in Seasons A and B

For Season A and B, the country was demarcated into 10 Strata (defined above). Only the first three strata were subjected to agricultural land sampling. In the 2013 Seasonal Agricultural Survey, the sample selection was a two stage sampling design as follows:

a) In each Stratum, Primary Sampling Units (PSUs) were selected using Probability Proportional to Size (PPS) sampling where area was the size of measure; and
b) For each selected PSU, one Second Stage Sampling (SSU) unit or in this case Segment was randomly selected.

If for example stratum one is divided into large PSUs, sampling units of 20-hectare will be assigned to each PSU. Then, if a PSU had 225 hectares, it would be divided into eleven (11) sampling units of 20-hectare each. And if this PSU is selected, one of its 11 sampling units will be selected as the segment for data collection.

3.1.2 Distribution of Sampled Primary Sampling Units

In the entire country, 327 PSUs were selected in the three main agricultural strata with probability proportionally to the size of each Stratum. Table 2 below shows the distribution of PSUs in each of the three Strata.

Table 2: Selected Segments by Strata for 2013 Seasons A and B

Strata	Area in SQ.Km	Number of Selected Segments
Stratum 1	15,350	295
Stratum 2	551	14
Stratum 3	1,928	18
Total	17,829	327

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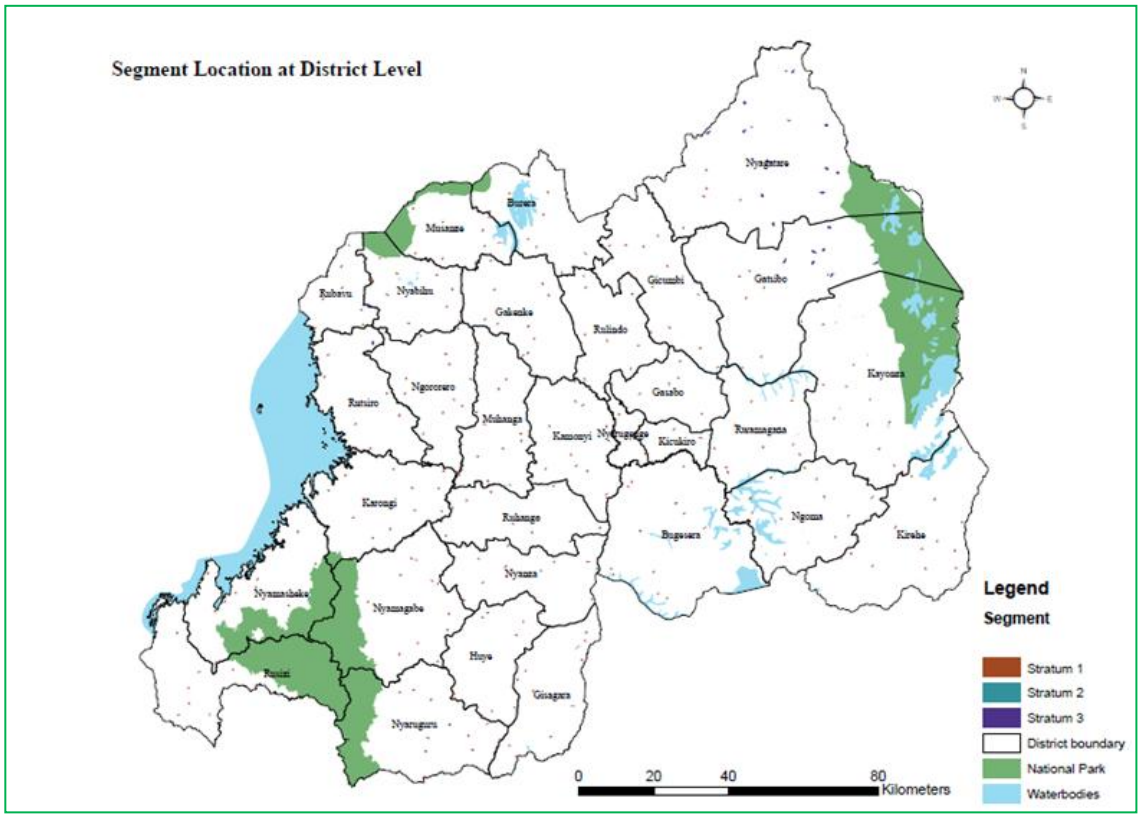
Each selected PSU having a size of 200 - 400 Hectares was subdivided into Second Stage Sampling Units (SSUs) of around 20 Hectares each, following natural boundaries as explained earlier. Note that for Stratum 3 PSUs, a segment had a size of around 50 Hectares.

The map below illustrates the distribution of the sampled segments throughout the country.

Figure 4: Distribution of Segments throughout the Country



3.1.3 Sampling of Secondary Sampling Units

In every selected PSU, one SSU (or Segment) was randomly selected for data collection purposes.

3.1.4 Sampling of Segments in Seasons C

For Season C, two Strata were demarcated namely Marshlands and Mountain sites. A Stratum was assigned PSUs of 200 - 250 Ha in both Mountains and in Marshlands. Every selected PSU was subdivided into segments of around 5 Ha in Marshlands and 10 Ha in Mountains. One SSU (or segment) was then selected in each selected PSU for data collection purpose. The Table 3 shows the distribution of PSUs in each of the two Strata.

Table 3: Land Stratification for Season C

Strata	Area (Sq. M.)	Total Number of PSU	Total Number of Segments	Number of Sampled Segments
Mashlands (including the Small marshlands)	221	582	3,709	120
Mountain	1,396	872	7,001	90
Small Mashlands	1,617	954	490	41
Total	3,234	2408	11,200	251
2013 Seasonal Agriculture Survey				

3.1.5 Selection of Respondents in Phase I of Seasons A and B

In each agricultural season, data collection was undertaken in two phases. Phase I was mainly used to collect data on demographic and social characteristics of interviewees, area under crops, crops planted, rainfall, livestock, etc. Phase II was mainly devoted to the collection of data on yield and production of crops.

Large Scale Farmers

From the list of LSF in Phase I of Season A or Season B, all 562 LSF were enumerated. The LSF were engaged in either Crop farming activities only or Livestock farming activities only or both Crop and Livestock farming activities.

Agricultural Operators

Agricultural Operators are the Small Scale Farmers within the Segment. Every selected Segment was firstly screened using the Screening Form. That means enumerators accounted for every plot inside the segment. All Tracts[6] were either Agricultural (cultivated land and fallow land) or Non-Agricultural Land (water, forests, roads, rocky and bare soils and buildings).

During Phase I, a complete enumeration of all farmers having agricultural land and operating within the selected Segment was undertaken by using a Farm Questionnaire.

[6] Tract: is the sum of all lands owned by one Agricultural Operators in the segment. It can be made of one or more fields or plots adjacent to each other or located in different places across the segment.

3.1.6 Selection of Respondents in Phase II of Seasons A and B

Large Scale Farmers

Table 4: Sampling Large Scale Farmers: Season A Phase II

	Number of LSF	Number of Sampled LSF
Crop	68	17
Crop and Livestok	378	95
Total	446	112

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In Phase II, 25% of the Agricultural Operators undertaking either Crop farming activities only or both Crop and Livestock farming were selected and interviewed using a Farm Questionnaire for this phase as it is shown in Table 4 above.

Agricultural Operators

In Phase II, Season A, a sample of 1,799 Agricultural Operators was selected using the method of Probability Proportional to Size (PPS) in each district.

In Phase II, Season B, a sample of 1,941 Agricultural Operators was selected as follows:

a) 1,545 Agricultural Operators were selected of which 1500 were from Strata 1 and 2 selected at district level, and 45 Agricultural Operators were from Stratum 3 selected at country level (they were mainly from Nyagatare, Gatsibo and Kayonza districts). Again the PPS method was used, area under crops being the measure of size in each district; also

b) 500 Agricultural Operators were selected using area under crops in each district. Due to the previous selection explained in a) above only 396 were retained due to the removal of duplicates. This second sample gave weight to major crops and thus increased representativeness of crop yield in the districts.

3.1.7 Selection of Respondents in Season C

In Season C, a Screening Form was used to undertake a complete enumeration and account for every plot inside the segment on which land use was taking place.

From a list of Agricultural Operators having agricultural land and cultivating Season C Crops:

a) A 10% sample of operators in Marshlands was selected for data collection that combined farm inputs, expenditure and production questions;

b) A complete enumeration in Mountain sites was undertaken for data collection that combined farm inputs, expenditure and production questions.

3.1.8 Estimation Methodology

As the stratified random sampling techniques have been adopted for the survey, below are the formulas used to estimate various statistical parameters:

1 – Definition of the Notations and Parameters

Population weight: $W_i = \frac{N_i}{N_i}$

- N is the total population (Universe) being studied;
- For the stratum *i*: The population is N_i

- The average of variable Y is $\bar{Y}_i$ in the stratum i;
- variance estimate of *Y* is equal to $S_i^2 = \frac{1}{N_i - 1}\sum_{\alpha_1=1}^{N_i}(Y_{\alpha i} - \bar{y}_i)^2$
- the sample size of the stratum k is equal to n_i with $(j_i = 1,\ldots,n_i)$,
- $f_i = \frac{n_i}{N_i}$ is the corresponding sampling rate; $\bar{y}_i = \frac{1}{n_i}\sum_{j_i}^{n_i} y_{ji}$ is the mean of sample observations in each stratum,
- $S_i^2 = \frac{1}{n_i - 1}\sum_{j_i=1}^{n_i}(y_{ji} - \bar{y}_i)^2$ is the sample variance of the stratum *i*.

2 – Estimation of Mean

- The overall mean of the population is $\bar{Y}$ and is written as follows:
  $\bar{Y} = \sum_k W_k \bar{Y}_k$, where *k* is strata, numbered from 1 to *k* sub-populations

- The unbiased estimator of $\bar{Y}$ is $\bar{Y}_{st} = \sum_{i=1}^{k} W_i \bar{y}_i$

3 – Estimation of Total

For stratum i the total of *Y* is estimated by $N_i \bar{y}_i$, the unbiased estimate of the total *Y* to the universe is: $\hat{T}(Y) = \sum_{i=1}^{k} N_i \bar{y}_i$

The term used for data weighting of the sample is called “Extrapolation coefficient” or “Expansion factor”.

The estimators $\hat{T}(Y)$ and $\hat{\bar{Y}}$ are unbiased estimators of the total and the mean since they satisfy the following expressions: $E[\hat{T}(Y)] = T(Y)$ and $E[\hat{\bar{Y}}] = \bar{Y}$

4 - Variance of the Mean Estimator and the Total Estimator Abbreviated as Var

$$Var[\bar{Y}_{st}] = \sum_{i=1}^{k} W_i^2 (1 - f_i) \frac{S_i^2}{n_i} \text{ and } Var[\hat{T}(Y)] = \sum_{i=1}^{k} N_i^2 (1 - f_i) \frac{S_i^2}{n_i}$$

5 - Estimation of Variances of these Estimators

$$\hat{Var}[\bar{Y}_{st}] = \sum_{i=1}^{k} W_i^2 (1 - f_i) \frac{S_i^2}{n_i} \text{ and } \hat{Var}[\hat{T}(Y)] = \sum_{i=1}^{k} N_i^2 (1 - f_i) \frac{S_i^2}{n_i}$$

Estimates of variance estimators of the mean and the total are used to calculate the estimators standard deviation, and thus to propose confidence intervals for estimators.

3.2 Data Collection and Processing

3.2.1 Contents of Data Collection Tools

Screening Questionnaire

A Screening Questionnaire was used to collect information that enabled identification of an Agricultural Operator or Large Scale Farmer and his or her land use. The purpose of the screening form was to account for every square meter of land inside the Segment or Large Scale Farm.

If segment 12_22_09 had 20 hectares, then approximately 20 hectares was accounted on the screening form. This was to include not only all farm lands but also all non-agricultural land such as buildings, forest, etc. as shown and delineated on the segment or Large Scale Farm map.

Figure 5: An Example of a Screened and Digitalized Segment Map

The photograph (Figure 5) is an example of a screened and digitized segment map. In addition to identification information (i.e. Province, District, Stratum, Segment, ...), Tract identification information was collected. This included information on Tract letter, Tract number, Name and address of Agricultural Operator, Plot number, Agricultural and Fallow land Pasture and Non- agricultural land.

Phase I Farm Questionnaire

For each agricultural season, Phase I of the survey covered the collection of data on characteristics of Agricultural Operators, crop identification and area, inputs (seeds, fertilizers, labor, …) and livestock information for Agricultural Operators (that lived inside the segment) and large scale farmers.

Phase 2 Farm questionnaire

For each agricultural season, Phase 2 of the survey covered the collection of data on crop production and use of production. Quantities harvested for seasonal and perennial crops were also collected.

3.2.2 Data Collection and Supervision

Teams

The survey used 120 Enumerators in 40 field teams and 43 Team leaders giving a ratio of one Team leader to 3 Enumerators.

All field work staff in 2013 SAS had a degree in Agronomy Science and were trained before starting data collection.

Higher level supervision staff from NISR and MINAGRI visited the field teams during each phase of data collection to ensure quality control.

Field Work Materials

Each Enumerator and Team leader had adequate materials composed of Enumerator's manual, Screening questionnaire, Farm questionnaires, Measuring tapes, Ruler, Pens, Pencils, Calculator, Weighing scales, Global Positioning System (GPS), Personal Digital Assistant (PDA), Maps, Rain coats, Boots, Umbrella, First aid equipment, etc. Each team was assigned a vehicle.

Field Procedures

Before proceeding to the field, Enumerators and their Team leaders checked that they had all necessary materials required for their field work. All staff was required to arrive early in the field (Segment or LSF).

Upon arrival in the field, the enumerators and their Team Leaders took the related geographical coordinate that were used by supervisors to know the real starting time of the field work.

The next step was the Segment delineation or LSF and to take geographical coordinates of the identified landmarks to allow supervisors to check if the Segment was delineated appropriately and to ensure the collected data was relating to the plots inside the Segment or LSF.

Screening Activity of the Segment

After delineation of the segment, enumerators used the segment map to mark all the tracts and related plots. They identified the land use of each plot and indicated information on the Screening Questionnaire. Before leaving the Segment, under the supervision of the team leader, enumerators checked if each tract and its plots were well marked on the map and indicated on the Screening Questionnaire.

Both the marked map and completed Screening Questionnaire for each segment or LSF were sent to the Geographic Information System (GIS) unit at NISR for digitalization and plot area calculations.

Farm Interview and Data Quality Assurance

Two types of questionnaires were used during the two phases of data collection covering season A and season B. Digitalized map for each Segment or LSF were used by Enumerators to identify each tract (and its plots); and a Farm questionnaire was used to conduct an interview with each selected Agricultural Operator or LSF during Phase I and Phase II (mainly for area measurement, land use and inputs estimation in Phase I or production during Phase II).

Figure 6: Illustration of Enumerators on the field

Figure 6 is an illustration of an enumerator interviewing an Agricultural Operator in Nyagatare District and also illustrates enumerators weighting maize production.

Figure 7: Use of Scales and Standard Local Containers

Figure 7 illustrates the precise weighting of crop production by type. In this picture, “Akabase –left- and Akadobo –right-” were used to have a precise weight for each crop type production.

For season C, after screening, an interview was conducted for each selected tract/Agricultural Operator using one consolidated Farm questionnaire.

It is important to mention that all Farm questionnaires were subjected to two/three rounds of data quality checking. The first round was conducted by the enumerator and the second round was conducted by the team leader to check if questionnaires had been well completed by enumerators. And in most cases, questionnaires completed by one enumerator were peer-reviewed by another enumerator before being checked by the Team leader.

3.3 Data Processing and Analysis

Data entry of the completed and checked questionnaires was undertaken at NISR offices by trained 20 staff members using CSPro software. To ensure appropriate matching of data in questionnaires and plot area measurements from the GIS unit, a LOOKUP file was integrated in the CSPro data entry program to confirm the identification of each Agricultural Operator/LSF before starting data entry. Thereafter, data was entered in computers, edited and summarized in tables.

Chapter 4: 2013 Season A Survey Results

4.1 Demographic and Social Characteristics of Agricultural Operators

Characteristics of Agricultural Operators describe their number by type (individual or cooperative), gender, age, education level, residency in segments, farming activities and cooperative membership.

4.1.1 Number of Agricultural Operators by type

The survey results showed that most of the Agricultural Operators (99.4%) were individual farmers and about 0.6 % operators only were members of cooperatives. The number and percentages of Agricultural Operators and Large Scale Farmers (LSF) by Province in 2013 Season A is given in Table 5 below.

The distribution of Agricultural Operators (in segments) was highest in the Southern Province (29.7%), followed by Western province with 24.6 percent.

Table 5: Agricultural Operators and Large Scale Farmers by Province

Province	Agricultural Operators						Number of LSF	
	Individual		Cooperative		Total			
	Number	%	Number	%	Number	%	Number	%
Kigali City	549	98.9	6	1.1	555	3.6	72	12.8
Southern	4556	99.5	24	0.5	4580	29.6	43	7.7
Western	3786	99.6	16	0.4	3802	24.6	31	5.5
Northern	2841	99.0	29	1.0	2870	18.7	67	11.9
Eastern	3618	99.6	16	0.4	3634	23.5	349	62.1
Total	15350	99.4	91	0.6	15441	100	562	100

2013 Seasonal Agricultural Survey - Season A

In 2013 Season A, 562 Large Scale Farmers were listed and enumerated in Rwanda. The Eastern Province was represented by 62 % of the LSF followed by 13 % in Kigali City, 12 % in Northern Province, 8 % in Southern Province and 6 % in Western Province.

The Distribution of Agricultural Operators in Segments by Province is given in Figure 8 while the distribution of LSF by Province is given in Figure 9.

Figure 8: Distribution of Agricultural Operators by Province

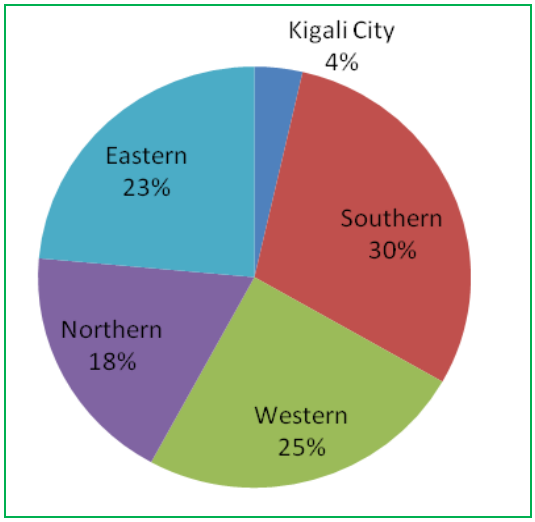
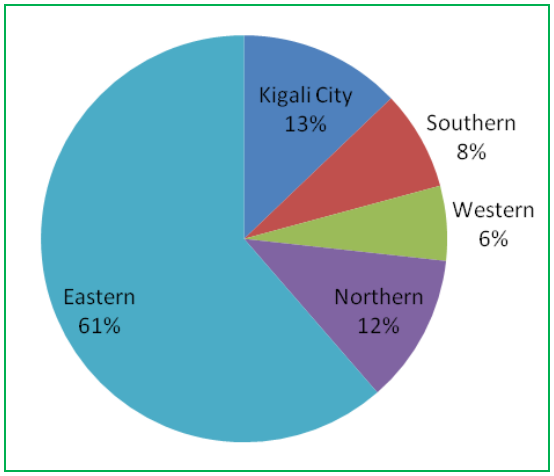


Figure 9: Distribution of Large Scale Farmers by Province



Among the 562 LSF listed in Rwanda in Season A 2013, 62.3 % stated that they were members of cooperatives while 37.7 % stated that they were not members of cooperatives. The cooperative membership of LSF is given in Table 6.

Table 6: Cooperative Membership of LSF

Province	Agricultural Operators			Large Scale Farmers		
	Yes	No	Total	Yes	No	Total
	Percent	Percent	Percent	Percent	Percent	Percent
Kigali City	21.3	78.7	100	20.8	79.2	100
Southern	23.7	76.3	100	74.4	25.6	100
Western	17.8	82.2	100	80.6	19.4	100
Northern	14.9	85.1	100	53.7	46.3	100
Eastern	24.2	75.8	100	69.3	30.7	100
Rwanda	20.6	79.4	100	62.3	37.7	100

2013 Seasonal Agricultural Survey - Season A

The cooperative membership of Agricultural Operators in Eastern Province had a highest proportion (24.2%) followed by the Southern Province (23.7%). For the LFS, the

Western Province had a highest proportion (80.6%) followed by Southern Province (74.4%), Eastern Province (69.3%), Northern Province (53.7%) with Kigali City (20.8%) having the lowest cooperative membership.

4.1.2 Number of Agricultural Operators by Gender

In 2013 Season A, the percentage distribution of Agricultural Operators in Rwanda by gender was 67.6% male and 32.4% female. The percentage distribution of Agricultural Operators in Rwanda by Gender is shown in Table 7.

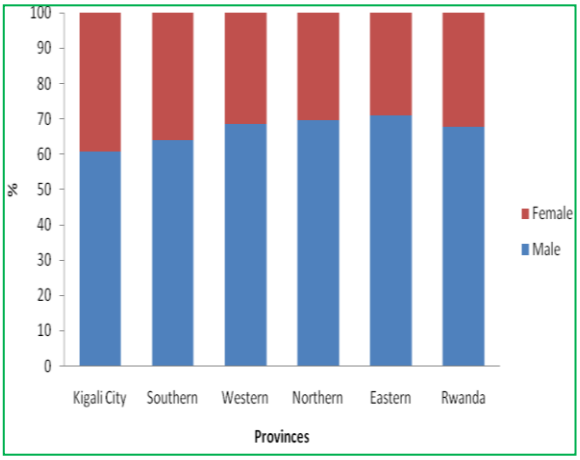
Table 7: Percentage of Agricultural Operators by Gender and Province

	Agricultural Operators		
	Male	Female	Total
Kigali City	60.7	39.3	100
Southern	64	36	100
Western	68.4	31.6	100
Northern	69.7	30.3	100
Eastern	70.9	29.1	100
Rwanda	67.6	32.4	100

2013 Seasonal Agricultural Survey - Season A

The comparison of gender distribution by Province showed that the largest number of male Agricultural Operators (70.9%) was in the Eastern Province while the smallest number of male Agricultural Operators (60.7%) was in Kigali City. The largest number of female Agricultural Operators (39.3%) was in Kigali City while the smallest number of female Agricultural Operators (29.1%) was in Eastern Province. The distribution of Agricultural Operators by gender and Province is shown in Figure 10.

Figure 10: % Distribution of Agricultural Operators by Gender and Province



4.1.3 Age distribution of Agricultural Operators

The majority (24.5%) of Agricultural Operators in Rwanda were in the age group 25-34 (see Table 8). This is followed by 23.8 % of Agricultural Operators in age-group 55 & above, 23.0 % of Agricultural Operators were in age-group 35-44 while 21.9 % were in age-group 45-54.

Table 8: Age Distribution of Agricultural Operators

	Agricultural Operators				
	14-24	25-34	35-44	45-54	55 and Above
Kigali City	5.6	27.7	28.1	18.7	18.7
Southern	5.1	22.4	22.4	23.6	26.0
Western	5.8	23.5	23.6	22.8	23.9
Northern	6.4	24.1	22.2	21.8	24.5
Eastern	7.9	28.2	23.1	19.3	21.1
Rwanda	6.2	24.5	23.0	21.9	23.8

2013 Seasonal Agricultural Survey - Season A

The age group percentage distribution of Agricultural Operators by Province varied more in the age group 55 & Above with Southern Province (26.0%) being highest and Kigali City (18.7%) being lowest. The least variation was in the age group 14-24 with the Eastern Province being the highest (7.9%) and Southern Province (5.1%) being the lowest.

The percentage distribution of male Agricultural Operators in Rwanda was high in the age-group 25-34 (28.6%) followed by 24.1 % of male Agricultural Operators in age-group 35-44, 20.7 % of male Agricultural Operators in age-group 45-54 and 19.9 % in age-group 55 &Above (See Table 9).

Table 9: Age Distribution of Male Agricultural Operators

	Agricultural Operators				
	14-24	25-34	35-44	45-54	55 and Above
Kigali City	7.2	31.8	27.0	15.9	18.0
Southern	5.5	27.1	23.4	22.8	21.2
Western	6.1	27.3	24.5	21.9	20.1
Northern	6.5	27.7	24.0	20.8	20.9
Eastern	8.3	31.9	24.1	17.8	17.9
Rwanda	6.6	28.6	24.1	20.7	19.9
2013 Seasonal Agricultural Survey - Season A					

The age group distribution of male Agricultural Operators by Province varied more in the age group 14-24 with Eastern Province (8.3%) being highest and Southern Province (5.1%) being lowest. The least variation was in the age group 55 & Above with the Southern Province being the highest (21.2%) and Eastern Province (17.9%) being the lowest.

The distribution of female Agricultural Operators in Rwanda was high in the age-group 55 and above (32.2%) followed by 24.6 % of female Agricultural Operators in age-group 45-54, 21.2 % of female Agricultural Operators in age-group 35-44, 16.5 % in age-group 25-34 and 5.5 % in age group 14-24 (see Table 10).

Table 10: Age Distribution of Female Agricultural Operators

	Agricultural Operators				
	14-24	25-34	35-44	45-54	55 & Above
Kigali City	3.2	22.2	30.6	23.6	20.4
Southern	4.5	14.4	21.1	25.3	34.8
Western	5.2	15.5	21.9	25	32.5
Northern	6.4	16.5	18.7	24.9	33.6
Eastern	6.9	19.6	21	23.1	29.4
Rwanda	5.5	16.5	21.2	24.6	32.2
2013 Seasonal Agricultural Survey - Season A					

The age group distribution of female Agricultural Operators by Province varied more in the age group 55 & Above with Southern Province (34.8%) being highest and Kigali City (20.4%) being lowest. The least variation was in the age group 45-54 with the Southern Province being the highest (25.3%) and Eastern Province (23.1%) being the lowest.

4.1.4 Education Level of Agricultural Operators

The Survey results of the Season A 2013 showed that in Rwanda, 63.5 % of Agricultural Operators had completed primary level education, 29.4 % had no education, 6.1 % attained secondary level education and only 1 % had completed tertiary level education (see Table 11 and Figure 11).

Table 11: Education Level of Agricultural Operators by Province (%)

	Agricultural Operators				
	Primary	Secondary	Tertiary	No education	Total
Kigali City	64.3	15.5	2.4	17.9	100
Southern	62.5	4.8	0.5	32.2	100
Western	64.3	6.1	1.0	28.6	100
Northern	63.8	4.8	1.1	30.2	100
Eastern	63.4	7.5	1.3	27.8	100
Rwanda	63.5	6.1	1.0	29.4	100
2013 Seasonal Agricultural Survey - Season A					

For those Agricultural Operators that had completed primary level education their distribution by province was reasonably uniform with Kigali City and Western Province having a slightly higher

percentage (64.3%). For those Agricultural Operators that had no education, the Southern province had the highest percentage (32.2%) while Kigali City had the lowest percentage (17.9%) of Agricultural Operators. For those that had completed secondary education, Kigali City (15.5%) had the highest percentage while Northern and Southern Provinces each had the lowest 4.8 %. For those that had completed Tertiary education Kigali City had the highest (2.4%) of Agricultural Operators while Southern Province had the lowest 0.5 % of Agricultural Operators.

Figure 11: Education level of Agricultural Operators by Province

In Rwanda, 69.2 % of male Agricultural Operators had completed primary level education, 22.4 % had no education, 7.1 % attained secondary level education and only 1.3 % had completed tertiary level education (see Table 12). In comparing the education level of male Agricultural Operators between Provinces, Western Province had the highest (70.6%) male Agricultural Operators with primary education. Kigali City had the lowest (12.6%) male Agricultural Operators with no education.

Table 12: Education level of Male Agricultural Operators (%)

	Agricultural Operators				
	Primary	Secondary	Tertiary	No educati	Total
Kigali City	65.5	19.5	2.4	12.6	100
Southern	68.7	5.0	0.8	25.5	100
Western	70.6	7.1	1.4	20.9	100
Northern	70.5	5.9	1.4	22.1	100
Eastern	67.6	8.7	1.7	22.0	100
Rwanda	69.2	7.1	1.3	22.4	100

2013 Seasonal Agricultural Survey - Season A

For those Agricultural Operators that had secondary education, Kigali City had the highest (19.5%) while for Tertiary education Kigali City had the highest (2.4%). level education.

In Rwanda, 51.6 % of female Agricultural Operators had completed primary level education, 43.9 % had no education, 4.1 % completed secondary level education and only 0.3 % had completed tertiary

Table 13: Education Level of Female Agricultural Operators (%)

	Agricultural Operators				
	Primary	Secondary	Tertiary	No educatio	Total
Kigali City	62.5	9.3	2.3	25.9	100
Southern	51.5	4.3	0.2	44.1	100
Western	50.8	3.8	0.1	45.3	100
Northern	48.5	2.3	0.5	48.7	100
Eastern	53	4.6	0.4	41.9	100
Rwanda	51.6	4.1	0.3	43.9	100

2013 Seasonal Agricultural Survey - Season A

Kigali City had the highest female Agricultural Operators with primary and secondary education level (62.5% and 9.3% respectively) and the lowest percentage of female agriculture operators with no education (25.9%).

4.1.5 Agricultural Operators Activities

The distribution of Agricultural Operators by their type of farming activities is shown in Table 14. In Rwanda a large number of Agricultural Operators were mainly involved in Crop and livestock farming (66.6%) while 32.8% undertook Crop farming activities only and less than 1 % undertook Livestock farming activities only. For those undertaking both Crop and Livestock farming activities, the largest number were in the Northern Province (71.6%) while the smallest number was in Kigali City (26.3%).

Table 14: Agricultural Operators Activities (%)

	Agricultural Opera			
	Cropping	Livestock	Cropping & l	Total
Kigali City	69.7	4.0	26.3	100
Southern	27.6	0.4	72.0	100
Western	36.3	0.5	63.2	100
Northern	27.8	0.6	71.6	100
Eastern	33.7	0.8	65.4	100
Rwanda	32.8	0.7	66.6	100

2013 Seasonal Agricultural Survey - Season A

For those Agricultural Operators undertaking Crop farming activities only, Kigali City had the highest percentage of the Agricultural Operators (69.7%), followed by Western Province (36.3%), Eastern Province (33.7%) and Southern Province (27.6%).

4.1.6 Residency of Agricultural Operators in Segments

An agricultural operator is considered to be resident in a segment if he/she lives in the segment and undertakes agricultural activities in the same segment. An agricultural operator is considered nonresident of a segment if his/her agricultural activities are undertaken in the segment but lives outside the segment. Results of the survey (see Table 15) showed that in Rwanda the majority of Agricultural Operators (72.2%) were nonresident while 27.8 % were residents.

Table 15: Agricultural Operators by Residency (%)

	Agricultural Operators		
	Resident	Non resident	Total
Kigali City	36.4	63.6	100
Southern	28.1	71.9	100
Western	25.4	74.6	100
Northern	26.8	73.2	100
Eastern	29.5	70.5	100
Rwanda	27.8	72.2	100

2013 Seasonal Agricultural Survey - Season A

Kigali City had the lowest percentage of non resident operators (63.6%) and the biggest percentage of resident operators (36.4%), while the rest of the Provinces had around 70% of non residents. On the residents, other provinces had between 25% and 30.5% of resident Agricultural Operators.

4.2 Date of Sowing, Production Expectation Date and Expected Date of Harvest

The starting dates of sowing by Agricultural Operators in Segments and LSF for each main crop is summarized in the Tables 16 and 17. On starting date of sowing by Agricultural Operators, sowing for some crops started before September 2012.

Table 16: Agricultural Operators Indicating the Sowing Date in Segments by Crop (%)

Crop name	Before September 2012	01-15 September 2012	16-30 September 2012	After September 2012	N/A	Total
Maize	9.1	24.2	23.0	42.0	1.4	100
Paddy rice	61.7	12.4	6.9	15.9	2.1	100
Sorghum	27.0	37.4	21.0	13.0	1.4	100
Wheat	6.1	24.3	12.1	52.8	4.6	100
Other cereals	6.4	21.1	14.3	56.0	2.2	100
Bush beans	1.6	16.4	21.0	60.5	0.3	100
Climbing beans	4.6	35.3	29.1	30.5	0.3	100
Peas	5.6	27.5	23.7	42.3	0.6	100
Other legumes & pulses	7.6	16.6	9.3	48.5	4.3	100
Cassava	11.6	8.1	7.8	21.9	49.9	100
Irish potatoes	13.8	17.8	17.9	48.7	1.4	100
Sweet potatoes	31.6	6.3	4.7	49.8	7.2	100
Yams & Taro	20.9	11.3	11.3	40.6	15.7	100
Cooking Bananas	3.0	1.9	1.3	2.1	91.0	100
Banana Fruit	2.5	1.8	0.6	2.8	91.2	100
Banana for beer	1.6	1.6	0.5	1.2	94.2	100
Soya beans	2.4	16.3	18.2	62.3	0.6	100
Ground nuts	0.8	11.7	22.5	64.0	1.0	100

2013 Seasonal Agriculture Survey - Season A

For the majority of crops, sowing of crops by Agricultural Operators started in September 2012. For Climbing beans, Peas, Sorghum and maize, the majority of Agricultural Operators indicated September as the sowing date while for Paddy rice, the date indicated by the majority of Agricultural Operators was before September 2012. Other crops: Groundnut, Soya beans, Other Legumes, Bush beans and Wheat were sown after September 2012.

Sowing dates for crops such as Banana fruit, Cooking Banana, Cassava were not applicable for the majority of Agricultural Operators. This may due to the fact that these crops may have been sown in the previous seasons.

Table 17: Large Scale Farmers Indicating Sowing Date for Crops (%)

Name of crop	Before September 2012	01-15 September 2012	16-30 September 2012	After September 2012	N/A	Total
Maize	5.7	29.1	27.3	37.4	0.5	100
Paddy rice	82.6	4.4	4.4		8.7	100
Sorghum	16.9	41.6	23.6	18		100
Wheat	5.9	11.8	29.4	47.1	5.9	100
Other cereals				100		100
Bush beans	1.3	17.6	30.9	49.8	0.4	100
Climbing beans	1.3	32.9	34.2	30.3	1.3	100
Peas	8.3	16.7	16.7	58.3		100
Other legumes & cereals		20		40	40	100
Cassava	8.3	7.6	11.1	21.5	51.4	100
Irish potato	8.9	21.4	16.1	51.8	1.8	100
Sweet potato	18.9	8.1	10.8	48.6	13.5	100
Yams & Taro				83.3	16.7	100
Cooking Banana	2.7	1.8	2.3	7.7	85.5	100
Banana fruit	3.4	1.7	6.9	86.2	1.7	100
Banana for beer	2.3	2.3			95.3	100
Soya bean		18.2	18.2	63.6		100
Groundnut	8	12	28	48	4	100

2013 Seasonal Agriculture Survey - Season A

The majority of LFS (82.6%) indicated that they sowed rice before September 2012 (see Table 17). The majority of main crops were sown in September with the exception of Soya beans, Banana fruit, Yams and Taro and Peas which were sown by the majority of LSF after September 2012.

On production expectations date of 28 February 2013, the majority of Agricultural Operators had high expectation to have the crop production by end of February 2013 for most crops with the exception of the root crops such as Yams & Taro (13%) and Sweet potatoes (42.2%). The expectation of Cassava production by that date was rated low (14.7%) by the majority of Agricultural Operators (see Table 18 below). A similar situation was reported by LSF on expected production by 28 February 2013.

Table 18: Agricultural Operators Expecting Production by 28th February 2013 (%)

Name of Crop	Yes	No	N/A	Total
Maize	71.3	27.7	0.4	100
Paddy rice	92.7	5.5	1.5	100
Sorghum	79.6	19.4	0.9	100
Wheat	53.6	43.1	0.6	100
Other cereals	56.6	36.8	4.4	100
Bush beans	98.5	0.7	0.4	100
Climbing beans	96.9	2.5	0.1	100
Peas	95.3	4.0	0.1	100
Other legumes & pulses	85.3	13.3		100
Cassava	14.6	8.9	75.8	100
Irish potatoes	90.0	9.4	0.2	100
Sweet potatoes	42.0	53.2	4.2	100
Yams & Taro	12.8	48.5	37.5	100
Cooking Banana	47.6	3.3	48.1	100
Banana Fruit	41.1	5.3	52.7	100
Banana for beer	51.1	4.9	42.7	100
Soya beans	89.2	9.9	0.3	100
Ground nuts	91.8	7.0	1.0	100

2013 Seasonal Agriculture Survey - Season A

A large number of Agricultural Operators indicated that production of some crops was not applicable to them particularly Cassava (75.8%), Banana fruit (52.7%), Cooking Banana (47.6%), Banana for beer (51.1%) Yams and Taro (37.5%). This may have been mainly due to the fact that those perennial crops were cultivated during this season (see Table 18).

On production expectations date of 28 February 2013, survey results (see Table 19) showed that for the majority of main crops, LSF had very high expectation to have the crop production by end of February 2013 with the exception of the root crops such as Cassava (31.9%) and Sweet potatoes (40.5%) and cereal crop Wheat (41.2%).

Table 19 : Large Scale Farmers Expecting Production of their Crops by 28th February 2013 (%)

Name of Crop	Yes	No	N/A	Total
Maize	80.9	17.8	1.3	100
Paddy rice	91.3	4.3	4.3	100
Sorghum	80.9	18.0	1.1	100
Wheat	41.2	52.9	5.9	100
Other cereals		100.0		100
Bush beans	99.6		0.4	100
Climbing beans	93.4	6.6		100
Peas	91.7	8.3		100
Cassava	31.9	3.5	64.6	100
Irish potatoes	92.0	8.0		100
Sweet potatoes	40.5	56.8	2.7	100
Cooking Bananas	59.7	1.8	38.5	100
Banana Fruit	51.7		48.3	100
Banana for beer	72.1		27.9	100
Soya beans	84.8	15.2		100
Ground nuts	92.0	4.0	4.0	100

2013 Seasonal Agriculture Survey - Season A

Some LSF indicated that production of a few crops was not applicable to them particularly Cassava (64.6%), Banana fruit (48.3%), Cooking Banana (38.5%), Banana for beer (27.9%). This may have been mainly due to the fact that they are perennial crops planted in this season.

Table 20 : Expected Date of Crop Harvest as Reported by Agricultural Operators (%)

Name of Crop	Before 01/12/12	01 to 31/12/12	1 to 31/01/13	1 to 28/02/13	After 28/02/13	N/A	Total
Maize	0.4	2.7	17.0	51.0	27.7	0.4	100
Paddy rice	1.3	18.2	34.5	37.3	6.5	1.5	100
Sorghum	0.3	1.5	19.3	56.9	20.9	0.6	100
Wheat	2.6	0.0	10.2	38.7	45.2	0.6	100
Other cereals	0.0	0.0	13.5	43.1	36.8	4.4	100
Bush beans	2.0	18.3	64.3	13.8	0.7	0.4	100
Climbing beans	0.9	9.0	52.6	34.4	2.4	0.1	100
Peas	2.1	17.6	55.2	20.4	3.9	0.1	100
Other legumes & pulses	6.4	6.9	35.7	33.8	15.8	0.0	100
Cassava	5.1	3.9	2.6	2.6	8.3	76.4	100
Irish potatoes	9.7	24.5	37.0	18.6	9.5	0.1	100
Sweet potatoes	12.4	10.7	7.1	11.7	52.9	4.6	100
Yams & Taro	1.3	1.7	3.1	7.2	47.4	37.9	100
Cooking Bananas	25.1	15.3	3.0	2.5	3.5	49.6	100
Banana Fruit	19.8	12.8	3.2	3.3	4.7	55.1	100
Banana for beer	27.2	14.2	4.5	3.9	5.0	43.6	100
Soya beans	0.3	4.2	34.3	49.9	10.3	0.4	100
Ground nuts	0.3	3.1	40.1	47.6	7.6	1.0	100

2013 Seasonal Agriculture Survey -Season A

The majority of Agricultural operators expected harvest to take place in January or February 2013 except for Sweet potatoes and Yams &Taro whose harvests were expected after February 2013 by 52.9% and 47.4% of Agricultural Operators respectively.

Some Agriculture Operators indicated that some crops were not applicable to them in terms of date of harvest notably Cassava (77.2%). This may have been due to the fact that they did not expect production because those crops were not mature yet.

Table 21: Expected Date of Crop Harvest as Reported by Large Scale Farmers (%)

Name of Crop	Before 01/12/12	01 to 31/12/12	1 to 31/01/13	1 to 28/02/13	After 28/02/13	N/A	Total
Maize	0.8	3.6	13.1	63.9	17.0	1.5	100
Paddy rice	0.0	52.2	30.4	8.7	4.3	4.3	100
Sorghum	0.0	1.1	19.1	60.7	18.0	1.1	100
Wheat	0.0	5.9	5.9	29.4	52.9	5.9	100
Other cereals	0.0	0.0	0.0	0.0	100.0	0.0	100
Bush beans	0.9	21.9	67.0	9.9	0.0	0.4	100
Climbing beans	0.0	2.6	51.3	38.2	6.6	1.3	100
Peas	0.0	8.3	66.7	16.7	8.3	0.0	100
Cassava	0.0	16.7	7.6	7.6	4.2	63.9	100
Irish potatoes	3.6	12.5	41.1	32.1	8.0	2.7	100
Sweet potatoes	2.7	16.2	10.8	8.1	59.5	2.7	100
Cooking Bananas	6.3	44.3	7.2	0.9	1.8	39.4	100
Banana Fruit	5.2	34.5	13.8	1.7	1.7	43.1	100
Banana for beer	11.6	48.8	9.3	0.0	0.0	30.2	100
Soya beans	0.0	3.0	24.2	57.6	15.2	0.0	100
Ground nuts	0.0	4.0	52.0	36.0	4.0	4.0	100

2013 Seasonal Agriculture Survey - Season A

On the expected date of harvest reported by LSF (see Table 21), the majority of LFS expected harvest of their crops to take place in December 2012 or January 2013 with the exception of the other cereals and Sweet potatoes whose harvests was expected to be after February 2013 by 100.0 %, and 59.5 % of Agricultural Operators respectively.

4.3 Farm Characteristics (Area, Yield and Production)

4.3.1 Crop Areas

In Rwanda, in terms of land area under crops the main crops grown in Season A 2013 were Beans (25.9%), Banana (21.3%), Cassava (13.7%) and Maize (11.3%) (see Table 22). Sweet potatoes and Irish potatoes both accounted for around 10.1 % of the agricultural land: Sweet potatoes (6.8%) and Iris potatoes (3.3%) (See also Figure 12). In terms of land area under crops, the following were the main groups of crops: Pulses (30.9%), Tubers and Roots (24.9%), Bananas (21.3%) and Cereals (15.5%) while Fruits and Vegetables and other crops accounted for less than 10 % of the total share of agricultural land (see Figure 13).

Table 22: Area (Ha) Cultivated by Crop and Group of Crops by Province (Hectares)

Crops	Kigali City	Southern	Western	Northern	Eastern	Rwanda	Percent
Cereals	**2,573**	**20,055**	**39,354**	**31,174**	**72,797**	**165,954**	**15.5**
Maize	2,408	13,648	30,922	26,210	47,763	120,951	11.3
Sorghum	4	730	735	1,727	21,825	25,020	2.3
*Other cereals	162	5,677	7,698	3,237	3,209	19,983	1.9
Tubers and Roots	**6,199**	**94,080**	**63,863**	**36,717**	**65,085**	**265,943**	**24.9**
Cassava	4,325	64,731	29,394	7,827	40,409	146,686	13.7
Sweet Potatoes	1,236	19,452	17,765	18,647	15,073	72,173	6.8
Irish Potatoes	436	6,161	12,300	9,249	7,321	35,467	3.3
Yams & Taro	202	3,737	4,404	993	2,282	11,618	1.1
Banana	**5,770**	**59,570**	**37,129**	**30,261**	**94,966**	**227,697**	**21.3**
Cooking Banana	2,408	10,887	8,638	8,115	63,619	93,668	8.8
Banana Fruit	1,685	12,381	3,521	5,950	6,048	29,584	2.8
Banana for beer	1,677	36,303	24,970	16,196	25,299	104,444	9.8
Pulses	**8,878**	**100,991**	**49,755**	**57,689**	**111,998**	**329,312**	**30.9**
Beans	6,728	82,162	41,189	52,858	93,277	276,214	25.9
Bush beans	6,427	58,681	11,066	13,138	86,145	175,456	16.4
Climbing beans	301	23,482	30,123	39,720	7,132	100,758	9.4
Peas	22	3,069	3,544	3,290	882	10,807	1.0
Groundnuts	321	5,250	287	327	13,885	20,070	1.9
Soya beans	1,719	9,823	4,551	1,178	3,916	21,188	2.0
Other legumes & Pulses	88	687	183	36	38	1,032	0.1
Vegetables and Fruits	**975**	**3,241**	**4,626**	**4,034**	**4,513**	**17,389**	**1.6**
Vegetables	855	2,121	3,104	2,395	3,050	11,525	1.1
Fruits	120	1,120	1,522	1,639	1,463	5,864	0.5
Other crops	**2,174**	**15,838**	**23,398**	**6,440**	**13,231**	**61,081**	5.7
Total developped crop land	**26,570**	**293,775**	**218,125**	**166,315**	**362,591**	**1,067,375**	**100**
Total Physical crop land	**25,082**	**277,200**	**208,466**	**161,640**	**345,857**	**1,018,245**	**100**
Fallow land	**4,686**	**85,694**	**46,075**	**28,383**	**176,398**	**341,236**	**34**

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Most of the Beans and Banana were mainly grown in the Eastern and Southern Provinces of the country. Maize was mainly grown in the Eastern, Western and Northern Provinces of the country while Cassava was mainly grown in the Southern, Eastern and Western Provinces of the country.

Figure 12: Share of Agriculture Land by Crops

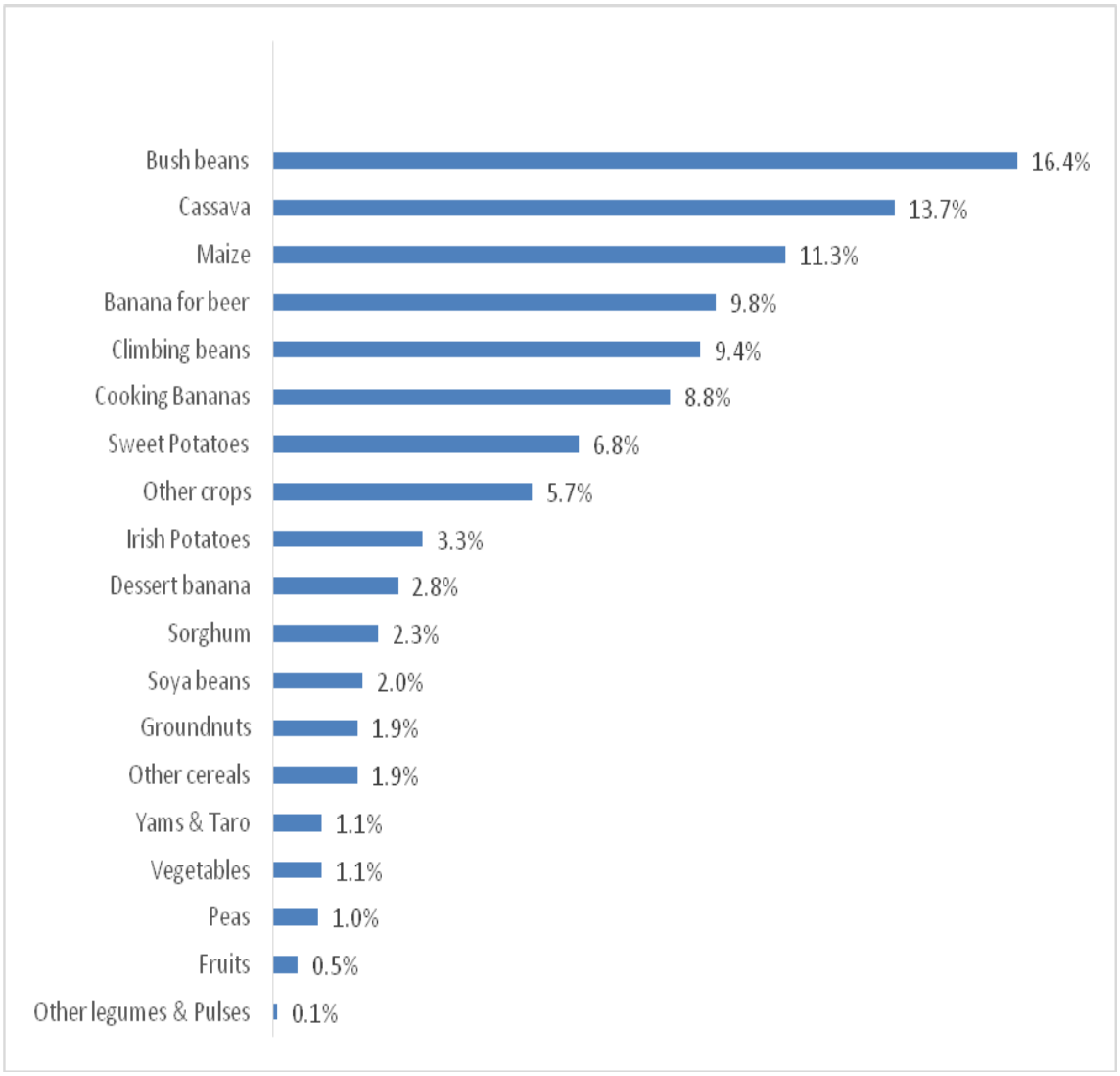
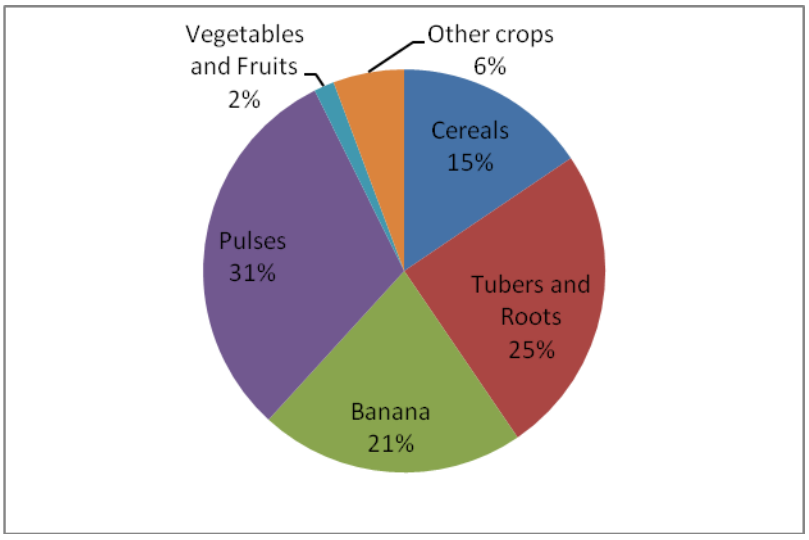


Figure 13: Share of Agriculture Land by Group of Crops



The survey results (see Table 23) showed that the average size of tracts for Agricultural Operators in Rwanda was 0.24 hectares.

Table 23: Average Size of Tracts by Province

Province	Average (Ha)
Kigali City	0.29
Southern	0.24
Western	0.18
Northern	0.15
Eastern	0.40
Rwanda	0.24

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The Eastern Province had the largest average size of tract for Agricultural Operators (0.40 Ha.) followed by Kigali City (0.29 Ha.), Southern Province (0.24 Ha.), Western Province (0.18 Ha.) and Northern Province (0.15 Ha).

The survey results confirmed the already known information on plot sizes for Agricultural Operators in Rwanda to be very small. (see Table 24)

Table 24: Average Size of Cultivated Plots of Agricultural Operators by Main Crops (Ha)

	Kigali City	Southern	Western	Northern	Eastern	Rwanda
Maize	0.03	0.03	0.05	0.04	0.06	0.05
Sorghum	0.01	0.10	0.05	0.06	0.19	0.15
Other cereals	0.07	0.06	0.12	0.09	0.07	0.08
Bush beans	0.09	0.08	0.05	0.06	0.12	0.09
Climbing beans	0.07	0.06	0.06	0.06	0.09	0.06
Peas	0.01	0.02	0.04	0.03	0.03	0.03
Other legumes & pulses	0.09	0.08	0.02	0.01	0.03	0.05
Cassava	0.08	0.10	0.07	0.04	0.10	0.08
Irish potatoes	0.03	0.03	0.07	0.05	0.05	0.05
Sweet potatoes	0.05	0.04	0.04	0.04	0.05	0.04
Yams & Taro	0.04	0.02	0.03	0.02	0.04	0.03
Tomotoes	0.04	0.03	0.04	0.04	0.05	0.04
White cabbage	0.03	0.02	0.03	0.02	0.03	0.03
Flower cabbage		0.05		0.06		0.06
Onion	0.00	0.03	0.04	0.01	0.02	0.03
Carrot		0.01	0.04	0.02	0.06	0.03
Eggplant	0.06	0.02	0.04	0.02	0.04	0.03
Other vegetables	0.04	0.01	0.01	0.02	0.04	0.02
Cooking Bananas	0.09	0.05	0.05	0.05	0.13	0.09
Banana Fruit	0.08	0.07	0.05	0.05	0.07	0.06
Banana for beer	0.10	0.09	0.10	0.07	0.12	0.09
Pineapple	0.05	0.06	0.06	0.06	0.09	0.07
Avocado	0.00	0.03	0.02	0.05	0.01	0.03
Passion fruits	0.15	0.00	0.06	0.02	0.06	0.04
Other fruits	0.02	0.02	0.05	0.05	0.07	0.05
Soya beans	0.11	0.04	0.04	0.02	0.05	0.04
Ground nuts	0.03	0.06	0.05	0.03	0.07	0.06
sun flower		0.01	0.00	0.03	0.01	0.01
other oil seeds		0.01				0.01
coffee	0.06	0.07	0.07	0.06	0.09	0.07
Pyrethrum			0.12	0.14		0.13
Other crops	0.11	0.08	0.10	0.04	0.10	0.08
Fallow land	0.15	0.13	0.13	0.10	0.47	0.20
Uncultivated	0.14	0.12	0.07	0.07	0.07	0.08

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The majority of plot sizes were below 0.10 Ha with the exception of Sorghum (0.15 Ha.) and Pyrethrum (0.13 Ha.). Surprisingly Fallow land in Segments had an average size of 0.20 Hectares whereby the Eastern Province has the largest fallow land average size of 0.47 Hectares.

The average size of cultivated plots of LSF by type of crop is given in Table 25. Clearly the sizes of plots managed by LSF are much bigger that those managed by Agricultural Operators in Segments.

Table 25: Average Size of Cultivated Plots of Large Scale Farmers by Main Crop (Hectares)

	Kigali	Southern	Western	Northern	Eastern	Rwanda
Maize	11.0	7.3	3.3	9.7	6.9	7.6
Sorghum		2.0		2.1	3.3	3.3
Other cereals	36.0	65.0	0.1	6.4	121.5	55.2
Bush beans	2.3	7.7	0.1	1.4	2.1	2.6
Climbing beans	1.6	10.7	1.0	1.8	2.6	2.8
Peas		2.3		1.0	0.8	1.5
Other legumes & pulses	3.9	0.4			1.1	1.8
Cassava	0.5	11.8	0.7	0.7	2.2	4.0
Irish potatoes	1.5	7.0	5.0	7.6	1.4	5.7
Sweet potatoes	0.8	1.1	0.3	0.6	1.1	0.9
Yams & Taro	0.2	0.2	0.7			0.3
Tomotoes	0.2	0.4		1.0	3.9	2.7
White cabbage	0.1		0.1	0.6	0.2	0.4
Onion	0.0			0.2	0.4	0.3
Carrot	0.0		0.0	0.1		0.1
Eggplant		0.5			0.0	0.3
Other vegetables	1.4		0.1	0.8	0.6	0.7
Cooking Bananas	2.4	1.0	3.8	1.0	2.0	2.0
Banana Fruit	0.7	0.7		0.2	3.2	2.2
Banana for beer	0.0	1.3	0.5	0.6	2.0	1.4
Pineapple	1.0	4.7	0.1	0.6	11.0	7.4
Avocado			0.8		0.6	0.8
Passion fruits	0.3		0.3	0.1	0.5	0.3
Other fruits	1.1	1.3	0.4	0.7	13.3	4.2
Soya beans	4.2	0.5	0.0		19.4	14.2
Ground nuts		0.3			0.4	0.4
sun flower					0.3	0.3
coffee	5.0	2.8	1.9	4.6	9.1	4.3
Other crops	8.0	2.1	1.5	4.4	10.8	7.1
Urajwe	15.1	7.3	1.3	5.3	41.0	36.9
Uncultivated	3.1	4.7	2.7	21.3	5.5	6.0

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Paddy rice had the largest average size (56.2 Ha) of plots cultivated by LSF followed by Soya beans (14.2 Ha), Pineapple (7.4 Ha), Maize (7.6 Ha), other crops (4.9 Ha), Wheat (7.1 Ha), Irish potatoes (36.9 Ha), etc. Fallow land for LSF had the average size of 32.4 Hectares coming mostly from the Eastern Province (averaging about 37.4 Hectares).

4.3.2 Crop Yields

Crop yield also known as "Agricultural output" refers to the measure of yield of a crop per unit area of land cultivation (see Table 26).

Table 26: Crops Yield by Province (Kg/Ha)

Crops	Kigali City	Southern	Western	Northern	Eastern	Rwanda
Maize	1,839	1,381	1,587	2,047	2,012	1,836
Sorghum	-	764	504	1,158	1,314	1,263
Other cereals	-	1,833	1,379	1,228	1,010	1,413
Cassava	3,482	2,020	2,268	2,521	2,410	2,247
Sweet Potatoes	4,798	5,976	5,972	8,462	6,535	6,714
Irish Potatoes	3,940	5,367	16,999	8,477	4,686	10,054
Yams & Taro	1,786	2,221	3,750	12,906	897	3,446
Cooking Banana	3,126	1,759	3,295	3,103	5,257	4,428
Banana Fruit	13,924	3,034	2,852	1,815	5,241	3,839
Banana for beer	4,181	3,412	4,226	3,964	5,987	4,328
Beans	1,820	1,538	1,482	1,824	1,626	1,662
Bush beans	874	806	690	715	716	750
Climbing beans	947	732	793	1,110	910	912
Peas	491	836	618	825	353	721
Other legumes & Pulses	18,713	112	-	-	-	1,665
Groundnuts	302	418	215	993	493	474
Soya beans	1,099	743	128	737	249	548
Vegetables	20,554	4,605	8,177	10,130	12,274	9,927
Fruits	706	283	868	24,814	822	7,434

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In terms of crop yields countywide, the survey results showed that Irish potatoes had high yields in the Northern and Western Provinces; Sweet potatoes had high yields mainly in the Northern and Eastern Provinces; Vegetables had high yields mainly in the Northern Province, Kigali City and Eastern Province; Cooking Banana had high yields mainly in Western and Eastern Provinces and Kigali City; Banana for Beer had high yields mainly in the Eastern and Western Provinces; Fruits

had high yields mainly in the Northern and Western Provinces; and Dessert Banana had high yields mainly in Kigali City, Eastern and Southern Provinces.

4.3.3 Crop Production

The contribution of individual crop production by Province (see Table 27) was calculated using the product of yield and area under the crop.

Table 27: Production of Main Crops by Province (MT)

Crops	Kigali City	Southern	Western	Northern	Eastern	Rwanda	%
Cereals	**4,428**	**29,814**	**60,060**	**59,628**	**127,996**	**281,926**	**8.5**
Maize	4,428	18,849	49,077	53,652	96,085	222,090	6.7
Sorghum	-	557	370	2,000	28,670	31,597	1.0
Other cereals	-	10,408	10,613	3,976	3,242	28,239	0.9
Tubers and Roots	**23,068**	**288,332**	**398,358**	**268,741**	**232,246**	**1,210,746**	**36.6**
Cassava	15,062	130,736	66,663	19,731	97,389	329,581	10.0
Sweet Potatoes	5,928	116,236	106,097	157,787	98,507	484,556	14.7
Irish Potatoes	1,717	33,062	209,084	78,404	34,302	356,569	10.8
Yams & Taro	360	8,299	16,514	12,819	2,048	40,039	1.2
Banana	**38,006**	**180,579**	**144,038**	**100,184**	**517,617**	**980,424**	**29.6**
Cooking Banana	7,527	19,152	28,464	25,185	334,449	414,776	12.5
Banana Fruit	23,467	37,565	10,041	10,801	31,695	113,570	3.4
Banana for beer	7,012	123,862	105,533	64,198	151,474	452,078	13.7
Pulses	**9,537**	**76,620**	**34,349**	**57,377**	**76,297**	**254,180**	**7.7**
Beans	5,900	64,479	31,512	53,469	68,168	223,528	6.8
Bush beans	5,615	47,287	7,631	9,390	61,677	131,599	4.0
Climbing beans	285	17,192	23,881	44,080	6,491	91,929	2.8
Peas	11	2,566	2,192	2,715	312	7,794	0.2
Groundnuts	97	2,196	62	325	6,843	9,522	0.3
Soya beans	1,889	7,302	583	869	974	11,617	0.4
Other legumes & Pulses	1,641	77	-	-	-	1,718	0.1
Vegetables and Fruits	**17,656**	**10,084**	**26,701**	**64,933**	**38,637**	**158,011**	**4.8**
Vegetables	17,571	9,768	25,379	24,260	37,435	114,414	3.5
Fruits	85	316	1,321	40,673	1,202	43,597	1.3
Other crops	**32,055**	**71,035**	**71,919**	**28,017**	**218,441**	**421,465**	12.7
Total	**124,750**	**656,463**	**735,425**	**578,879**	**1,211,234**	**3,306,751**	**100.0**

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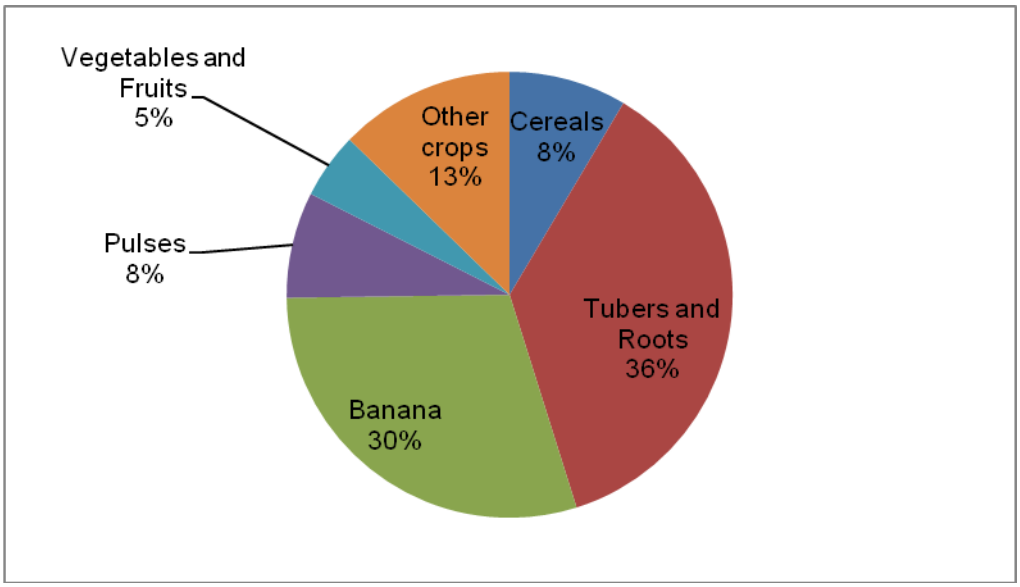
As shown in Figure 14, the share of crop production by groups of crops in Rwanda was significantly high for Tubers and Roots (36%) followed by Banana (30%). Other crop groups contributed less than 10 % as follows: Cereals (8%); Pulses (8%) and Vegetables and Fruits (5%). The share of crop production for individual crops was highest for Sweet Potatoes (14.7%),Banana for Beer (13.7%) followed by Cooking banana (12.7%), Irish Potatoes (10.8%) and Cassava (10.0%). The remaining crops contributed less than 9 % each to the total crop production of the country (see Figure 14).

Figure 14: Share of Agricultural Production by Group of Crops



4.4 Agricultural Practices

4.4.1 Pure and Mixed Cropping

The survey results showed that the percentage share of agricultural land used by Agricultural Operators to grow crops in pure stand and mixed stand in Rwanda was 36.2 % and 63.8 % respectively (see Table 28). For LSF the share between pure stand and mixed stand was 84.2 % and 15.8 % respectively.

Table 28: Share of Pure and Mixed Crop Agricultural Land (%)

Province	Agricultural Operators			Large Scale Farmers		
	Pure Crop Land	Mixed Crop Land	Total	Pure Crop Land	Mixed Crop Land	Total
Kigali City	30.7	69.3	100	82.9	17.1	100
Southern	34.2	65.8	100	89.0	11.0	100
Western	47.8	52.2	100	93.0	7.0	100
Northern	46.7	53.3	100	97.4	2.6	100
Eastern	26.4	73.6	100	80.4	19.6	100
Rwanda	36.2	63.8	100	84.2	15.8	100

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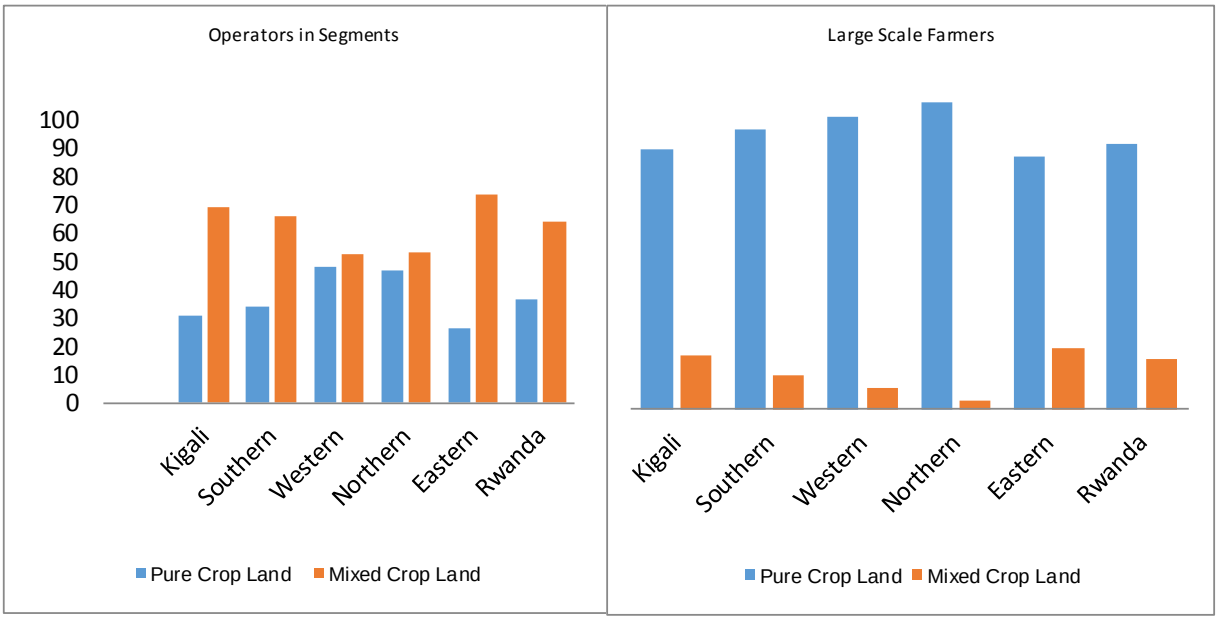
In general Agricultural Operators used most of their agricultural land to cultivate mixed crops while LSF devoted most of their agricultural land to cultivate crops in pure stand.

Figure 15 shows the share of pure and mixed cropping agricultural land for both Agricultural Operators and Large Scale Farmers.

Figure 15: Share Pure and Mixed Crop Agricultural Land



On the land used by Agricultural Operators and LSF in pure or mixed stand, Table 29 clearly shows that on average 98.4 % of all pure crop land was used by Agricultural Operators while only 1.6 % was used by LSF.

The same table also shows that on average 99.8 % of the mixed crop land in Rwanda during 2013 agricultural season A was used by Agricultural Operators while only 0.2 % was used by LSF.

Table 29: Share of Pure and Mixed Crop Agricultural Land (%)

Province	Pure Crop Agricultural Land			Mixed Crop Agricultural Land		
	Agricultural Operators	Large scale farmers	Total	Agricultural Operators	Large scale farmers	Total
Kigali City	91.4	8.6	100	99.2	0.8	100
Southern	98.9	1.1	100	99.9	0.1	100
Western	99.9	0.1	100	100.0	0.0	100
Northern	98.9	1.1	100	100.0	0.0	100
Eastern	96.4	3.6	100	99.7	0.3	100
Rwanda	98.4	1.6	100	99.8	0.2	100

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Table 30 shows the use of agricultural land for growing main crops in pure stand in the country. Kigali City used only 2.0 % of total l and for pure stand while the other Provinces used on average between 20-27 % of the total agricultural land to cultivate crops in pure stand.

Table 30: Pure Crop Agricultural Land (Ha) in Segments by Type of Crop (%)

Province	Maize	Sorghum	Bush beans	Climbing beans	Cassava	Irish potatoes	Sweet potatoes	Banana	Others	Total	Percent
Kigali City	2.3	-	9.0	0.9	21.5	1.4	7.6	13.5	43.8	100	2.0
Southern	3.1	0.5	9.4	7.1	32.2	1.7	11.3	11.9	22.8	100	26.0
Western	14.5	0.2	1.6	12.4	11.8	8.3	10.1	11.4	29.6	100	27.1
Northern	18.0	0.4	3.6	27.5	4.3	6.7	18.7	5.2	15.6	100	20.1
Eastern	16.0	4.7	11.3	2.4	14.3	1.7	10.0	20.0	19.6	100	24.6
Rwanda	12.3	1.4	6.6	11.3	16.4	4.5	12.1	12.5	22.8	100	100

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4.4.2 Use of Organic Fertilizer

In segments, 55.3 % of all Agricultural Operators in Rwanda reported that they already used fertilizer while 44.7 % did not use fertilizer (see Table 31). The total number of Agricultural Operators who already used organic fertilizers in the Provinces was compared to the total number of Agricultural Operators in the country. Agricultural Operators in the Northern Province (76.4%) were the most user of organic fertilizer followed by Southern Province (56.9%), Western Province (56.9%), Kigali City (41.0%) and Eastern Province (38.8%) (see Figure 16).

Table 31: Users of Organic Fertilizers (%)

Province	Agricultural Oper	Large Scale Farmers
	Used organic fertilizers	Used organic fertilizers
Kigali City	41.0	65.3
Southern	56.9	81.4
Western	55.4	51.6
Northern	76.4	79.1
Eastern	38.9	57.0
Rwanda	55.3	62.3

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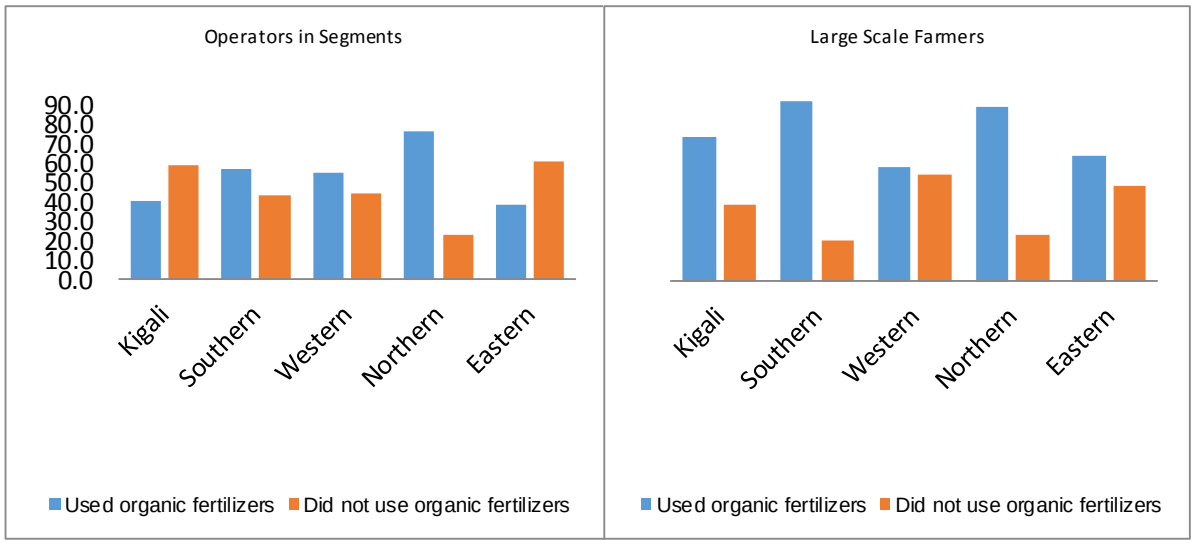
For Large Scale Farmers, 62.3 % of LSF already used fertilizers and 37.7 had not already used fertilizer. The Southern Province was the highest (81.4%) in the use of organic fertilizer followed by Northern Province (79.1%), Kigali City (65.3%), Eastern Province (57.0%) and Western Province (55.4%) (see Figure 16).

Figure 16: Use of Organic Fertilizer in Provinces (%)



4.4.3 Use of Inorganic Fertilizer by Agricultural Operators and Large Scale Farmers

The survey results showed that 19.9 % of Agricultural Operators used inorganic fertilizers while 44.5 % of LSF used inorganic fertilizers during Season A 2013 (see Table 32 and Figure 17). This shows that a larger proportion of LSF used inorganic fertilizer than Agricultural Operators during this agricultural season.

Table 32: Use of Inorganic Fertilizer

	Agricultural Opera	Large Scale Farmers
	Used inorganic fertilizers	Used inorganic fertilizers
Kigali City	18.4	55.3
Southern	11.4	65.7
Western	28.5	68.8
Northern	29.5	73.1
Eastern	14.2	33.2
Rwanda	19.9	44.5

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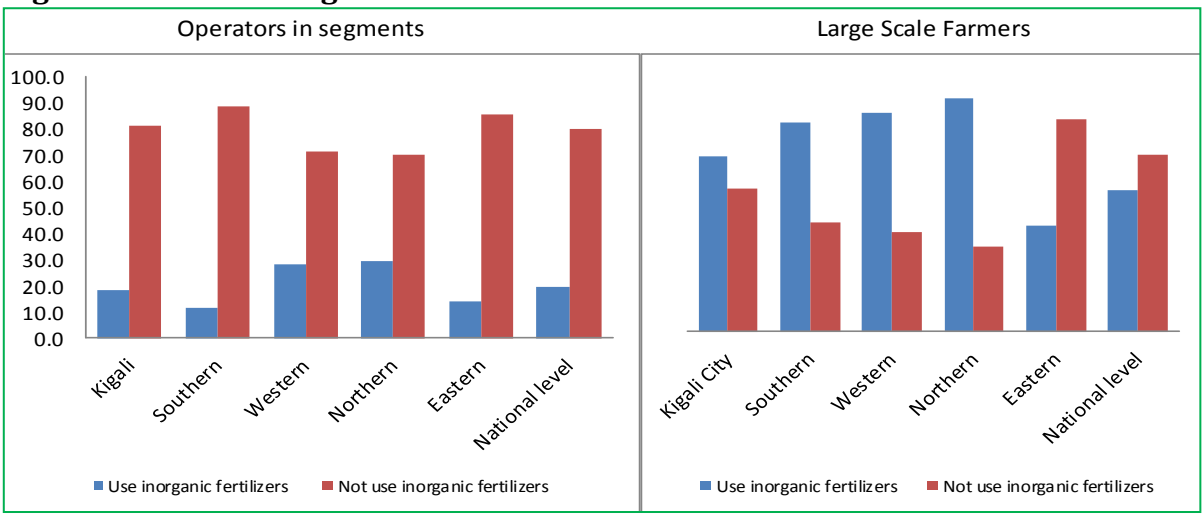
Agricultural Operators in the Northern Province were the biggest users of inorganic fertilizers (29.5%) followed by the Western Province (28.5%). The Southern Province (11.4%) had the smallest percentage of users of inorganic fertilizers. For LSF, Northern Province (73.1%) ranked highest in the use of inorganic fertilizer while Eastern Province ranked lowest.

Figure 17: Use of Inorganic Fertilizers



On the type of inorganic fertilizer used by Agricultural Operators and LSF (see Table 33), the majority of Agricultural Operators used DAP fertilizer (43.9%), followed by Urea (33.3%), NPK (20.9%). UREA (LIQUID) and LIME were equally used by 0.9% of Agricultural Operators.

Table 33: Type of Inorganic Fertilizer Used (%)

	Agricultural Operators	Large Scale Farmers
NPK	20.9	18.7
UREA	33.3	39.3
UREA(LIQUID)	0.7	1.1
DAP	43.9	38.5
LIME	1.2	2.5

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On the type of fertilizer used by LSF, the majority of LSF used UREA (39.3%), followed by DAP (38.5%) and NPK (18.7%). UREA (LIQUID) and LIME were used by 0.7 % and 1.2 % respectively of LSF.

Table 34: Agricultural Operators Using Inorganic Fertilizers by Type and by Province (%)

	Agricultural Operators						Large scale farmers					
Province	NPK	UREA	UREA (LIQUID)	DAP	LIME	Total	NPK	UREA	UREA (LIQUID)	DAP	LIME	Total
Kigali City	0.2	0.5	0.2	2.9	-	3.8	2.2	4.9	0.5	3.6		11.3
Southern	5.5	3.6	0.1	5.9	0.5	15.6	4.4	4.1		3.3	1.6	13.5
Western	9.0	11.6	0.2	12.7	0.3	33.7	1.9	1.9		1.6		5.5
Northern	4.9	11.4	0.2	14.2	0.4	31.1	7.1	8.0		8.5	0.8	24.5
Eastern	1.3	6.2	0.1	8.2	0.1	15.8	3.0	20.3	0.5	21.4		45.3
Total	20.9	33.3	0.7	43.9	1.2	100	18.7	39.3	1.1	38.5	2.5	100

2013 Seasonal Agricultural Survey - Season A

Western Province (33.5%) had the largest number of users of inorganic fertilizers while Southern Province (15.6%) had the smallest number of Agricultural Operators using inorganic fertilizers. For LSF, Eastern Province (45.3%) had the largest number of users and Western Province had the smallest number of users of inorganic fertilizer.

Table 35: Distribution of Agricultural Operators and LSF Using Inorganic Fertilizer by Type

						Large scale farmers				
Province	NPK	UREA	UREA (I	DAP	LIME	NPK	UREA	UREA(	DAP	LIME
Kigali City	1.0	1.4	30.8	6.6		11.8	12.6	50.0	9.3	
Southern	26.1	10.9	15.4	13.5	39.1	23.5	10.5		8.6	66.7
Western	43.0	34.9	23.1	28.9	21.7	10.3	4.9		4.3	
Northern	23.6	34.2	23.1	32.3	34.8	38.2	20.3		22.1	33.3
Eastern	6.2	18.6	7.7	18.6	4.3	16.2	51.7	50.0	55.7	
Rwanda	100	100	100	100	100	100	100	100	100	100

2013 Seasonal Agricultural Survey - Season A

Agricultural operators in Western Province were the biggest users of inorganic fertilizers (43.0% for NPK while for LSF the Eastern Province were the biggest users of DAP and Urea (55.7% and 51.7% respectively).

4.4.4 Use of Seeds

In Rwanda, Agricultural Operators used traditional seeds more than improved ones (82.1 % and 17.9 % respectively). The use of traditional seeds and improved seeds by LSF by Province is also given in Table 36 and Figure 18.

Table 36: Agricultural Operators by Type of Seeds Used

Province	Agricultural Operators		Large Scale Farmers	
	Traditional seeds	Improved seeds	Traditional seeds	Improved seeds
	Percent	Percent	Percent	Percent
Kigali City	75.2	24.8	50.6	49.4
Southern	86.4	13.6	52.1	47.9
Western	77.5	22.5	63.0	37.0
Northern	77.2	22.8	47.7	52.3
Eastern	86.6	13.4	64.4	35.6
Rwanda	82.1	17.9	59.0	41.0

2013 Seasonal Agricultural Survey - Season A

For Agricultural Operators, Eastern Province had the largest share of users of traditional seeds (86.6%) while Kigali City (75.2%) had the largest share of users of improved seeds in Rwanda.

For LSF, the Northern Province (52.3%) had the largest share of users of improved seeds while the Eastern Province (35.6%) had the smallest share of users of improved seeds.

Figure 18: Use of Traditional Seeds and Improved Seed (%)

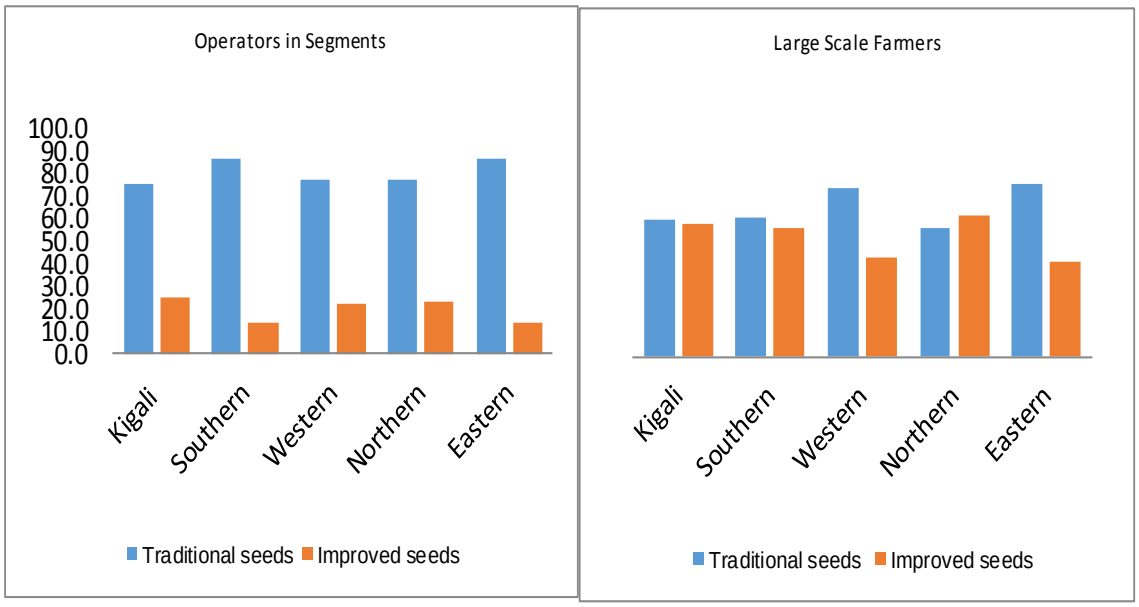


Table 37: Users of Traditional Seeds by Type of Crop (in %)

	Agricultural Operators						Large Scale Farmers					
	Kigali City	Southern	Western	Northern	Eastern	All Rwanda	Kigali City	Southern	Western	Northern	Eastern	All Rwanda
Maize	1.3	5.3	4.7	3.8	9.6	24.7	1.1	1.1	1.1	0.9	16.9	21.0
Paddy rice		0.6	0.0	0.0	0.3	1.0	0.3	0.8	0.2		0.3	1.5
Sorghum	0.0	0.1	0.2	0.3	1.9	2.5				0.2	11.5	11.6
Wheat	0.0	0.1	0.2	0.1	0.0	0.4				0.3	0.2	0.5
Other cereals		0.0	0.0	0.2	0.1	0.3					0.2	0.2
Bush beans	1.6	9.4	2.7	2.0	10.5	26.1	1.1	1.7	0.5	0.8	17.3	21.3
Climbing beans	0.1	5.0	6.6	6.6	1.1	19.4	0.2	0.6	1.1	3.0	0.6	5.4
Peas	0.1	2.3	1.3	1.1	0.4	5.1		0.6		0.6	0.3	1.5
Cassava		0.2	0.1	0.0	0.1	0.3	0.3	1.8	0.6	0.3	6.3	9.4
Irish potatoes	0.2	2.1	2.4	1.9	2.2	8.9	0.3	1.8	0.5	3.5	2.4	8.4
Sweet potatoes		0.0	0.0	0.0	0.0	0.1	0.5	0.3	0.5	0.8	3.0	5.0
Banana Fruit		0.0	0.0	0.0		0.0	0.6	0.5		0.9	3.9	5.9
Banana for beer		0.1	0.0	0.0	0.0	0.1	0.2	0.5	0.3	0.9	2.0	3.8
Soya beans	0.2	3.0	1.4	0.5	1.1	6.2	0.2	0.3	0.2		0.8	1.4
Ground nuts	0.2	1.3	0.1	0.1	3.1	4.8		0.6			2.7	3.3

2013 Seasonal Agricultural Survey - Season A

Traditional seeds for Bush beans were the most used in the two groups of farmers (26.1% for Agricultural Operators and 21.3% for Large Scale Farmers) (see Table 37) followed by traditional seeds for Maize (24.7% of Agricultural Operators and 21% of LSF).

Table 38: Users of Improved Seeds by Type of Crop (%)

	Agricultural Operators						Large Scale Farmers					
	Kigali City	Southern	Western	Northern	Eastern	All Rwanda	Kigali City	Southern	Western	Northern	Eastern	All Rwanda
Maize	1.2	5.6	23.8	20.8	15.1	66.5	8.3	3.4	2.1	10.4	28.7	52.9
Paddy rice		3.6	0.1	0.1	0.1	4.0	0.6	1.5			0.9	3.1
Sorghum											0.3	0.3
Wheat			0.0	0.1		0.2				2.8		2.8
Other cereals												
Bush beans	0.5	1.1	1.1	0.1	0.5	3.3	2.4	1.8		0.9	7.3	12.5
Climbing beans		0.6	1.5	2.8	0.2	5.1	0.3	0.9		3.7	2.8	7.6
Peas		0.1	0.6	0.1		0.8						
Cassava	0.3	2.4	1.5	0.2	0.9	5.2	0.6	0.6		0.3	1.5	3.1
Irish potatoes		0.3	0.3	0.7	0.1	1.5	0.3	0.3	0.6	4.6	0.3	6.1
Sweet potatoes		0.5	1.1	0.4	0.0	2.0				0.9	0.6	1.5
Banana Fruit	0.0	0.4	0.1		0.2	0.8	0.6	0.3		0.3	1.5	2.8
Banana for beer		0.5	0.7	0.0	0.0	1.3		0.6			0.3	0.9
Soya beans	2.7	5.6	0.1	0.0	0.5	9.0	0.9	0.6			4.6	6.1
Ground nuts		0.1			0.0	0.2					0.3	0.3

2013 Seasonal Agricultural Survey - Season A

Among Agricultural Operators and Large Scale Farmers, improved seed was mostly used for maize (66.5% and 52.9% respectively). The Western Province ranked highest in terms of use of improved seeds of Maize crop by Agricultural Operators while the Eastern Province ranked highest for LSF on the use of improved seeds of Maize.

4.4.5 Irrigation Practice

In Rwanda only 2.2% of Agricultural Operators practiced irrigation. The majority of Agricultural Operators did not practice irrigation. The few Agricultural Operators that practiced irrigation were in the Southern Province (3.4%), Eastern Province (2.3%) and Northern Province (2.1%). The distribution of Agricultural Operators and LSF that practiced irrigation in Rwanda by Province is given in Table 39 and Figure 19.

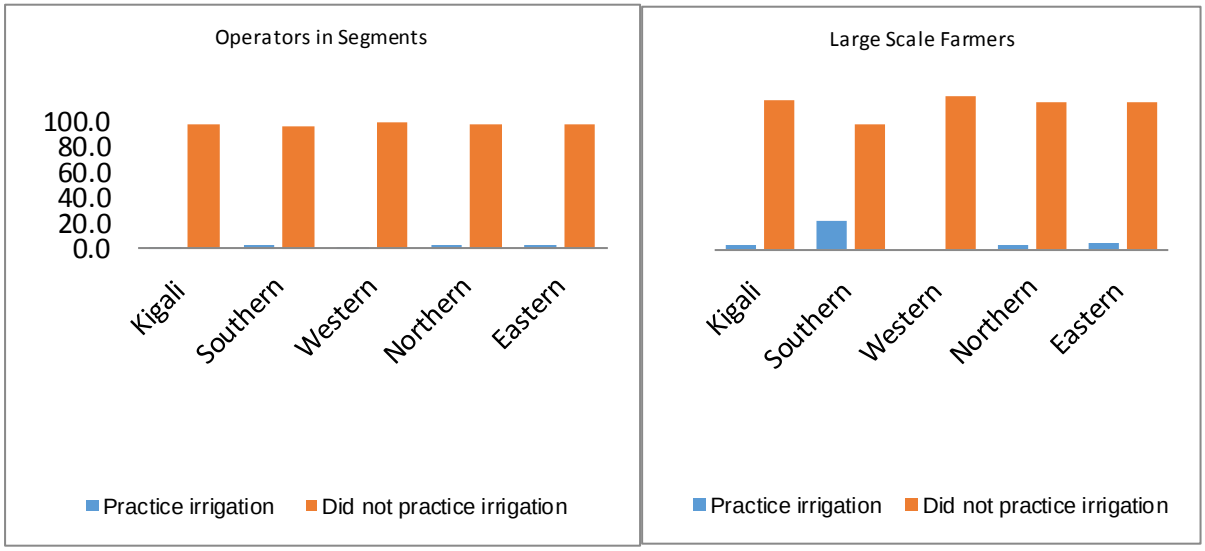
Table 39: Agricultural Operators and Large Scale Farmers Practicing Irrigation (%)

	Agricultural Operators	Large Scale Farmers
Kigali City	1.4	2.8
Southern	3.4	18.6
Western	0.7	-
Northern	2.1	3.0
Eastern	2.3	4.0
Rwanda	2.2	4.6

2013 Seasonal Agricultural Survey - Season A

The survey results showed that about 4.6 % of LSF in Rwanda practiced irrigation (see Table 39 and

Figure 19: Irrigation Practice by Agriculture Operators and Large Scale Farmers



On the type of irrigation practiced by Agricultural Operators, the survey results showed that the majority of Agricultural Operators practiced Water drainage type of irrigation (64.8%), followed by those that used Watering cans (16.9%) and other (see Table 40).

Table 40: Agricultural Operators by Type of Irrigation Practiced (%)

Province	Agricultural Operators				
	Pumps/tube wells/irrigation machines	Watering can	Water drainage	Other	Total
	Percent	Percent	Percent	Percent	Percent
Kigali City		2.4			2.4
Southern	0.6	1.5	36.1	7.4	45.6
Western	1.8	2.7	4.1		8.6
Northern		3.6	7.7	7.1	18.3
Eastern		6.8	16.9	1.5	25.1
Rwanda	2.4	16.9	64.8	16.0	100
2013 Seasonal Agricultural Survey - Season A					

Use of water drainage for irrigation was predominantly in the Southern Province (36.1%) and Eastern Province (16.9%). There was very little use of Pumps/Tube wells/Irrigation machines by Agricultural Operators in Rwanda (2.4%).

Table 41: Large Scale Farmers by Type of Irrigation Practiced (%)

	Pumps/tube wells/irrigation machines	Watering can	Water drainage	Other	Total
Kigali City			3.6	3.6	7.1
Southern	3.6	3.6	17.9	7.1	32.1
Northern		3.6	3.6	3.6	10.7
Eastern	28.6	3.6	3.6	14.3	50.0
Rwanda	32.1	10.7	28.6	28.6	100
2013 Seasonal Agricultural Survey - Season A					

Most of the LSF in Rwanda practiced the Pumps/Tube wells/Irrigation Machines type of irrigation (32.1%) and Water Drainage (28.6%) type of irrigation.

4.4.6 Anti-erosion Activities

Erosion refers to the process in which the earth's surface is worn away. Due the mountainous landscape of Rwanda, the Agricultural Operators practice anti-erosion activities to prevent the wasting away of the earth. The survey results (see Table 42 and Figure 20) show the distribution of Agricultural Operators and LSF practicing anti-erosion activities.

Anti-erosion was practiced by 63.2 % of Agricultural Operators and 53.9 % of LSF. Most of the anti-erosion activities were available for Agricultural Operators in the Northern Province (73.7%) followed by Western Province (65.8%) , Southern Province (65.4%), Eastern Province (53.5%) and Kigali City (36.8%).

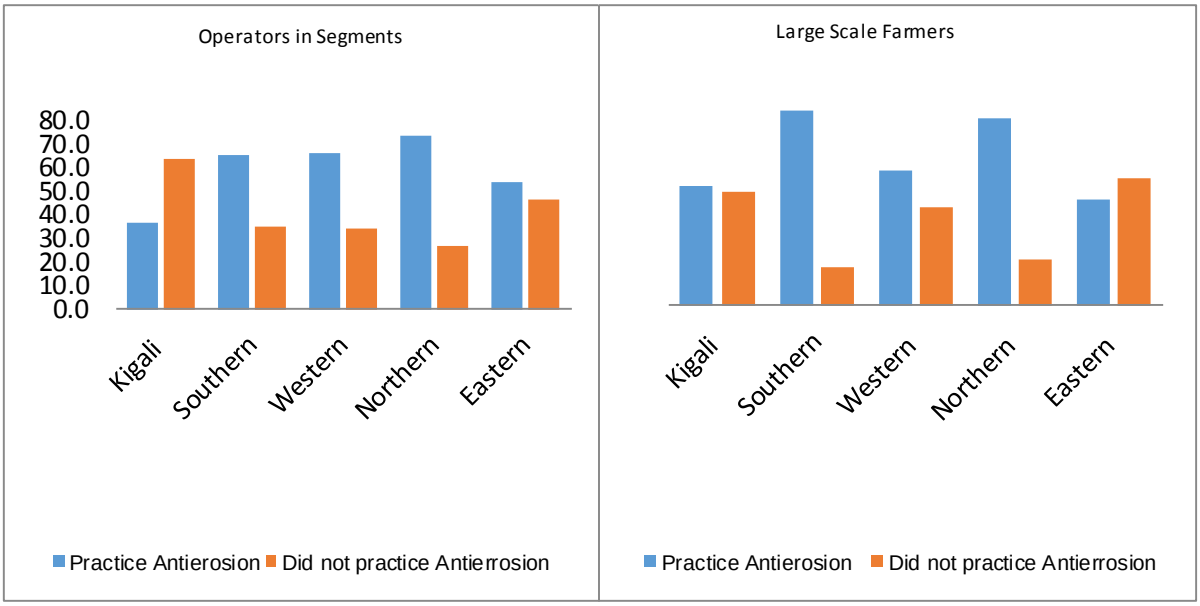
Table 42: Anti-erosion Activities by Agricultural Operators and Large Scale Farmers (%)

	Agricultural Operators	LSF
Kigali City	36.8	51.4
Southern	65.4	83.7
Western	65.8	58.1
Northern	73.7	80.6
Eastern	53.5	45.3
Rwanda	63.2	53.9

2013 Seasonal Agricultural Survey - Season A

For LSF, the Southern Province ranked high with 83.7 % having anti-erosion activities followed by Northern with 80.6 %, Western (58.1%), and Kigali City (51.4%).

Figure 20: Anti-erosion Activities by Agriculture Operators and Large Scale Farmers (%)



The Survey shows that in Rwanda the most practiced erosion control measures by Agricultural Operators in all Provinces were Grasses (48.7%) and Ditches (29.2%) (see Table 43). Other erosion control measures such as planting of trees, terracing, progressive tracing, waterway and mulching were also practiced by a small number of Agricultural Operators. The Western Province (30.5%), Southern Province (28.2%) and Northern Province (21.7%) were high in their use of anti-erosion control measures.

Table 43: Anti-erosion Activities by Agricultural Operators and LSF (%)

	Agricultural Operators in Segments								
	Ditches	Trees	Radical Terracing	Progressive terracing	Grasses	Water drainage	Mulching	Other	Total
Kigali City	0.5	0.0	0.0	0.3	1.8	1.1	0.3		4.0
Southern	12.6	0.4	0.2	0.5	10.8	3.0	0.8		28.2
Western	7.4	1.4	0.7	1.2	15.5	1.4	2.2	0.7	30.5
Northern	2.9	0.6	1.8	1.3	13.8	0.9	0.3	0.2	21.7
Eastern	5.8	0.2	0.0	0.4	6.8	0.9	1.3	0.1	15.5
Rwanda	29.2	2.7	2.7	3.6	48.7	7.2	4.9	1.0	100
	Large Scale Farmers by Type of Anti-erosion Activities Practised								
	Ditches	Trees	Radical Terracing	Progressive terracing	Grasses	Water drainage	Mulching	Other	Total
Kigali City	4.1	1.5		1.1	4.1	3.7	1.5		15.9
Southern	6.3	0.7	1.5		2.6	2.2	1.1		14.4
Western	1.5	0.7	0.4		1.8	1.1		0.4	5.9
Northern	7.7	2.2	5.5	1.8	11.1	1.8			30.3
Eastern	16.6	1.5			5.9	7.0	2.2	0.4	33.6
Rwanda	36.2	6.6	7.4	3.0	25.5	15.9	4.8	0.7	100

2013 Seasonal Agricultural Survey - Season A

With regard to LSF use of anti- erosion activities, just like Agricultural Operators, LSF used mainly Ditches (36.2%) and Grasses (25.5%). In addition some of the LSF also used Water drainage (15.9%) type of irrigation. The Eastern Province (33.6%) and Northern Province (30.3%) ranked high in their use of erosion control measures.

4.4.7 Use Pesticides

The survey results showed that in Rwanda 6.8 % of Agricultural Operators used pesticides in their farming activities while 19.6 % of LSF used pesticides in the farming activities (see Table 44).

Table 44: Agricultural Operators and LSF using of Pesticide (%)

	Agricultural Operators	LSF
Kigali City	5.1	16.7
Southern	4.4	37.2
Western	11.2	25.8
Northern	10.3	50.7
Eastern	2.8	11.5
Rwanda	6.8	19.6

2013 Seasonal Agricultural Survey - Season A

For Agricultural Operators, the Western Province (11.2%) and Northern Province (10.3%) were high in their use of pesticides while for LSF the Northern Province (50.7%) was the highest user of Pesticides followed by Southern Province (37.2%), Western Province (25.8%) and Kigali City (16.7%) and Eastern Province (11.5%).

Countrywide the majority of Agricultural Operators used Dithane pesticide (32.1%), followed by Cypermetrine pesticide (22.2%), Ridomil pesticide (13.8%) and Dimethoate pesticide (12.0%) (see Table 45). Only 14.9 % of Agricultural Operators used other pesticides.

Table 45: Type of Pesticide used by Agricultural Operators

	DITHANE	RIDOMIL	DIMETHOATE	CYPERMETRINE	DURSIBAN	TILT	PILKARE	OTHER PESTICIDE	Total
Kigali City	1.5	0.2	0.3	0.8	0.4			1.1	4.3
Southern	3.8	0.4	0.3	6.5	1.3		0.1	1.0	13.4
Western	15.2	9.3	6.8	5.5	1.0	0.1	0.1	10.7	48.6
Northern	8.8	3.1	3.4	5.5	1.6	0.1	0.1	1.3	23.7
Eastern	2.9	0.8	1.3	3.9	0.2	0.1		0.9	10.0
Rwanda	32.1	13.8	12.0	22.2	4.5	0.3	0.2	14.9	100

2013 Seasonal Agricultural Survey - Season A

For Agricultural Operators, the Western Province (48.6%) had the highest use of pesticides, followed by Northern Province (23.7%), Southern Province (13.4%) and Eastern Province (10.0%). Countrywide the majority of LSF used Dithane pesticide (24.4%), followed by Cypermetrine pesticide (20.0%), Dimethoate pesticide (19.4%) and Ridomil pesticide (15.6%) (see Table 46 and Figure 21). Only 13.9 % of LSF used other pesticides

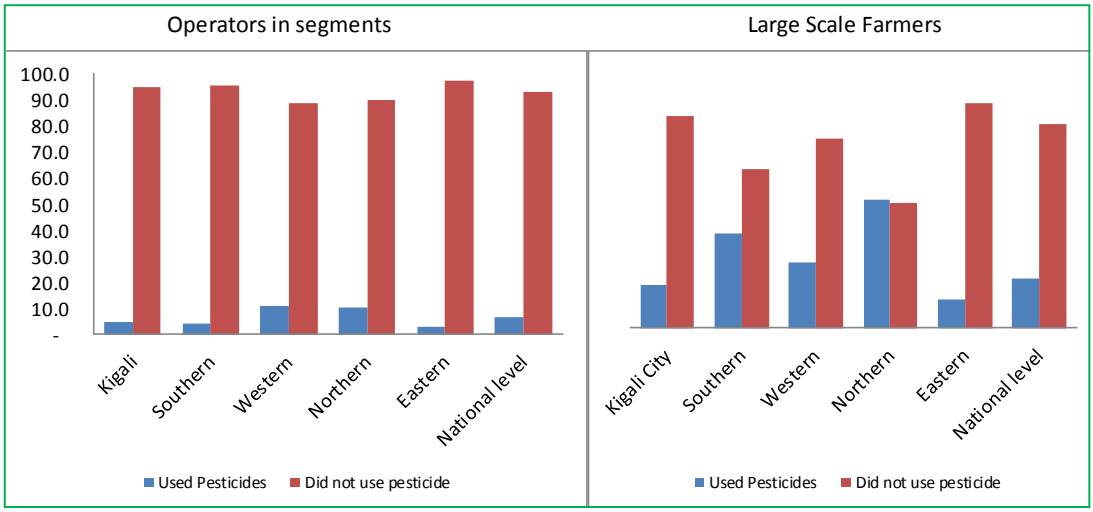
Table 46: Type of Pesticide used by LSF

	DITHANE	RIDOMIL	DIMETHOATE	CYPERMETRINE	DURSIBAN	OTHER PESTICIDE	Total
Kigali City	1.1	1.1	3.3		0.6	2.8	8.9
Southern	2.8	1.7	0.6	4.4	2.2	1.7	13.3
Western	2.8	0.6	0.6	1.1	0.6		5.6
Northern	13.9	8.3	4.4	8.3	1.1	2.8	38.9
Eastern	3.9	3.9	10.6	6.1	2.2	6.7	33.3
All Rwanda	24.4	15.6	19.4	20.0	6.7	13.9	100

2013 Seasonal Agricultural Survey - Season A

In LSF, Northern Province (38.9%) was the Province with the largest number of users of pesticides, followed by the Eastern Province (33.3%), Southern Province (13.3%), Kigali City (8.9%) and Western Province (5.6%).

Figure 21: Use of Pesticides by Agriculture Operators and LSF



4.5 Small Agricultural Equipment

The survey results showed that countrywide, most of the expenditure by Agricultural Operators was on the Hoe (25.1%) followed by the Bicycle (16.1%) (See Table 47). The expenditures on the other tools that were used for cultivation by Agricultural Operators were below 10 % each of the total expenditure.

Table 47: Expenditure by Type of Small Agricultural Equipment

Small Agricultural Equipment	Agricultural Operator	LSF
Hoe	25.1	7.7
Spring Hoe	2.1	0.3
Hoe majagu	5.3	11.2
Rake	0.1	27.7
Pick/ Ipiki	1.4	0.6
Wheelbarrow	0.4	1.8
Shovel/igitiyo	1.7	0.6
Sprayer	6.6	5.0
Watering can	0.9	0.2
Scie	0.2	0.1
Sickle	2.6	3.4
Sécateurs	0.1	0.0
Scythe	0.3	0.0
Axe/ishoka	1.8	0.3
Machete	3.8	1.4
Billhook	0.1	0.0
Mixer/umuvure	1.7	0.4
Mortar/isekuru	0.7	0.1
Mill/urusyo	0.1	0.0
Basket	2.6	0.9
Sack	4.9	9.6
Big basket	0.3	0.1
Pitcher	0.4	0.0
Winnower	1.6	3.8
Basket/ikibo	0.9	0.1
Basket/inkangara	0.2	0.0
Churn/igisabo	0.4	0.3
Calabash	0.1	0.1
Milk can/igicuba	0.7	3.3
Milk ju(icyansi)/ Milk container	0.2	0.6
Scales	2.6	1.8
Jerry.can	7.9	1.6
Barrel	2.4	1.1
Bike	16.1	4.9
Craft bike	0.2	0.0
Bowl/ingeremeri	0.3	0.2
Others(specify)	3.3	10.9
Total	100	100
2013 Seasonal Agricultural Survey - Season A		

Expenditure on small agricultural equipment by LSF was mainly on the Rake (27.7%) and Hoe Majagu (11.2%). Expenditures on the other tools that were used for cultivation by LSFs were below 10 % each of the total expenditure.

The survey results showed that In terms of percentage number of donations received by Agricultural Operators, Sacks (39.8%) were the largest donation followed by Baskets (15.1%) and Sickle (12.6%) (see Table 48). The rest of the donations of small agricultural equipment received by Agricultural Operators was each below 10% of the national total of donations that were received.

Table 48: Small Equipment Received from Non Agricultural Donors (%)

Hoe	8.1	0.1
Spring Hoe	0.3	0.0
Hoe majagu	0.2	0.1
Rake	0.2	0.1
Pick/ Ipiki	0.2	0.0
Wheelbarrow	0.2	0.1
Shovel/igitiyo	0.2	0.1
Sprayer	0.1	0.1
Watering can	0.4	0.0
Scie	9.8	
Sickle	12.6	0.3
Sécataurs	0.2	
Scythe	0.2	
Axe/ishoka	0.1	13.0
Machete	0.2	0.0
Billhook	0.3	
Mixer/umuvure	0.1	
Mortar/isekuru	0.1	
Mill/urusyo	0.2	
Basket	15.1	
Sack	39.8	30.9
Big basket	0.2	
Pitcher	0.3	
Winnower	0.1	
Basket/ikibo	0.3	0.0
Basket/inkangara	0.2	0.0
Churn/igisabo	0.1	0.0
Calabash	0.2	0.0
Milk can/igicuba	0.2	0.0
Milk ju(icyansi)/ Milk containe	0.2	
Scales	0.2	0.1
Jerry-can	1.9	32.7
Barrel	0.2	17.1
Bike	0.2	0.0
Craft bike	0.3	0.0
Bowl/ingeremeri	0.4	
Others(specify)	6.6	5.2
Total	**100**	**100**
2013 Seasonal Agricultural Survey - Season A		

Donations received by LSF were slightly different from those received by Agricultural Operators and were as follows: Jerry-can (32.7%), Sack (30.9%), Barrel (17.1%) and Axe/Ishoka (13.0%)

4.6 Use of Crop Production by Agricultural Operators and by Large Scale Farmers

Clearly the majority of the crop production (50% or more) by agricultural operators was consumed by the household except for Pyrethrum and Passion fruit which were consumed 100 % by the Agricultural Operators households. The rest of the crop production for some crops was offered as gifts to others, seed or stored. A small percentage of the crop production for some crops was used for payment of hired labour.

With respect to LSF, although the use of crop production was similar to that of Agricultural Operators, on the crop production consumed by the household, only Avocado was consumed 100 % by the LSF households. For some crops, a substantial percentage of the production was used as wages for hired labour, offered as gifts to others and used as seed or put in storage.

The survey results on the use of crop production by agricultural operators are given in Table 49 and 50.

Table 49. Use of Production by Agricultural Operators (%)

	Sold	Stored	Auto consumption	Used as wage for hired labour	Used as Farm rent	Offered as Gift to Other	Exchanged with other things	Used as seeds	Used as fodder	Total
Maize	20.6	11.2	56.6	1.4	.3	5.3	.1	4.0	.5	100
Paddy rice	61.3	2.1	31.5	.5	.7	.5	.7	2.6	.0	100
Sorghum	51.3	11.1	28.6	.7	1.5	1.8	.7	4.3	.0	100
Wheat	21.0	8.5	41.6	.0	.0	2.3	.0	21.7	5.0	100
Other cereals	23.6	18.3	54.0	.0	.0	.9	.0	3.2	.0	100
Bush beans	16.3	9.4	56.1	1.8	.3	3.6	.5	12.0	.0	100
Climbing beans	10.3	8.3	61.7	1.4	.0	4.5	.3	13.3	.1	100
Peas	10.0	7.4	64.8	.6	.4	2.8	.1	13.5	.4	100
Other legumes & pulse	10.9	3.1	83.7	.0	.0	.4	.0	1.9	.0	100
Cassava	29.0	3.0	59.9	2.9	.4	4.1	.1	.4	.3	100
Irish potatoes	24.1	1.1	57.4	1.4	.3	4.1	.1	11.2	.3	100
Sweet potatoes	16.8	8.8	65.1	3.3	.0	4.5	.1	.1	1.3	100
Yams & Taro	14.4	8.1	70.4	2.0	.0	4.8	.0	.3	.0	100
Tomotoes	61.1	1.0	29.0	.3	.0	8.0	.0	.4	.3	100
White cabbage	51.3	.0	37.0	.0	.6	10.7	.0	.0	.3	100
Onion	58.9	.6	29.9	.0	.0	4.7	.0	5.9	.0	100
Carrot	71.0	.0	26.4	.0	.0	2.6	.0	.0	.0	100
Eggplant	45.6	1.1	48.0	.1	.0	5.2	.0	.0	.0	100
Other vegetables	39.8	.0	51.4	.0	.0	5.0	.0	3.8	.0	100
Cooking Bananas	28.8	.1	65.8	1.4	.0	3.2	.2	.4	.1	100
Banana Fruit	60.5	.2	36.8	.2	.1	2.1	.0	.0	.0	100
Banana for beer	72.6	.2	22.4	.8	.2	3.5	.1	.1	.2	100
Pineapple	42.7	.0	50.1	.4	.0	6.8	.0	.0	.0	100
Avocado	48.3	19.4	26.0	.0	.0	4.2	.0	.0	2.0	100
Passion fruits	88.6	.0	11.4	.0	.0	.0	.0	.0	.0	100
Other fruits	56.8	.0	35.6	.0	.0	7.6	.0	.0	.0	100
Soya beans	20.1	13.0	50.3	1.3	.2	2.5	.3	11.8	.5	100
Ground nuts	23.3	8.6	45.9	.5	.8	1.9	.1	18.8	.1	100
sun flower	20.0	13.6	61.3	.0	.0	1.9	.0	3.2	.0	100
coffee	92.3	.9	5.7	.0	.0	.0	1.1	.0	.0	100
Pyrethrum	81.8	.0	18.2	.0	.0	.0	.0	.0	.0	100
Other crops	21.9	2.4	44.4	.0	.0	1.9	.6	.0	29.0	100

2013 Seasonal Agriculture Survey - Season A

Table 50. Use of Production by Large Scale Farmer (%)

	Sold by Household	Stored	Used by household (Auto consumption)	Used as wage for hired labour	Used as Farm rent	Offered as Gift to Other	Exchanged with other things	Used as seeds	Used as fodder	Total
Maize	47.4	15.3	27.8	1.8	.0	3.6	.0	2.9	1.2	100
Paddy rice	81.8	7.6	9.5	.4	.0	.0	.0	.6	.0	100
Sorghum	87.9	6.7	1.8	.5	.0	.9	.0	2.2	.0	100
Wheat	84.0	10.0	6.0	.0	.0	.0	.0	.0	.0	100
Other cereals	.0	100.0	.0	.0	.0	.0	.0	.0	.0	100
Bush beans	38.9	12.8	35.2	.1	.0	3.9	.3	8.8	.0	100
Climbing beans	43.4	16.2	29.7	1.3	.0	1.6	.0	7.0	.7	100
Peas	.0	30.0	60.0	.0	.0	.0	.0	10.0	.0	100
Cassava	38.7	7.9	42.7	6.7	.4	3.6	.0	.0	.0	100
Irish potatoes	54.4	1.8	34.5	1.3	.0	1.5	.0	6.5	.0	100
Sweet potatoes	18.5	7.6	50.7	12.6	.0	8.9	.0	.2	1.5	100
Tomotoes	73.0	.0	25.5	.0	.0	1.6	.0	.0	.0	100
White cabbage	45.3	.0	11.9	39.9	.0	3.0	.0	.0	.0	100
Onion	52.3	.0	35.0	12.7	.0	.0	.0	.0	.0	100
Carrot	82.5	.0	11.3	.0	.0	6.3	.0	.0	.0	100
Eggplant	75.0	.0	15.0	10.0	.0	.0	.0	.0	.0	100
Other vegetables	66.7	.0	33.3	.0	.0	.0	.0	.0	.0	100
Cooking Bananas	38.1	.7	54.1	2.1	.0	4.8	.0	.0	.2	100
Banana Fruit	77.4	.0	19.0	2.3	.0	1.3	.0	.0	.0	100
Banana for beer	68.0	.0	32.0	.0	.0	.0	.0	.0	.0	100
Pineapple	84.8	.0	14.5	.0	.0	.8	.0	.0	.0	100
Avocado	.0	.0	100.0	.0	.0	.0	.0	.0	.0	100
Passion fruits	66.0	28.0	4.0	.0	.0	2.0	.0	.0	.0	100
Other fruits	50.0	.0	50.0	.0	.0	.0	.0	.0	.0	100
Soya beans	18.2	44.3	20.0	.0	.0	3.5	.0	6.8	7.3	100
Ground nuts	43.3	6.6	41.4	.0	.0	4.9	1.3	2.7	.0	100
coffee	100.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Other crops	13.8	.0	18.3	.0	.0	.1	4.3	4.3	59.1	100

2013 Seasonal Agriculture Survey - Season A

Chapter 5: 2013 Season B Survey Results

5.1 Demographic and Social Characteristics of Agricultural Operators

Characteristics of Agricultural Operators describe the number, type, gender, age, education level, residency in segments, farming activities and cooperative membership.

5.1.1 Number of Agricultural Operators by Type

The survey results showed that most of the Agricultural Operators (99.3%) were individual farmers of which about 0.7 % only were members of cooperatives.

The distribution of Agricultural Operators in Segments by Province is given in Figure 22 while the distribution of LSF by Province is given in Figure 23. The distribution of Agricultural Operators was highest in the Southern Province (30.1%), followed by Western Province (24.3%) and Eastern Provinces (23.9%) , Northern Province (18.2%). The number and percentage of Agricultural Operators and Large Scale Farmers (LSF) by Province in 2013 Season B is given in Table 51 below.

Table 51: Number of Agricultural Operators by Province

Province	Agriculture Operators in Segments						Number of LSF	
	Individual Farmers		Cooperative		Total			
	Number	%	Number	%	Number	%	Number	%
Kigali City	539	98.9	6	1.1	545	3.5	60	12
Southern	4,691	99.2	38	0.8	4,729	30.1	39	8
Western	3,797	99.4	23	0.6	3,820	24.3	32	6
Northern	2,822	98.9	32	1.1	2,854	18.2	62	12
Eastern	3,771	99.7	11	0.3	3,782	23.9	310	62
Total	15,620	99.3	110	0.7	15,730	100	503	100

2013 Seasonal Agriculture Survey - Season B

In 2013 Season B, 503 Large Scale Farmers were listed and enumerated in Rwanda. The Eastern Province was represented by 62 % of the LSF followed by 12 % in Kigali City, 12 % in Northern Province, 8 % in Southern Province and 6 % in Western Province (see Figure 23).

Figure 22: Distribution of Agricultural Operators by Province

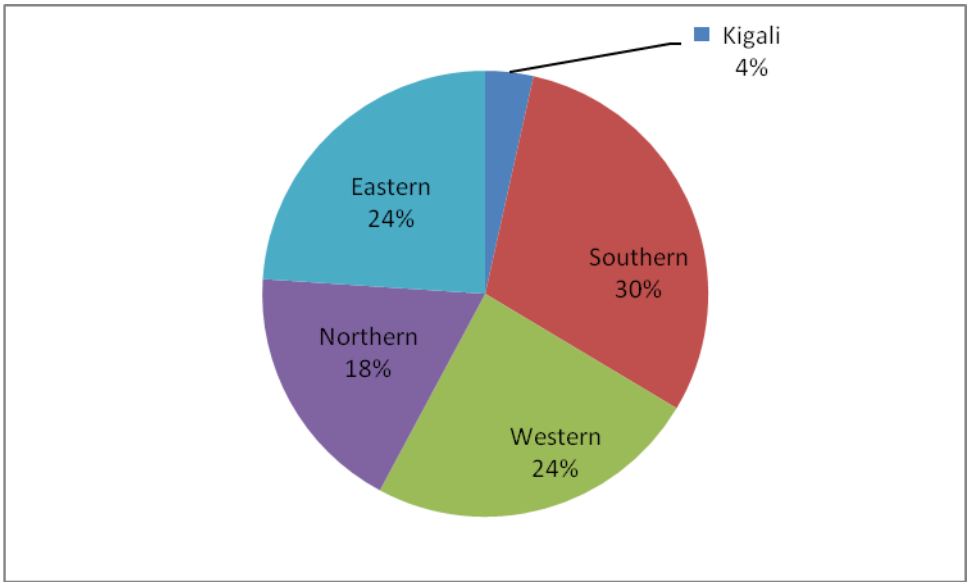
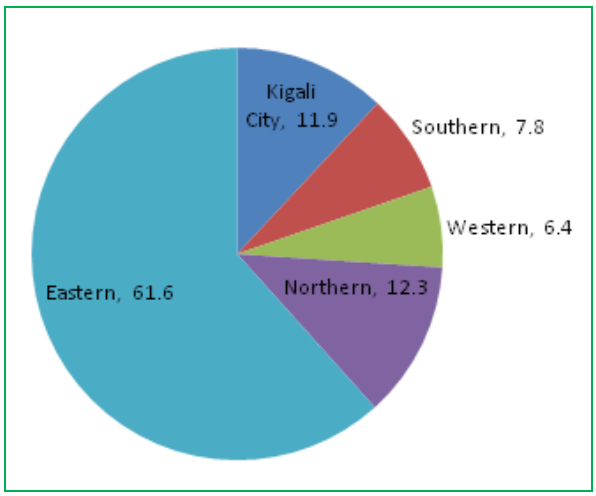


Figure 23: Distribution of Large Scale Farmers by Province



The cooperative membership of Agricultural Operators and LSF is given in Table 52. Among 503 LSF, 67.8 % stated being members of agricultural cooperatives while 32.2 % stated not being a member of an agricultural cooperative. Among 15,616 Agricultural Operators 19% were members of cooperatives and 81% were not members of cooperatives.

Table 52 : Cooperative Membership for Agricultural Operators and LSF

Province	Agricultural Operators			Large Scale Farmers		
	Yes	No	Total	Yes	No	Total
	Percent	Percent	Percent	Percent	Percent	Percent
Kigali City	22.0	78.0	100	30.0	70.0	100
Southern	24.0	76.0	100	69.2	30.8	100
Western	14.7	85.3	100	81.3	18.8	100
Northern	8.7	91.3	100	56.5	43.5	100
Eastern	26.9	73.1	100	75.8	24.2	100
Rwanda	19.6	80.4	100	67.8	32.2	100

2013 Seasonal Agriculture Survey - Season B

The cooperative membership of Agricultural Operators was highest in Eastern Province (26.6%) followed by the Southern Province (24.0%). For the LSF, Western Province had a highest proportion (81.3%) followed by Eastern Province (75.8%), Southern Province (69.2%), Northern Province (56.5%) and Kigali City (30.0%).

5.1.2 Number of Agricultural Operators by Gender

The percentage distribution of Agricultural Operators in Rwanda by gender is given in Table 53. In 2013 Season B the percentage distribution of Agricultural Operators in Rwanda by gender was 67.7 % male and 32.3 % female.

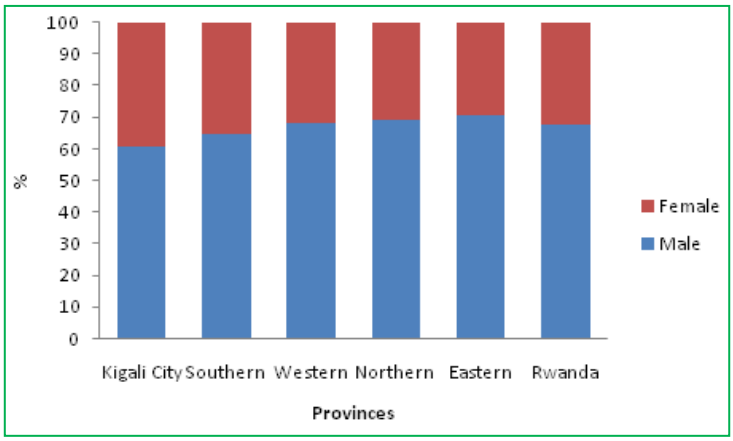
Table 53: Distribution of Agricultural Operator by Gender and Province

	Agriculture Operators		
	Male	Female	Total
Kigali City	60.9	39.1	100
Southern	64.8	35.2	100
Western	68.2	31.8	100
Northern	69.0	31.0	100
Eastern	70.5	29.5	100
Rwanda	67.7	32.3	100

2013 Seasonal Agriculture Survey - Season B

In Season B 2013, the comparison of gender distribution by Province showed that the largest number of male Agricultural Operators (70.5%) was in the Eastern Province while the smallest number of male Agricultural Operators (60.9%) was in Kigali City.

Figure 24: Distribution of Agricultural Operators by Gender and Province



The largest number of female Agricultural Operators (39.1%) was in Kigali City while the smallest number of female Agricultural Operators (29.5%) was in Eastern Province. The distribution of Agricultural Operators by gender and Province is shown in Figure 24.

5.1.3 Age distribution of Agricultural Operators

Table 55 shows that the majority of Agricultural Operators in Season B 2013 were in the age group 55 and above (25.2%) followed by 24.1 % of Agricultural Operators in age-group 25-34, 23.5% of Agricultural Operators were in age-group 35-44 while 21.6 % were in age-group 45-54.

Table 54: Age Distribution of Agricultural Operators

	Agricultural Operators in Segments				
	14-24	25-34	35-44	45-54	55 and Above
Kigali City	3.9	28.6	25.5	20.1	21.9
Southern	4.6	22.6	22.4	23.7	26.6
Western	5.3	23.2	23.1	22.5	25.9
Northern	5.5	23.5	24.4	20.5	26.1
Eastern	7.4	26.7	24.4	19.1	22.4
Rwanda	5.6	24.1	23.5	21.6	25.2
2013 Seasonal Agriculture Survey - Season B					

The age group distribution of Agricultural Operators by Province varied more in the age group 25-34 with Kigali City (28.6%) being highest and Southern Province (22.6%) being lowest. The least variation was in the age group 35-44 with Kigali City (25.6%) being the highest and Southern Province (22.4%) being the lowest.

The distribution of male Agricultural Operators in Rwanda was high in the age-group 25-34 (28.2%) followed by 24.7 % of male Agricultural Operators in age-group 35-44, 20.5 % of male operators in age-group 45-54 and 21.0 % in age-group 55 and above (See Table 55).

Table 55: Age Distribution of Male Agricultural Operators

	Agricultural Operators				
	14-24	25-34	35-44	45-54	55 and Above
Kigali City	4.3	32.0	24.1	18.6	21.0
Southern	4.6	27.3	23.7	22.6	21.8
Western	5.3	27.4	24.5	21.4	21.4
Northern	5.2	27.0	25.9	20.2	21.7
Eastern	7.6	30.5	25.3	17.6	19.1
Rwanda	5.6	28.2	24.7	20.5	21.0
2013 Seasonal Agriculture Survey - Season B					

The age group distribution of male Agricultural Operators by Province varied more in the age group 25-34 Kigali City (32.0%) being highest and Northern Province (27.4%) being lowest. The least variation was in the age group 35-44 with the Northern Province being the highest (25.9%) and Southern Province (23.7%) being the lowest.

The distribution of female Agricultural Operators in Rwanda was highest in the age-group 55 and above (33.9%) followed by 24 % of female operators in age-group 45-54, 21.1 % of female Agricultural Operators in age-group 35-44 and 15.5 % in age-group 25-34 (see Table 56).

Table 56: Age Distribution of Female Agricultural Operators

	Agricultural Operators				
	14-24	25-34	35-44	45-54 55 and Above	
Kigali City	3.3	23.2	28.0	22.3	23.2
Southern	4.5	13.9	20.2	26.0	35.5
Western	5.5	14.1	20.0	25.0	35.4
Northern	6.1	15.8	21.1	21.2	35.8
Eastern	7.0	17.6	22.2	22.7	30.4
Rwanda	5.5	15.5	21.1	24.0	33.9
2013 Seasonal Agriculture Survey - Season B					

The age group distribution of female Agricultural Operators by Province varied more in the age group 55 and Above with Northern Province (35.8%) being highest and Kigali City (23.2%) being lowest. The least variation was in the age group 14-24 with the Eastern Province (7.0%) being the highest and Kigali City (3.3%) being the lowest.

5.1.4 Education level of Agricultural Operators

In Rwanda the survey results of 2013 Season B showed 64.1 % of agricultural operators had completed primary level education, 29.5 % had no education, 5.4 % attained secondary level education and only 1 % had completed tertiary level education.

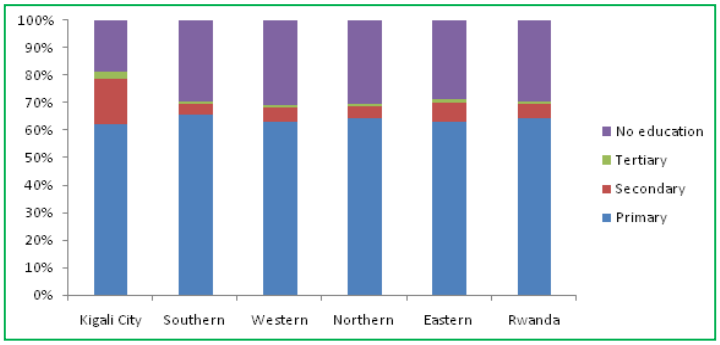
Table 57. Education level of Agricultural Operators (%)

	Agricultural Operators				
	Primary	Secondar	Tertiary	No educatio	Total
Kigali City	62.0	16.9	2.6	18.6	100
Southern	65.8	3.9	0.6	29.7	100
Western	63.1	5.0	1.1	30.8	100
Northern	64.4	4.3	1.0	30.3	100
Eastern	63.2	6.9	1.0	28.9	100
Rwanda	64.1	5.4	1.0	29.5	100
2013 Seasonal Agriculture Survey - Season B					

For those Agricultural Operators that had completed primary level education their distribution by province was reasonably uniform with Southern Province having slightly higher percentage (65.8%). For those Agricultural Operators that had no education, the Western Province had the highest percentage (30.8%) while Kigali City had the lowest percentage (18.6%) of Agricultural Operators. For those that had completed secondary education, Kigali City (16.9%) had the highest percentage while Southern Province had the lowest 3.9 %. For those that had completed Tertiary education Kigali City had the highest (2.6%) proportion of Agricultural Operators while Southern Province had the lowest 0.6 % of Agricultural Operators.

The figure 25 shows the distribution of education level of agricultural operators by province during 2013 Agricultural Season B.

Figure 25: Education Level of Agricultural Operators



In Rwanda, 70.0 % of male Agricultural Operators had completed primary level education, 22.5 % had no education, 6.2 % completed secondary level education and only 1.2 % had completed tertiary level education (see Table 58).

Table 58: Education level of Male Agricultural Operators (%)

	Primary	Secondar	Tertiary	No educatio	Total
Kigali City	63.7	18.9	3.35	14.0	100
Southern	70.8	4.3	0.8	24.1	100
Western	70.3	6.0	1.4	22.2	100
Northern	72.5	4.6	1.3	21.6	100
Eastern	67.8	8.1	1.4	22.7	100
Rwanda	70.0	6.2	1.2	22.5	100

2013 Seasonal Agriculture Survey - Season B

For those male Agricultural Operators that completed primary level education their distribution by Province was reasonably uniform with the Northern Province having a slightly higher proportion (72.5%). For those Agricultural Operators that had no education, the Southern Province had the highest proportion (24.1%) while Kigali City had the lowest proportion (14.0%) of Agricultural Operators.

The 2013 Season B survey results showed that 51.8 % of female Agricultural Operators had completed primary level education, 44.1 % had no education, 3.8 % attained secondary level education and only 0.4 % had completed tertiary level education.

Table 59: Education Level of Female Agricultural Operators (%)

	Agricultural Operators in Segments				
	Primary	Secondar	Tertiary	No educatio	Total
Kigali City	59.2	13.7	1.4	25.6	100
Southern	56.6	3.2	0.3	40.0	100
Western	47.6	2.8	0.5	49.1	100
Northern	46.3	3.7	0.3	49.7	100
Eastern	52.0	4.0	0.2	43.8	100
Rwanda	51.8	3.8	0.4	44.1	100

2013 Seasonal Agriculture Survey - Season B

Kigali City had the highest proportion (59.2%) of female Agricultural Operators who completed primary level education, and Northern Province had the lowest proportion (47.6%). Again, Kigali City had the highest proportion of female Agricultural Operators who had completed Secondary school education (13.7%).

5.1.5 Agricultural Operators Activities

The distribution of Agricultural Operators by their type of farming activities is shown in Table 60. In Rwanda a large number of agricultural operators were mainly involved in Crop and livestock farming (76.9%) while 22.7 % undertook Crop farming activities only and less than 1 % undertook Livestock farming activities only. For those who undertook both Crop and Livestock farming activities, the largest proportion were in

the Northern Province (84.8%) while the smallest proportion were in Kigali City (55.6%).

Table 60: Agricultural Operators Activities (%)

	Agricultural Operators			
	Cropping	Livestock	Cropping & Livestock	Total
Kigali City	42.9	1.5	55.6	100
Southern	20.3	0.4	79.3	100
Western	24.3	0.3	75.4	100
Northern	15.1	0.1	84.8	100
Eastern	26.9	0.4	72.6	100
Rwanda	22.7	0.4	76.9	100

2013 Seasonal Agriculture Survey - Season B

For those agricultural operators that undertook crop farming activities only, Kigali City (42.9%) had the highest proportion of the Agricultural Operators, followed by Eastern Province (26.9%), Western Province (24.3%), Southern Province (20.9%) and the lowest proportion was in the Northern Province (15.1%).

5.1.6 Residency of Agricultural Operators in Segments

The survey results of 2013 Season B showed that the majority of Agricultural Operators (71.6%) were nonresident while 28.4 % were residents (see Table 61).

Table 61: Agricultural Operators by Residency (%)

	Agricultural Operator		
	Resident	Non residen	Total
Kigali City	35.4	64.6	100
Southern	27.5	72.5	100
Western	26.4	73.6	100
Northern	27.4	72.6	100
Eastern	31.2	68.8	100
Rwanda	28.4	71.6	100

2013 Seasonal Agriculture Survey - Season B

On the nonresident Agricultural Operators, Kigali City had the lowest proportion (64.6%) while the rest of the Provinces had proportions around 70%. On the Residents, Kigali City had the highest percentage (35.4%) and the rest of the provinces had between 26-30 % Agricultural Operators resident in the segments.

5.1.7 Date of Sowing, Production Expectation Date and Expected Date of Harvest

For some crops, sowing for 2013 Season B was done by Agricultural Operators as early as January 2013. Crops in this group were mainly root crops, Cassava, Sweet potatoes and Yams & Taro. The starting dates of sowing crops by Agricultural Operators and LSF are summarized in tables 62 and 63.

Table 62: Agricultural Operators Indicating the Sowing Date in Segments by Crop (%)

Crop name	Before 31/12/12	01/01 to 28/02/13	1 to 15/03/13	16-31/03/13	After 31/03/13	N/A	Total
Maize	2.7	47.0	39.1	7.7	3.2	0.4	100
Paddy rice	7.7	73.1	9.4	1.0	7.3	1.6	100
Sorghum	5.9	89.9	3.3	0.3	0.1	0.4	100
Wheat	0.0	7.4	18.1	13.0	60.9	0.5	100
Other cereals	0.0	82.7	7.2	5.1	0.0	5.1	100
Bush beans	0.5	39.2	47.5	10.0	2.4	0.4	100
Climbing beans	0.6	34.0	40.2	15.1	9.8	0.3	100
Peas	1.2	32.1	44.7	13.9	7.7	0.3	100
Other legumes & pulses	0.0	27.4	38.5	0.0	15.3	18.8	100
Cassava	15.3	9.3	2.4	0.7	3.3	68.9	100
Irish potatoes	1.4	35.5	27.8	10.4	22.8	2.2	100
Sweet potatoes	27.3	34.4	10.9	4.7	20.3	2.5	100
Yams & Taro	26.7	16.3	2.4	1.1	5.1	48.4	100
Cooking Bananas	1.1	1.4	0.5	0.1	1.0	96.0	100
Banana Fruit	1.1	0.9	0.2	0.1	1.5	96.3	100
Banana for beer	1.0	1.0	0.4	0.0	0.9	96.8	100
Soya beans	0.9	47.4	34.1	10.6	6.0	0.9	100
Ground nuts	1.2	45.4	41.1	9.3	2.3	0.7	100

2013 Seasonal Agriculture Survey - Season B

In February 2013, most of the Agricultural Operators sowed nearly all their main crops: Maize, Paddy rice, Sorghum, Other cereals, Bush beans, Climbing beans, Peas, Other legumes and Pulses, Irish and Sweet potatoes. Indeed some Agricultural Operators continued sowing of some crops after February with crops such as Wheat sown by 60.9 % of Agricultural Operators after March 2013. Sowing for some root crops such as Cassava and Yams & Taro were reported as not applicable by 68.9 % and 48.4 % respectively by some Agricultural Operators. This may be due to the fact that these crops may have been sown in previous seasons.

The majority of main crops were sown by LSF during February 2013 and first half of March 2013 (see Table 63). Cassava was reported as not applicable by 79.0 % by some LSF**.** This may be due to the fact that this crop like any other perennial crop not has been sown in this season.

Table 63: Large Scale Farmers Indicating Sowing Date of Crops (%)

Crop name	Before 31/12/12	01/01 to 28/02/13	1 to 15/03/13	16-31/03/13	After 31/03/13	N/A	Total
Maize	3.9	30.9	44.9	11.9	8.4	0.0	100
Paddy rice	2.8	80.6	13.9	2.8	0.0	0.0	100
Sorghum	8.2	78.0	11.3	1.9	0.6	0.0	100
Wheat	0.0	0.0	7.7	46.2	43.6	2.6	100
Other cereals	0.0	0.0	100.0	0.0	0.0	0.0	100
Bush beans	0.0	21.7	54.0	19.1	5.1	0.0	100
Climbing beans	0.0	22.4	36.7	14.3	26.5	0.0	100
Peas	0.0	24.0	28.0	20.0	28.0	0.0	100
Cassava	9.6	6.0	0.6	1.2	3.6	79.0	100
Irish potatoes	2.7	20.9	26.4	20.0	29.1	0.9	100
Sweet potatoes	24.5	41.5	13.2	5.7	13.2	1.9	100
Cooking Bananas	1.1	3.7	1.6	0.0	1.1	92.6	100
Banana Fruit	0.0	4.4	4.4	0.0	4.4	86.8	100
Banana for beer	0.0	0.0	0.0	0.0	0.0	100.0	100
Soya beans	0.0	8.3	16.7	29.2	45.8	0.0	100
Ground nuts	0.0	42.9	42.9	7.1	7.1	0.0	100

2013 Seasonal Agriculture Survey - Season B

The majority of Agricultural Operators did not have expectation to have their crop production by June 2013 with the exception of Bush beans (94.3%), Climbing beans (51.1%), Peas (63.8%), other legumes & cereals (75.9%), and Irish potatoes (62.3%) (see Table 64).

Table 64: Agricultural Operators in Segments Expecting Production by 30th June 2013 (%)

Crop name	Yes	No	N/A	Total
Maize	32.4	67.4	0.3	100
Paddy rice	33.0	66.0	1.0	100
Sorghum	33.4	66.0	0.6	100
Wheat	4.2	94.7	1.1	100
Other cereals	22.7	77.3		100
Bush beans	94.3	5.5	0.3	100
Climbing beans	51.1	48.8	0.1	100
Peas	63.8	36.1	0.1	100
Other legumes & pulses	75.9	24.1		100
Cassava	9.3	7.2	83.5	100
Irish potatoes	62.3	37.2	0.5	100
Sweet potatoes	19.7	79.8	0.6	100
Yams & Taro	19.2	20.9	59.9	100
Cooking Bananas	56.2	4.1	39.7	100
Banana Fruit	57.1	5.1	37.8	100
Banana for beer	63.7	5.1	31.1	100
Soya beans	63.9	35.8	0.3	100
Ground nuts	69.4	30.2	0.4	100

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Production of Maize, Paddy rice, Sorghum Wheat, Other cereals and Sweet potatoes was expected mainly after 30th June 2013. The expectation of Cassava production by that date was rated low (9.3%) by the majority of Agricultural Operators.

The majority of LSF did not expect production of most of the crops by 30th June 2013 except Bush beans (93.2%), climbing beans (51.0%) Peas (40.0%) , other legumes and Pulses (75.9%) and Irish potatoes (62.3%). Most of the LSF expected production of most of their crops after June 2013 (see Table 65).

Table 65: Large Scale Farmers Expecting Production by 30th June 2013 (%)

Crop name	Yes	No	N/A	Total
Maize	30.9	68.8	0.4	100
Paddy rice	52.8	47.2	0.0	100
Sorghum	74.2	25.8	0.0	100
Wheat	7.7	92.3	0.0	100
Other cereals	100.0	0.0	0.0	100
Bush beans	93.2	6.8	0.0	100
Climbing beans	51.0	49.0	0.0	100
Peas	40.0	60.0	0.0	100
Cassava	22.2	3.6	74.3	100
Irish potatoes	50.0	50.0	0.0	100
Sweet potatoes	39.6	56.6	3.8	100
Cooking Bananas	76.8	2.1	21.1	100
Banana Fruit	64.7	2.9	32.4	100
Banana for beer	75.0	6.8	18.2	100
Soya beans	33.3	66.7	0.0	100
Ground nuts	78.6	21.4	0.0	100

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Large Scale Farmers indicated 30th June as Not Applicable for production of Cassava and Yams &Taro due to the fact that these root crops do not have a specific sowing and harvesting date.

On expected date of harvesting, the majority of Agricultural Operators expected to harvest their crops during the second half of June and the month of July 2013 (see Table 66).

Table 66: Expected Date of Harvest as Reported by Agricultural Operators (%)

Crop name	Before 01/06/13	01 to 15/06/13	15 to 30/06/13	1 to 31/07/13	After 31/07/13	N/A	Total
Maize	2.1	3.6	26.6	48.7	18.7	0.3	100
Paddy rice	3.9	6.6	22.0	53.0	13.4	1.1	100
Sorghum	2.7	2.7	27.0	59.6	7.8	0.2	100
Wheat	0.5		3.4	20.3	74.7	1.1	100
Other cereals			22.7	31.0	46.3		100
Bush beans	16.7	20.6	56.9	4.9	0.7	0.3	100
Climbing beans	5.3	8.5	37.0	35.8	13.1	0.2	100
Peas	10.2	8.9	43.8	28.6	8.4	0.1	100
Other legumes & pulses	30.7		45.2	19.1	5.0		100
Cassava	6.8	0.7	1.8	2.0	5.0	83.7	100
Irish potatoes	19.6	9.9	32.3	23.7	14.0	0.5	100
Sweet potatoes	7.6	2.5	9.5	16.2	63.6	0.6	100
Yams & Taro	11.7	1.7	5.8	7.8	12.8	60.2	100
Cooking Bananas	51.2	1.7	3.3	1.6	2.5	39.7	100
Banana Fruit	52.3	1.5	3.4	2.0	3.0	37.8	100
Banana for beer	57.4	2.6	3.6	1.8	3.2	31.5	100
Soya beans	8.8	10.3	44.7	31.6	4.2	0.3	100
Ground nuts	6.3	9.7	53.1	27.6	2.8	0.4	100

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Wheat crop was expected to be harvested after 31 July 2013 by 74.7 % of Agricultural Operators while 63.6 % of Agricultural Operators also expected to harvest their Sweet potatoes after 31 July 2013. Some Agriculture Operators indicated that some crops were not applicable to them in terms of date of harvest notably Cassava (83.7%), Yams & Taro (60.2%), Cooking bananas (39.7%), Banana fruits (37.8%) and Banana for beer (31.5%). This may have been due to the fact that these perennial crops are not yet mature enough to be harvested.

On the expected date of harvest by LSF (see Table 67), the majority of LSF expected to harvest their crops during the second half of June and the month of July 2013 (see Table 67).

Table 67: Expected date of Harvest as reported by Large Scale Farmers (%)

Crop name	Before 01/06/13	01 to 15/06/13	15 to 30/06/13	1 to 31/07/13	After 31/07/13	N/A	Total
Maize	2.1	3.2	24.6	59.3	10.9	-	100
Paddy rice	22.2	2.8	27.8	44.4	2.8	-	100
Sorghum	3.8	9.4	58.5	25.2	2.5	0.6	100
Wheat	2.6	-	-	53.8	43.6	-	100
Other cereals	-	-	100.0	-	-	-	100
Bush beans	3.4	19.6	70.2	6.4	0.4	-	100
Climbing beans	-	8.2	42.9	24.5	24.5	-	100
Peas	4.0	4.0	32.0	36.0	24.0	-	100
Cassava	14.4	0.6	3.6	0.6	2.4	78.4	100
Irish potatoes	11.8	1.8	38.2	20.9	27.3	-	100
Sweet potatoes	30.2	7.5	3.8	22.6	30.2	5.7	100
Cooking Bananas	74.7	1.6	0.5	1.1	0.5	21.6	100
Banana Fruit	63.2	-	1.5	1.5	1.5	32.4	100
Banana for beer	68.2	2.3	4.5	4.5	2.3	18.2	100
Soya beans	-	4.2	29.2	66.7	-	-	100
Ground nuts	3.6	3.6	67.9	25.0	-	-	100

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Wheat crop was expected to be harvested after 31 July 2013 by 43.6 % of LSF while 30.2 % of LSF expected to harvest their Sweet potatoes after 31 July 2013. A large proportion of LSF reported the expected date of harvest as Not Applicable for Cassava (78.4%).

5.2 Farm Characteristics (Area, Yield and Production)

5.2.1 Crop Areas

In Rwanda in terms of land area under crops, the main crops grown in Season B 2013 were Banana (27.7%), Cassava (20.0%), Beans (13.3%), and Sorghum (11.2%) (see Table 68 and Figure 26). In terms of land area under crops, the following were the main groups of crops cultivated: Tubers & roots (31.4%), Banana (27.7), Cereals (17.5%), Pulses (16.8) and Fruits and Vegetables (1.6%).

Table 68:. Area (Ha) Cultivated by Crop and Group of Crops by Province

Crops	Kigali City	Southern	Western	Northern	Eastern	Rwanda	Percent
Cereals	**10,258**	**60,776**	**24,878**	**47,551**	**102,647**	**246,110**	**17.5**
Sorghum	4,200	44,187	2,429	30,698	75,813	157,327	11.2
Other cereals	3,698	8,140	9,509	3,561	3,388	28,296	2.0
Tubers and Roots	**11,706**	**154,441**	**104,699**	**56,022**	**114,816**	**441,684**	**31.4**
Cassava	9,220	108,133	55,369	18,610	90,043	281,375	20.0
Sweet Potatoes	620	6,241	17,973	7,652	6,810	39,297	2.8
Irish Potatoes	1,587	34,801	27,573	27,659	13,001	104,620	7.4
Yams & Taro	280	5,266	3,784	2,100	4,963	16,393	1.2
Banana	**8,508**	**103,376**	**69,720**	**44,024**	**163,873**	**389,502**	**27.7**
Cooking Banana	3,305	22,406	20,333	12,298	96,012	154,355	11.0
Banana Fruit	2,657	25,051	9,928	8,450	19,049	65,135	4.6
Banana for beer	2,546	55,918	39,460	23,276	48,811	170,012	12.1
Pulses	**4,219**	**57,375**	**37,093**	**41,560**	**95,302**	**235,548**	**16.8**
Beans	3,581	43,092	29,310	38,302	72,475	186,761	13.3
Bush beans	3,337	28,509	8,541	5,491	64,851	110,730	7.9
Climbing beans	244	14,584	20,769	32,811	7,624	76,032	5.4
Peas	75	2,042	3,119	1,761	826	7,823	0.6
Groundnuts	186	5,096	663	304	15,456	21,704	1.5
Soya beans	340	6,762	3,940	1,138	6,456	18,636	1.3
Other legumes & Pulses	37	381	61	56	89	624	0.0
Vegetables and Fruits	**882**	**5,031**	**5,499**	**5,414**	**5,616**	**22,441**	**1.6**
Vegetables	691	2,675	3,438	2,666	2,281	11,751	0.8
Fruits	191	2,357	2,061	2,748	3,334	10,691	0.8
Other crops	**2,603**	**18,599**	**24,770**	**8,293**	**16,145**	**70,410**	5.0
Total developped crop land	**38,177**	**399,597**	**266,659**	**202,864**	**498,399**	**1,405,696**	100
Total Physical crop land	**29,122**	**293,570**	**201,856**	**172,746**	**377,516**	**1,074,810**	100
Fallow land	**4,544**	**63,759**	**68,395**	**24,478**	**161,407**	**322,583**	**30.0**

Most of the Beans and Bananas were mainly grown in the Eastern, Southern, Western and Northern Provinces of the country. Sorghum was mainly grown in the Eastern, Southern and Northern Provinces of the country while Cassava was mainly grown in the Southern, Eastern and Western Provinces of the country.

Figure 26: Percentage Share of Agriculture Land by Crop

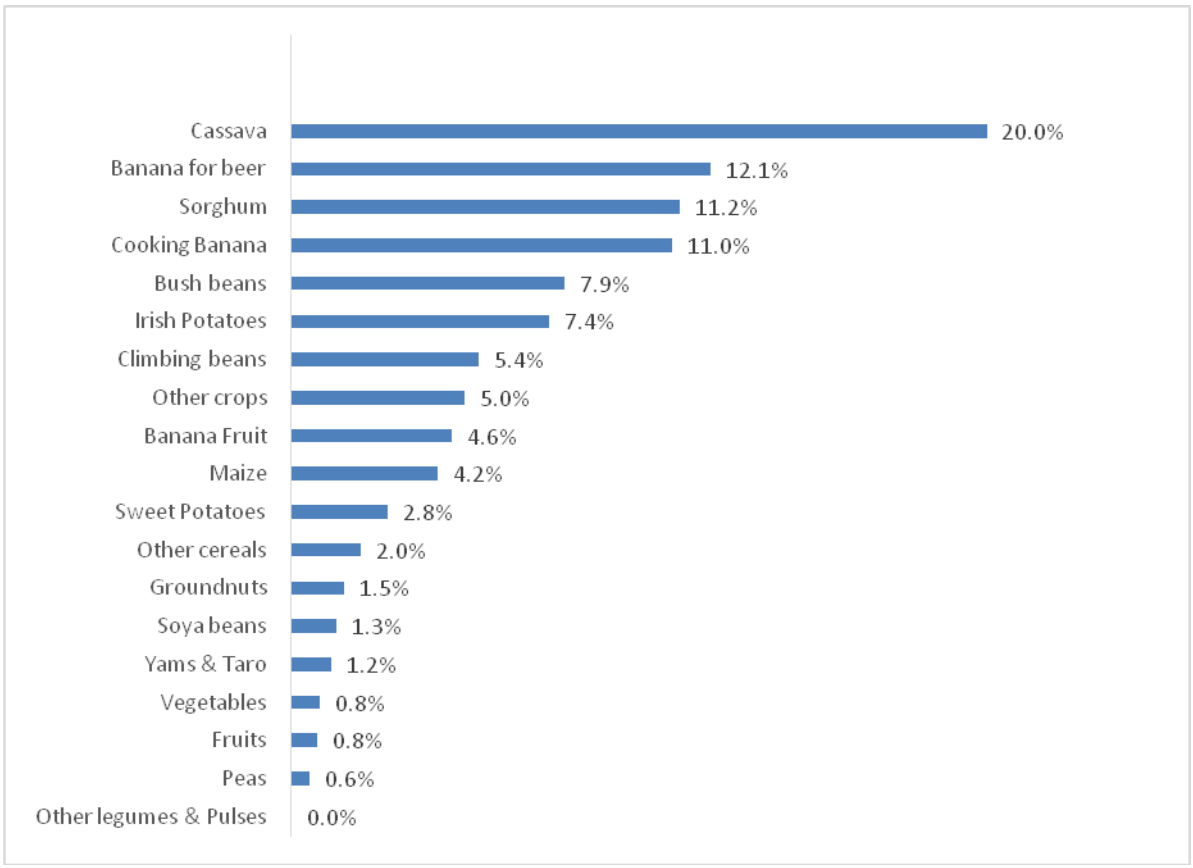
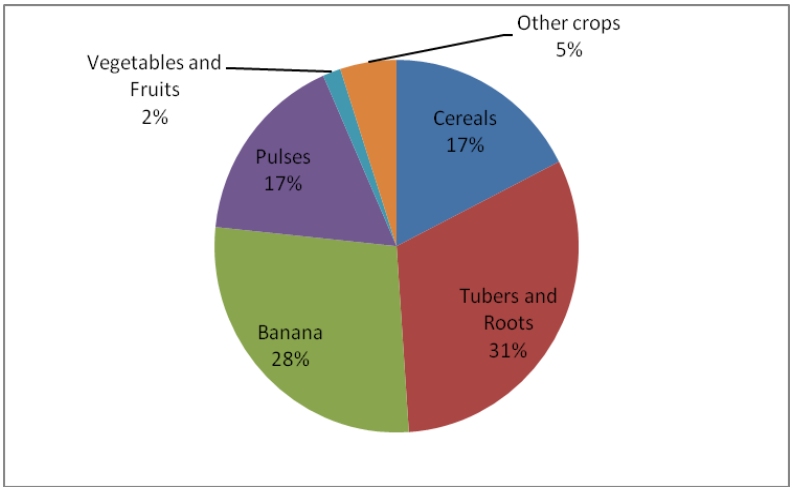


Figure 27: percentage share of Agriculture Land by Group of Crops



The average size of tracts for Season B 2013 is given in the Table 69. In Rwanda the average size of tracts for Agricultural Operator was 0.28 Ha.

Table 69: Average Size of Tracts by Province (Ha)

Province	Average (Ha)
Kigali City	0.39
Southern	0.27
Western	0.22
Northern	0.17
Eastern	0.47
National	0.28

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The Eastern Province had the largest average size of Tract for Agricultural Operators (0.47 Ha) followed by Kigali City 0.39 Ha, Southern Province 0.27 Ha, Western Province 0.22 Ha and Northern Province 0.17 Ha.

The average size of cultivated plots by main crops by Province is given in Table 70 below. The survey results confirm the already known information on plot sizes cultivated by Agricultural Operators in Rwanda to be small.

Table 70: Average Size of Cultivated Plots of Agricultural Operators by Main Crops (Ha)

	Kigali City	Southern	Western	Northern	Eastern	ational
Maize	0.05	0.02	0.04	0.03	0.04	0.03
Sorghum	0.10	0.07	0.08	0.08	0.15	0.10
Other cereals	2.30	0.07	0.12	0.09	0.11	0.11
Bush beans	0.06	0.05	0.04	0.04	0.10	0.07
Climbing beans	0.04	0.04	0.05	0.06	0.07	0.05
Peas	0.03	0.01	0.04	0.02	0.03	0.02
Other legumes & pulses	0.05	0.50	0.07	0.03	0.07	0.11
Cassava	0.15	0.12	0.10	0.07	0.13	0.11
Irish potatoes	0.05	0.03	0.08	0.03	0.04	0.05
Sweet potatoes	0.04	0.04	0.05	0.04	0.04	0.04
Yams & Taro	0.03	0.02	0.02	0.02	0.04	0.03
Tomatoes	0.04	0.04	0.04	0.03	0.04	0.04
White cabbage	0.03	0.01	0.02	0.04	0.03	0.03
Flower cabbage		0.01	0.05	0.14	0.04	0.08
Onion	0.01	0.02	0.07	0.01	0.03	0.04
Carrot	0.01	0.01	0.07	0.02	0.36	0.05
Eggplant	0.06	0.02	0.03	0.03	0.02	0.03
Other vegetables	0.09	0.02	0.02	0.03	0.03	0.02
Cooking Bananas	0.12	0.08	0.08	0.06	0.17	0.11
Banana Fruit	0.13	0.10	0.09	0.06	0.11	0.09
Banana for beer	0.14	0.12	0.12	0.08	0.16	0.12
Pineapple	0.03	0.11	0.09	0.07	0.13	0.10
Avocado	0.05	0.02	0.02	0.04	0.03	0.03
Passion fruits		0.05	0.05	0.03	0.05	0.04
Other fruits	0.08	0.05	0.07	0.04	0.15	0.07
Soya beans	0.04	0.03	0.03	0.03	0.06	0.03
Ground nuts	0.03	0.04	0.04	0.03	0.07	0.05
sun flower		0.01		0.00	0.01	0.01
coffee	0.08	0.08	0.08	0.09	0.12	0.09
Pyrethrum		0.02	0.15	0.16		0.15
Other crops	0.14	0.07	0.07	0.03	0.09	0.07
Fallow-Land	0.15	0.11	0.13	0.07	0.44	0.17
Uncultivated	0.16	0.10	0.06	0.06	0.07	0.08

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The majority of plot sizes were below 0.10 Ha with the exception of Banana for beer (0.12 Ha.), Cooking banana (0.11), Cassava (0.11 ha), other legumes and pulses (0.11 ha), Sorghum (0.10 ha), other cereals (0.11 ha) and Pyrethrum (0.15 Ha). Fallow land in Segments had an average size of 0.17 Hectares per Agricultural Operator. The Eastern Province had the largest average size of fallow land of 0.44 Hectares.

The average size of cultivated plots of LSF by type of crop is given

in Table 71. Clearly the sizes of plots managed by LSF are much bigger than those managed by Agricultural Operators in Segments.

Table 71: Average Size of Cultivated Plots of LSF by Main Crops by Province (Ha)

	Kigali City	Southern	Western	Northern	Eastern	Rwanda
Maize	6.16	2.17	5.22	2.40	4.31	4.27
Sorghum	2.04	1.06	0.01	3.06	2.77	2.60
Other cereals					0.21	0.21
Bush beans	3.83	3.05	1.59	0.39	2.86	2.83
Climbing beans	0.17	0.14	0.53	3.45	1.63	2.28
Peas		3.84	9.15	2.37	1.11	3.34
Other legumes & pulses	2.50			2.05	1.88	2.22
Cassava	2.39	5.60	0.74	0.08	1.71	2.14
Irish potatoes	1.81	3.13	4.25	9.52	0.58	4.43
Sweet potatoes	0.24	0.21	1.57	0.23	0.48	0.43
Yams & Taro			0.29	0.12	1.01	0.43
Tomotoes	0.40	0.17		0.03	0.61	0.41
White cabbage	3.52	0.97		0.82	0.71	1.25
Onion	0.09			0.06	0.37	0.17
Carrot		0.37		0.18	0.07	0.20
Eggplant	2.99			0.17	0.25	1.26
Other vegetables	1.18	0.28	0.01	0.32	0.65	0.64
Cooking Bananas	0.96	1.17	0.02	2.94	1.02	1.10
Dessert Banana	0.51	1.13	0.15	0.11	1.60	1.36
Banana for beer		0.65	0.13	0.52	1.24	0.91
Pineapple	1.25	5.95	0.04	0.48	3.47	3.14
Avocado	0.05	0.97	1.80	1.21	0.33	1.00
Passion fruits				0.26		0.26
Other fruits	0.69	0.14	0.50	1.40	6.99	2.86
Soya beans	9.87	1.65	2.18		31.59	25.88
Ground nuts		0.57			0.21	0.30
sun flower					0.62	0.62
other oil seeds					72.94	72.94
coffee		0.88	5.67	3.93	12.46	4.48
Pyrethrum			0.65			0.65
Other crops	8.41	0.89	2.47	1.97	5.77	5.43
Fallow-Land	9.82	22.73	8.19	25.58	38.68	33.75
Uncultivated	1.37	2.40	3.41	4.24	1.42	1.83

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Soya beans had the largest average size (25.88 Ha) of plots cultivated by LSF. Other crops had: Irish Potatoes (4.43 Ha) and Maize (4.27 Ha), Peas (3.34 Ha), Pineapple (3.14 Ha) etc. Fallow land for LSF had an average size of 33.75 Ha (mostly contributed by the Eastern Province 38.668 Ha).

5.2.3 Crop Yields

Crop yield also known as "Agricultural output" refers to the measure of yield of a crop per unit area of land cultivation (see Table 72).

Table 72: Crops Yield (KG/Ha) by Province

Crops	Kigali City	Southern	Western	Northern	Eastern	Rwanda
Maize	827	1,705	1,262	733	805	1,009
Sorghum	1,069	1,059	1,091	1,287	1,447	1,291
Other cereals	10,676	3,097	2,353	3,190	5,273	4,108
Cassava	327	1,420	1,084	1,489	922	1,163
Sweet Potatoes	5,051	5,629	5,815	5,795	5,648	5,716
Irish Potatoes	1,272	2,353	4,202	2,571	1,672	3,106
Yams & Taro	525	3,657	3,796	2,155	1,830	2,890
Cooking Banana	2,046	1,504	2,146	2,575	4,268	3,405
Dessert banana	1,354	1,590	1,573	2,844	2,464	1,996
Banana for beer	1,847	2,680	3,071	4,755	4,019	3,426
Bush beans	686	644	645	657	605	623
Climbing beans	557	675	855	948	754	849
Peas	784	471	278	462	418	390
Groundnuts	281	486	698	572	356	399
Soya beans	400	246	306	337	235	263
Other crops	7,563	5,024	2,003	8,188	11,332	5,874
Vegetables	12,262	7,034	4,682	6,694	9,270	7,010

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In terms of crop yields the survey results showed that Irish potatoes had high yields mainly in the Western and Northern Provinces; Cooking Banana had high yields in the Eastern Province and Northern Province; Maize had high yields in Southern Province; etc.

5.2.4 Crop Production

The contribution of individual crop production by Province (see Table 73) was calculated using the product of yield and area under the crop.

Table 73: Production of Main Crops by Province (MT)

Crops	Kigali City	Southern	Western	Northern	Eastern	Rwanda	%
Cereals	**45,924**	**87,112**	**41,350**	**60,626**	**148,210**	**383,222**	**11.3**
Maize	1,951	13,548	16,329	9,744	18,549	60,121	1.8
Sorghum	4,490	46,804	2,650	39,517	109,705	203,166	6.0
Other cereals	39,483	26,760	22,372	11,365	19,956	119,935	3.6
Tubers and Roots	**11,964**	**383,393**	**310,276**	**212,199**	**176,903**	**1,094,736**	**32.4**
Cassava	3,014	153,567	60,042	27,707	83,012	327,343	9.7
Sweet Potatoes	8,014	195,885	160,337	160,294	73,425	597,955	17.7
Irish Potatoes	789	14,684	75,530	19,671	11,383	122,056	3.6
Yams & Taro	147	19,257	14,366	4,527	9,084	47,382	1.4
Banana	**15,064**	**223,380**	**180,413**	**166,384**	**652,907**	**1,238,149**	**36.7**
Cooking Banana	6,764	33,705	43,630	31,668	409,812	525,579	15.6
Banana Fruit	3,598	39,838	15,617	24,030	46,944	130,026	3.8
Banana for beer	4,703	149,837	121,166	110,686	196,151	582,543	17.2
Pulses	**2,671**	**33,322**	**25,799**	**36,075**	**52,377**	**150,244**	**4.4**
Beans	2,424	28,218	23,265	34,704	45,013	133,625	4.0
Bush beans	2,288	18,372	5,509	3,608	39,262	69,040	2.0
Climbing beans	136	9,846	17,756	31,095	5,752	64,585	1.9
Peas	59	962	867	814	345	3,047	0.1
Groundnuts	52	2,475	463	174	5,499	8,662	0.3
Soya beans	136	1,666	1,205	384	1,519	4,910	0.1
Vegetables and Fruits	**8,468**	**23,799**	**20,185**	**22,653**	**22,884**	**97,989**	**2.9**
Vegetables	8,468	18,815	16,095	17,846	21,147	82,372	2.4
Fruits	-	4,984	4,090	4,807	1,736	15,617	0.5
Other crops	**19,687**	**93,435**	**49,620**	**67,907**	**182,958**	**413,606**	12.2
Total	**103,779**	**844,441**	**627,643**	**565,844**	**1,236,238**	**3,377,945**	**100.0**

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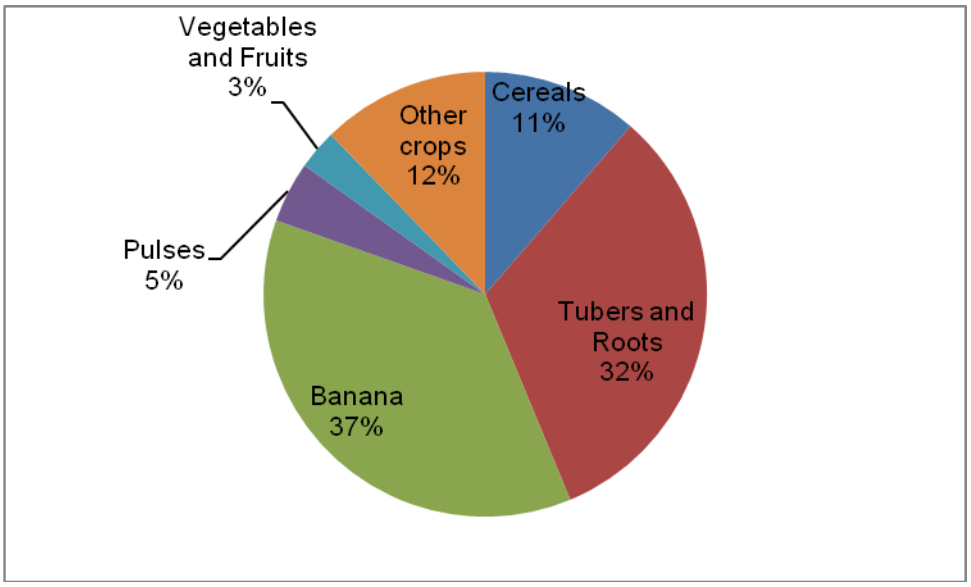
The share of crop production for individual crops was highest for Irish potatoes (17.7%) followed by Banana for beer (17.2%), Cooking banana (15.6%), and Cassava (9.7.0%). The remaining crops contributed less than 9 % each to the total crop production of the country (see Table 73).

As shown in Figure 28, the share of the crop production by groups of crops in Rwanda was significantly high for Banana (37%) followed by Tubers and Roots (32%) and Cereals (11%). Other crop groups contributed less than 10 % as follows: Pulses (5%) and Vegetables and fruits (3%).

Figure 28: Percentage Share of Agricultural Production by Group of Crops



5.3 Agricultural Practices

5.3.1 Pure and Mixed cropping

The 2013 Season B survey results showed that the percentage share of agricultural land used by Agricultural Operators to grow crops in pure stand and mixed stand in Rwanda was 20.8 % and 79.2 % respectively (see Table 74). For LSF the share between pure stand and mixed stand was 66.3 % and 33.87 % respectively.

Table 74: Share of Pure and Mixed Crop Agricultural Land (%)

Province	Agricultural Operators			Large Scale Farmers		
	Pure Crop Land	Mixed Crop Land	Total	Pure Crop Land	Mixed Crop Land	Total
Kigali City	28.7	71.3	100	91.0	9.0	100
Southern	18.5	81.5	100	86.7	13.3	100
Western	29.7	70.3	100	51.9	48.1	100
Northern	33.0	67.0	100	88.4	11.6	100
Eastern	12.2	87.8	100	54.2	45.8	100
Rwanda	20.8	79.2	100	66.3	33.7	100

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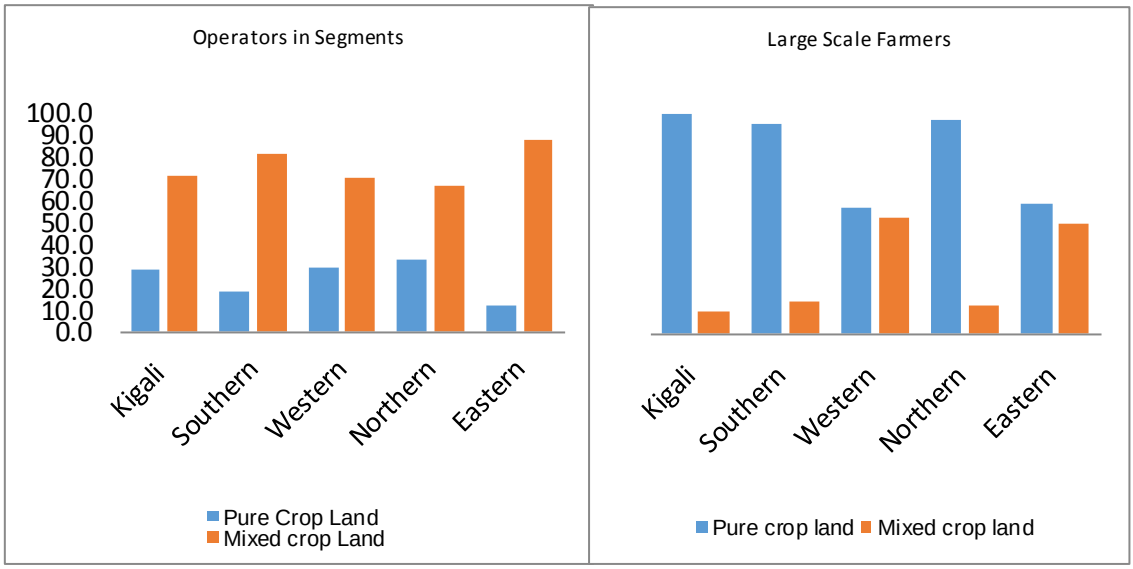
In general Agricultural Operators used most of their agricultural land to cultivate mixed crops while LSF used most of their agricultural land to cultivate crops in pure stand. Figure 29 shows the share of pure and mixed cropping agricultural land for both Agricultural Operators and Large Scale Farmers.

Figure 29: Share of Pure and Mixed Crop Agricultural Land



On the land used by Agricultural Operators and LSF in pure or mixed stand, Table 75 clearly shows that on average 95.3 % of all pure crop land came from Agricultural Operators while only 4.7 % came from LSF.

Table 75: Pure and Mixed Crop Agricultural Land (Ha)

Province	Pure Crop Agricultural Land			Mixed Crop Agricultural Land		
	Agricultural Operators	Large scale farmers	Total	Agricultural Operators	Large scale farmers	Total
Kigali City	95.3	4.7	100	99.8	0.2	100
Southern	99.0	1.0	100	100	0.0	100
Western	100	0.1	100	100	0.0	100
Northern	99.4	0.6	100	100	0.0	100
Eastern	97.1	2.9	100	99.7	0.3	100
Rwanda	98.8	1.2	100	99.8	0.2	100

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The same table also shows also that on average 99.8 % of the mixed crop land in Rwanda during 2013 season B was contributed by Agricultural Operators while LSF contributed only 0.2 %.

The use of agricultural land for growing main crops in pure stand by Agricultural Operators in the country is shown in Table 76. Eastern Province contributed 21.8% of total pure crop land while the Southern Province contributed 25.4 %, Kigali City 3.7%, Northern Province22.9 %, and Western Province contributed 27.2 % of total cultivated land in pure stand.

Table 76: Pure Crop Agricultural Land in Segments by Type of Crop (%)

Province	Maize	Sorghum	Bush beans	Climbing beans	Peas	Cassava	Irish potatoes	Sweet potatoes	Banana	Other cereals	Other crops	Total	%
Kigali City	21.0	24.6	3.0	1.0	0.5	13.1	2.5	6.8	4.4	1.2	21.8	100	3.7
Southern	5.3	13.1	2.8	3.8	0.5	22.0	1.8	23.9	4.9	8.6	13.3	100	25.4
Western	4.9	1.0	1.3	10.9	1.2	16.5	12.5	20.6	7.7	5.4	18.1	100	27.2
Northern	7.4	15.8	0.9	23.1	0.9	4.3	3.9	27.6	3.2	2.1	10.9	100	22.9
Eastern	0.7	26.7	3.7	2.6	0.3	15.5	1.8	12.4	12.6	4.0	19.7	100	20.8
Rwanda	5.4	12.5	2.0	10.6	0.8	14.9	5.2	22.2	6.2	5.3	14.9	100	100

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The share of pure crop land for individual crops was highest for Sweet Potatoes (22.2%), followed by Cassava (14.9%) and Sorghum (12.5%). The shares of the other main crops were less than 10 % each.

5.3.2 Use of Organic Fertilizers

The results of the survey show that the number of Agricultural Operators that already used and those that did not use organic fertilizer in segments was 48.5 % and 51.5 % respectively (see Table 77 and Figure 30).

Table 77: Users of Organic Fertilizers (%)

	Agricultural Operators	Large Scale Farmers
Province	Used organic fertilizers	Used organic fertilizers
Kigali City	36.3	56.7
Southern	53.5	74.4
Western	46.9	43.8
Northern	68.7	58.1
Eastern	30.4	48.7
Rwanda	48.5	52.5

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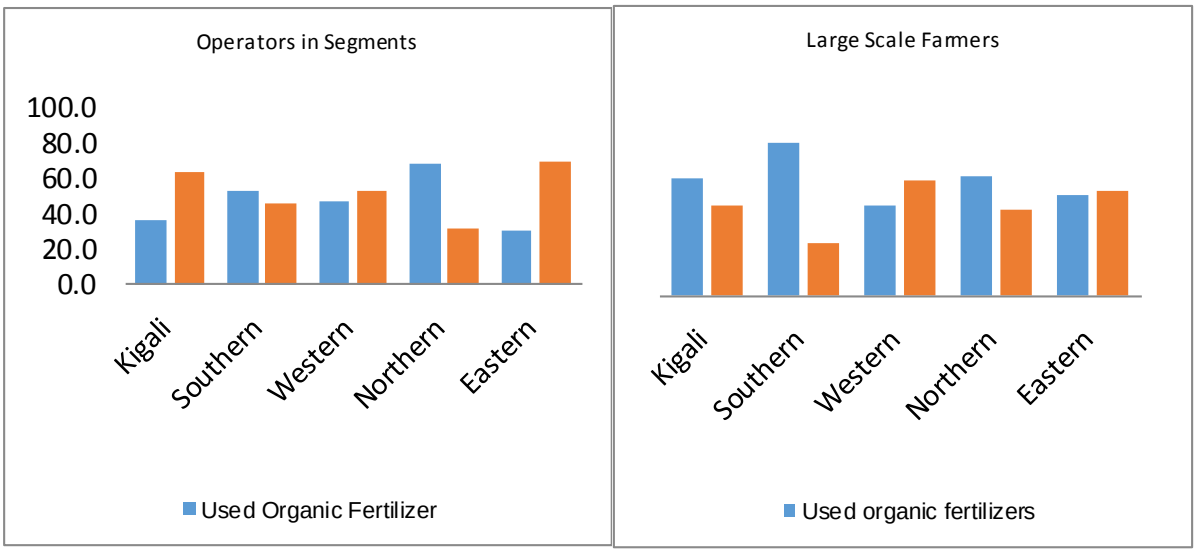
For LSF, 52.5 % reported that they had already used organic fertilizers against 47.7 % that did not use organic fertilizer during 2013 Season B.

The total number of Agricultural Operators and LSF who already used organic fertilizers in the Provinces was compared to the total number of Agricultural Operators and LSF within the same province. Clearly, Northern Province ranked high for Agricultural Operators in Segments (68.7%) followed by Southern Province (53.5%) and Western Province (46.9%) in their use of organic fertilizer. Again Southern Province (74.4%) ranked high for LSF followed by Northern Province (58.1%) and Kigali City (56.7%) in their use of organic fertilizers.

Figure 30: Use of Organic Fertilizer by Province (%)



5.3.3 Use of Inorganic Fertilizers

The survey results showed that 17.3 % of Agricultural Operators used inorganic fertilizer while 18.9 % of LSF used inorganic fertilizer during 2013 Season B. (see Table 78 and Figure 31).

Table 78: Use of Inorganic Fertilizer

	Agricultural Operators	Large Scale Farmers
	Used inorganic fertilizers	Used inorganic fertilizers
Kigali City	17.2	19.0
Southern	12.7	42.5
Western	26.6	28.1
Northern	21.4	20.6
Eastern	10.7	14.5
Rwanda	17.3	18.9

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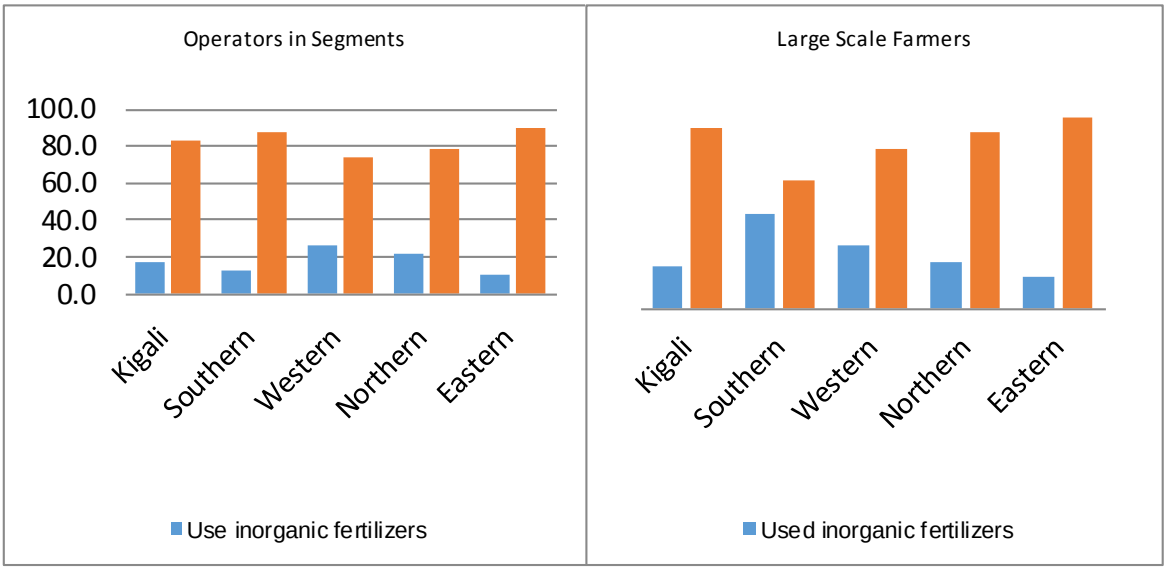
In comparing the use of inorganic fertilizers by Agricultural Operators, those in the Western Province (26.6%) were the highest user followed by Northern Province (21.4%), Kigali City (17.2%), Eastern Province (10.7%) and Southern Province (12.7%). With regard to LSF, those in the Southern Province (42.5%) were the high user of inorganic fertilizer followed by Western Province (28.1%), Northern Province (20.6%), Kigali City (19.0%) and Eastern Province (14.5%).

Figure 31: Agricultural Operators that Used and those that did not Use Inorganic Fertilizer (%)



On the type of inorganic fertilizer used by Agricultural Operators, the results of the survey (see Table 79) showed that DAP (36.2%) was the main inorgarnic fertilizer used followed by UREA (34.2%) and NPK (25.7%). For the LSF, UREA (35.2%) was the main fertilizer used followed by DAP (33.2%) and NPK (26.2%).

Table 79: Type of Inorganic Fertilizer used by Province (%)

	Agricultural Operators							Large Scale Farmers						
	NPK	UREA	UREA (LIQUID)	DAP	LIME	OTHER Fertilizers	Total	NPK	UREA	UREA (LIQUID)	DAP	LIME	OTHER Fertilizers	Total
Kigali City	0.4	2.1	0.1	1.7	-	-	4.3	2.5	3.7	-	3.3	-	0.4	9.8
Southern	7.6	8.1	0.1	7.5	0.6	0.0	24.1	7.8	7.8	-	4.5	1.6	-	21.7
Western	11.8	11.8	1.0	12.0	0.5	-	37.1	3.3	2.5	-	3.7	0.4	-	9.8
Northern	3.6	6.8	0.3	9.5	0.1	-	20.3	8.2	6.1	0.4	4.5	-	-	19.3
Eastern	2.2	5.4	0.4	5.4	0.7	-	14.2	4.5	15.2	0.4	17.2	-	2.0	39.3
Rwanda	25.7	34.2	2.0	36.2	1.9	0.0	100	26.2	35.2	0.8	33.2	2.0	2.5	100

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For those Large Scale Farmers that used inorganic fertilizers, 39.3% were from Eastern Province followed by Southern Provinces (21.7%) , Northern(19.3%)and Western Province (9.8%).

The results of the survey showed also that UREA was the main inorgarnic fertilizer used (35.2%) followed by DAP(33.2%), NPK (26.2%), Lime (2.0%) and UREA (LIQUID) (0.8%).

The distribution of type of inorganic fertilizer used by Province is given in Table 80. For those Agricultural Operators in segment that used NPK, 46.0% of them were from Western Province followed by Southern Province (29.8%). For those LSF that used NPK, 31.3% of them are from Northern Province followed by Southern Province (29.7%). The Western Province also used the maximum of the other Inorganic Fertilizers: Urea (34.5%), Urea-liquid (50.0%), DAP (33.2%) and Lime (25.0%).

Table 80: Distribution of Agricultural Operators and LFS Using Inorganic Fertilizer (%)

	Agricultural Operators in Segments							Large Scale Farmers						
	NPK	UREA	UREA(LI	DAP	LIME	OTHER F	TOTAL	NPK	UREA	UREA(LIQUID)	DAP	LIME	OTHEF	TOTAL
Kigali Cit	1.5	6.1	6.1	4.7	-	-	4.3	9.4	10.5	-	9.9	-	16.7	9.8
Southern	29.8	23.7	7.3	20.9	32.9	100.0	24.1	29.7	22.1	-	13.6	80.0	-	21.7
Western	46.0	34.5	50.0	33.2	25.0	-	37.1	12.5	7.0	-	11.1	20.0	-	9.8
Northern	13.9	19.8	14.6	26.3	6.6	-	20.3	31.3	17.4	50.0	13.6	-	-	19.3
Eastern	8.7	15.9	22.0	15.0	35.5	-	14.2	17.2	43.0	50.0	51.9	-	83.3	39.3
Rwanda	100	100	100	100	100	100	100	100	100	100	100	100	100	100

2013 Seasonal Agriculture Survey - Season B

For LSF, NPK was mostly used in Northern Province (31.3%), Urea in Eastern Province (43.10%), Urea-Liquid in Northern and Eastern Provinces (50.0% each) and Lime in Southern Province (80%).

5.3.4 Use of seeds

The use of traditional seeds and improved seeds by Agricultural Operators by Province is given in Table 81 and Figure 32. In Rwanda Agricultural Operators that used traditional seeds were 91.9 % while those that used improved seed were 8.1 %. For those Agricultural Operators that used traditional seeds, the majority were in the Eastern Province (96.2%), followed by Northern Province (93.6%), Southern province (91.2%), Western Province (88.0%) and Kigali City (85.4%). For those that used improved seeds, the majority were in the Kigali City (14.6%).

Table 81: Agricultural Operators by type of seeds used (%)

	Agricultural Operators		Large Scale Farmers	
	Traditional seeds	Improved seeds	Traditional seeds	Improved seeds
Kigali City	85.4	14.6	53.1	46.9
Southern	91.2	8.8	65.0	35.0
Western	88.0	12.0	56.3	43.8
Northern	93.6	6.4	72.3	27.7
Eastern	96.2	3.8	66.5	33.5
Rwanda	91.9	8.1	66.5	33.5

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The use of traditional seeds and improved seeds by LSF by Province is also given in Table 81 and Figure 32. In Rwanda LSF that used traditional seeds were 66.5 % while those that used improved seed were 33.5 %. For those LSF that used traditional seeds, the majority were in the Northern Province (72.3%), followed by Eastern Province (66.5%), Southern Province (65.0%) ,Western Province (56.3%) and Kigali city (53.1%). For those LSF that used improved seeds, the majority were in the Kigali City (46.9%) followed by Western Province (43.8%), Southern Province (35.0%), Eastern Province(33.5%) and Northern Province (27.7%).

Figure 32: Use of Traditional and Improved Seeds (%)

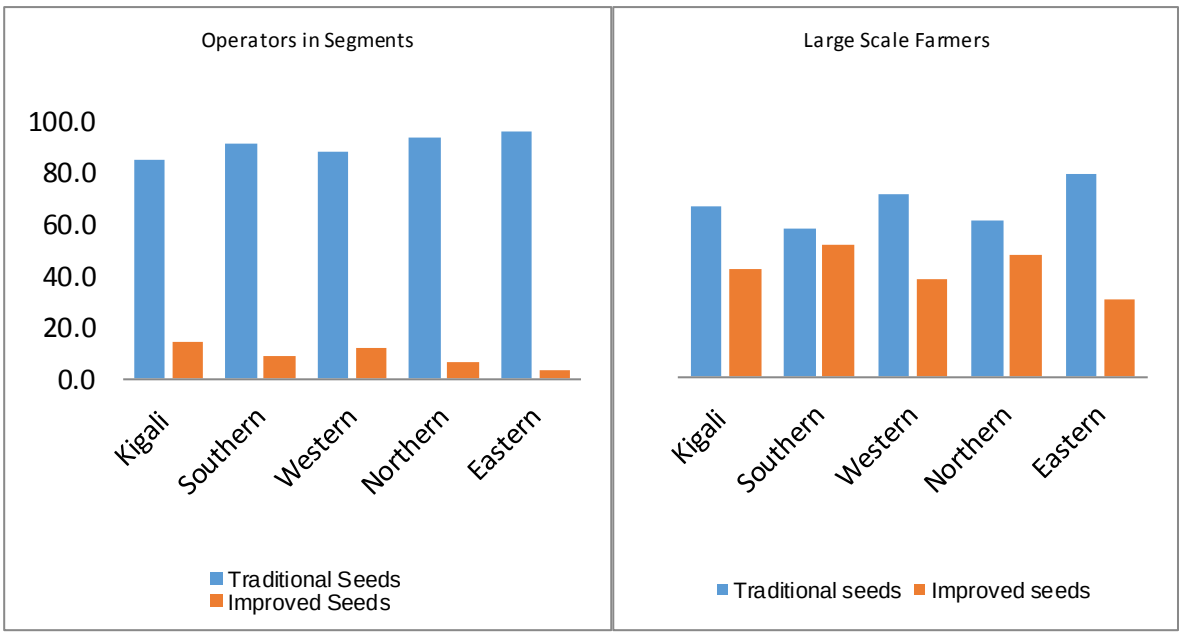

Table 82 shows the distribution of Agricultural Operators that used traditional seeds by type of crop. For operators in segments, the majority of Agricultural Operators used traditional seed mainly on Cassava (14.9) followed by Sweet potatoes(12.3%), Bush beans (10.1%), Sorghum(9.9) and Maize (9.7%).

Table 82: Users of Traditional Seeds by Type of Crop (%)

	Agricultural Operators						Large Scale Farmers					
	Kigali City	Southern	Western	Northern	Eastern	All Rwanda	Kigali City	Southern	Western	Northern	Eastern	All Rwanda
Maize	0.4	2.1	1.4	1.4	4.4	9.7	0.8	0.5	0.3	0.4	12.6	14.7
Paddy rice	0.0	0.3	0.2	0.0	0.2	0.8	0.3	0.3	0.1	-	0.3	0.9
Sorghum	0.4	3.8	0.3	1.8	3.7	9.9	0.4	1.1	0.1	0.5	11.2	13.3
Wheat	0.0	0.1	0.2	0.1	0.0	0.5	-	-	0.1	-	0.3	0.4
Other cereals	-	0.0	-	-	0.0	0.0	-	-	-	-	0.1	0.1
Bush beans	0.6	3.5	1.0	0.6	4.4	10.1	0.4	1.3	0.3	0.5	14.2	16.8
Climbing beans	0.1	2.4	2.6	2.7	0.7	8.4	0.1	0.1	0.7	1.2	0.3	2.4
Peas	0.0	0.9	0.5	0.3	0.2	2.0	-	0.5	-	0.4	0.7	1.6
Cassava	0.6	5.4	3.0	1.3	4.6	14.9	0.4	1.2	0.5	0.4	7.8	10.3
Irish potatoes	0.1	1.1	1.4	1.0	1.3	5.0	0.1	1.1	0.7	1.6	2.7	6.2
Sweet potatoes	0.3	4.7	3.0	2.4	1.8	12.3	0.5	0.7	0.3	0.4	2.3	4.2
Cooking Bananas	0.3	1.7	1.4	1.0	3.9	8.3	1.6	0.7	0.3	0.8	14.7	18.0
Banana Fruit	0.2	1.5	0.6	0.7	1.1	4.0	0.1	0.7	-	0.1	3.1	4.0
Banana for beer	0.2	2.8	1.9	1.4	1.9	8.3	-	0.5	0.4	0.5	2.0	3.5
Soya beans	0.1	1.6	0.8	0.2	0.6	3.3	0.1	-	-	-	0.5	0.7

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For Large Scale Farmers, traditional seeds were mostly used on Cooking Banana (18.0%), Bush beans (16.8%), Maize (14.7%), Sorghum (13.3) and Cassava (10.3%).
The distribution of Agricultural Operators in Segments and Large Scale Farmers that used improved seeds is given in Table 83.

The majority of Agricultural Operators used improved seed mainly on Maize (67.3%), followed by Paddy rice (9.3%), Soya beans (5.2%), Cassava (4.7%) and Climbing beans (2.7%)

In the case of Maize, most of the Agricultural Operators were from the Western Province (28.1%), followed by Southern Province (18.4%), Northern Province (12.1%) and Kigali City (6.1%). With respect to Paddy rice, the Agricultural Operators were mainly from Southern Province (9.2%).

Table 83: Users of Improved Seeds by type of Crop

	Agricultural Operators						Large Scale Farmers					
	Kigali City	Southern	Western	Northern	Eastern	All Rwanda	Kigali City	Southern	Western	Northern	Eastern	All Rwanda
Maize	6.1	18.4	28.1	12.1	2.7	67.3	2.7	1.8	3.2	3.6	16.7	28.1
Paddy rice	-	9.2	0.1	-	-	9.3	-	3.2	-	-	1.4	4.5
Sorghum	0.1	0.3	0.2	0.3	0.2	1.0	-	-	-	0.5	-	0.5
Wheat	-	0.3	0.4	0.3	-	1.0	-	2.3	-	5.0	-	7.2
Bush beans	0.2	0.7	0.5	0.1	0.3	1.7	2.3	-	-	0.5	10.0	12.7
Climbing beans	0.1	0.2	0.3	0.5	1.6	2.7	-	0.5	0.5	3.6	2.3	6.8
Peas	-	-	0.1	-	-	0.1	-	0.5	0.9	-	-	1.4
Cassava	0.2	3.8	0.5	0.2	0.1	4.7	1.4	1.8	0.5	-	2.3	5.9
Irish potatoes	-	0.5	0.8	0.5	-	1.8	-	3.2	0.9	3.6	0.5	8.1
Sweet potatoes	-	0.9	-	-	-	0.9	0.5	0.9	-	0.5	-	1.8
Cooking Bananas	-	0.7	0.5	-	0.2	1.4	0.9	0.5	-	0.9	3.6	5.9
Banana Fruit	-	1.4	0.2	-	0.2	1.7	1.4	0.9	-	0.5	6.8	9.5
Banana for beer	-	0.7	0.3	-	-	1.0	-	0.5	-	-	0.9	1.4
Soya beans	-	0.2	-	-	5.1	5.2	0.5	0.5	0.5	-	5.0	6.3
Ground nuts	-	-	-	-	0.1	0.1						

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The majority of LSF used improved seed mainly on Maize (28.1%), followed by Bush beans (12.7%) and Banana fruit (9.5%). In the case of Maize, most of the LSF were from the Eastern Province (16.7%), followed by Northern Province (3.6%), Western Province (3.2%) and Kigali City (2.7%). For Bush beans most of the LSF were from Eastern Province (10.0%) and Kigali City (2.3%) while for Banana fruit most of the LSF were from Eastern Province (6.8%) and Kigali City (1.4%).

5.3.5 Irrigation Practice

The distribution of Agricultural Operators and LSF practicing irrigation by Province in Rwanda, during 2013 Season B, is given in Table 84 and Figure 33. In Rwanda only 2.7 % of Agricultural Operators practiced irrigation. The majority of Agricultural Operators did not practice irrigation. The few Agricultural Operators that practiced irrigation were in the Southern Province (5.3%) followed by Eastern Province (1.9%), Western Province (1.8%) and Northern Province (1.1%).

Table 84: Agricultural Operators and Large Scale Farmers Practicing Irrigation (%)

	Agricultural Operators	Large Scale Farmers
Kigali		6.9
Southern	5.3	25.6
Western	1.8	-
Northern	1.1	4.8
Eastern	1.9	2.6
Rwanda	2.7	5.0

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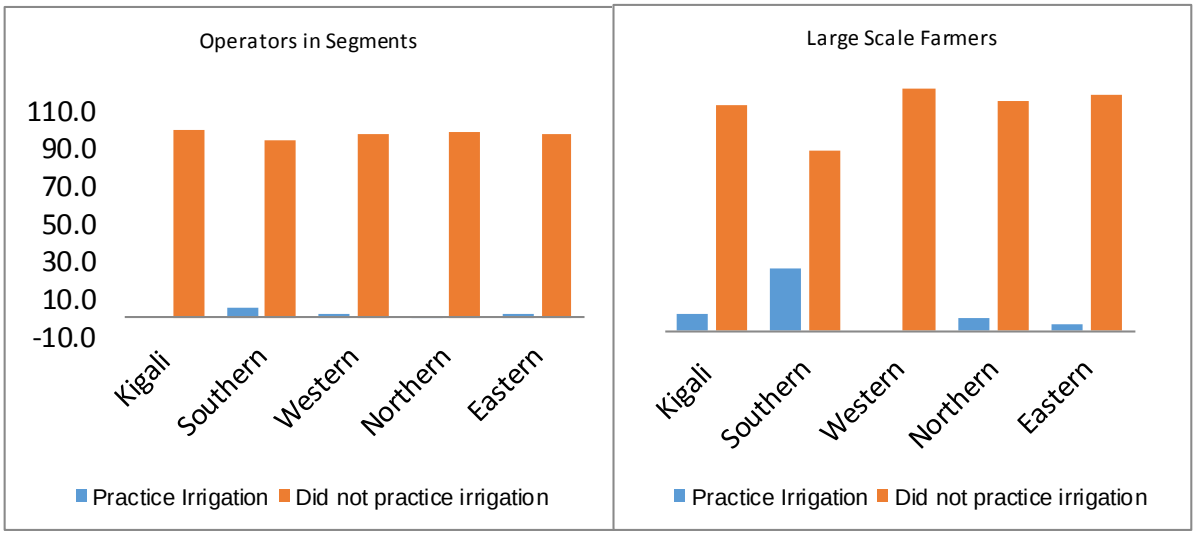
For Large Scale Farmers, the largest proportion of farmers that practiced irrigation was reported also in Southern Province (25.6%), followed by Kigali City (6.9%). In the Western Province no LSF practiced irrigation in 2013 Season B.

Figure 33: Irrigation practice by Agriculture Operators and Large Scale Farmers (%)



On the type of irrigation practiced by Agricultural Operators, the survey results showed that the majority of Agricultural Operators practiced Water drainage type of irrigation (90.3%), followed by those that used Watering cans (6.4%) and other (2.1%). Use of water drainage for irrigation was predominantly in the Southern Province (55.4%) followed by Eastern Province (15.1%) and Western Province (14.9%).

Table 85: Agricultural Operators by Type of Irrigation Practiced (%)

	Agricultural Operators				
	Pumps/tube wells/irrigation machines	Watering can	Water drainage	Other	Total
Southern	0.9	2.6	55.4	1.2	60.1
Western		0.9	14.9		15.8
Northern		1.2	5.0	0.9	7.1
Eastern	0.2	1.7	15.1		17.0
Rwanda	1.2	6.4	90.3	2.1	100

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For Agricultural Operators who practiced irrigation, 60.1% were from Southern Province followed by Eastern Province (17%) and Western Province (15.8%).

Most of the LSF in Rwanda practiced the Water Drainage (57.7%) type of irrigation followed by the Pumps/Tube wells/Irrigation Machines type of irrigation (26.9%). Watering can type of irrigation was practiced by 15.4 % of the LSF (see Table 86). The Water drainage type of irrigation was practiced mainly in the Southern Province (34.6%) followed by the Eastern Province (11.5%). The Pumps/Tube wells/Irrigation Machines type of irrigation was practiced mainly in the Eastern Province (11.5%).

Table 86: Large Scale Farmers by Type of Irrigation Practiced

	Pumps/tube wells/irrigation machines	Watering can	Water drainage	Total
Kigali City	3.8	3.8	7.7	15.4
Southern	3.8		34.6	38.5
Northern	7.7	3.8	3.8	15.4
Eastern	11.5	7.7	11.5	30.8
Rwanda	26.9	15.4	57.7	100.0

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Among the LSF that practiced irrigation, 38.5 % were from Southern Province, followed by Eastern

Province (30.8%) and Kigali City and Eastern Province (15.4% each).

5.3.6 Anti-erosion Activities

Erosion refers to the process in which the earth's surface is worn away. Due the mountainous landscape of Rwanda, most of the Agricultural Operators have anti-erosion activities to prevent the wasting away of the earth. The survey results (see Table 87 and Figure 34) show the distribution of Agricultural Operators and LSF having plots with anti-erosion activities in 2013 Season B.

Anti-erosion was available for 65.7 % of Agricultural Operators and 55.3 % of LSF. Most of the anti-erosion activities were available for Agricultural Operators in the Northern Province (82.6%), followed by Southern Province (67.3%), Western Province (67.1%), Eastern Province (52.0%) and Kigali City (50.5%).

Table 87: Anti-erosion Activities by Agricultural Operators and Large Scale Farmers (%)

	Agricultural Operators	LSF
Kigali City	50.5	55.2
Southern	67.3	89.7
Western	67.1	62.5
Northern	82.6	79.4
Eastern	52.0	45.3
Rwanda	65.7	55.3

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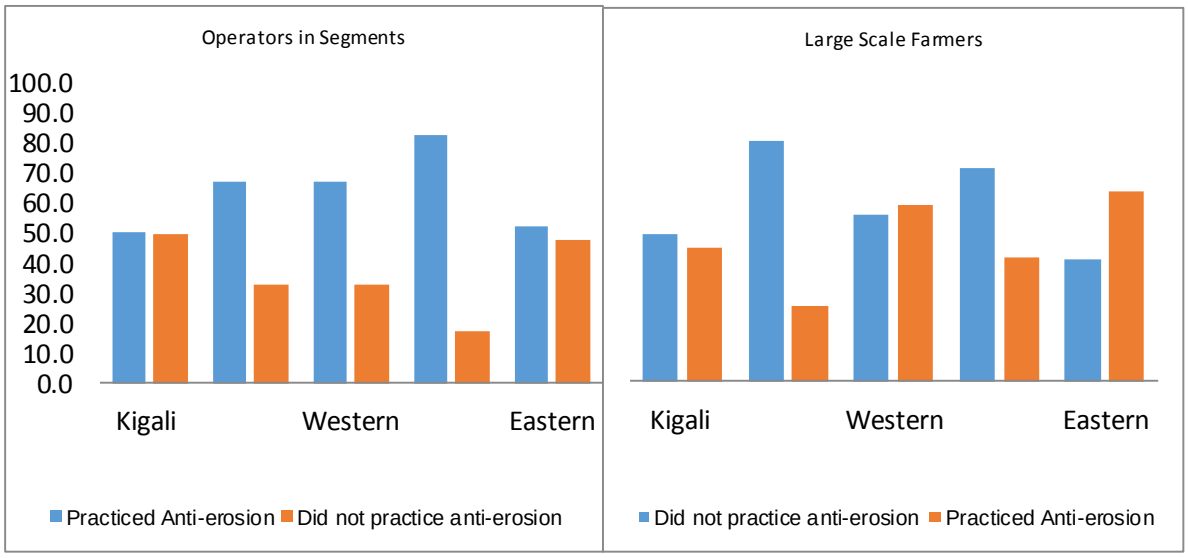
For LSF, Southern Province was ranked high with 89.7 % having Plots with anti-erosion activities followed by Northern Province with 79.4% and Western with 62.5%.

Figure 34: Anti-erosion Activities by Agriculture Operators and Large Scale Farmers (%)



The survey results showed that in Rwanda the most practiced anti-erosion control measures by Agricultural Operators in all Provinces were Grasses (41.8%) and Ditches (25.6%) (see Table 87). Other erosion control measures such as Water drainage

(12.6%), Mulching (7.4%), radical terracing (4.3%) and Trees (2.2%) were also practiced by Agricultural Operators. The Southern Province (33.9%), Western Province (27.2%) and Eastern Province (21.4%) were significant in their use of anti-erosion control measures.

Table 88: Type of Anti-erosion Activities Practiced by Province (%)

	Agricultural Operators								
	Ditches	Trees	Radical Terracing	Progressive terracing	Grasses	Water drainage	Mulching	Other	Total
Kigali City			0.1		0.3	2.8	0.1		3.2
Southern	10.1	0.2	0.5	0.5	13.9	6.6	1.7	0.4	33.9
Western	4.4	1.8	0.5	2.3	13.7	0.2	1.5	2.9	27.2
Northern	2.0	0.1	0.3		8.2	1.3	2.1	0.2	14.2
Eastern	9.1	0.1	2.0	0.2	5.7	1.8	2.0	0.3	21.4
Rwanda	25.6	2.2	3.4	3.0	41.8	12.6	7.4	3.9	100
	Large Scale Farmers by Type of Anti-erosion Activities Practised								
	Ditches	Trees	Radical Terracing	Progressive terracing	Grasses	Water drainage	Mulching	Other	Total
Kigali City	6.6		2.2	-		2.2	1.1		12.1
Southern	6.6	1.1	2.2	-	5.5		1.1		16.5
Western	1.1		1.1	-		1.1		1.1	4.4
Northern	4.4			-	4.4			1.1	9.9
Eastern	34.1	3.3	1.1	-	2.2	5.5	7.7	3.3	57.1
Rwanda	52.7	4.4	6.6	-	12.1	8.8	9.9	5.5	100

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With regard to LSF use of anti- erosion activities, most of them used mainly Ditches (52.7%) and Grasses (12.1%). In addition some of the LSF also used Mulching (9.9%) and Water drainage (8.8%) types of anti-erosion activities. The Eastern Province (57.1%), Southern Province (16.5%) and Kigali City (12.1%) were prominent in their use of anti-erosion activities.

5.3.7 Use of Pesticides

In 2013 Season B, as shown in Table 89, countrywide 9.2 % of Agricultural Operators used pesticides while 17.7% of LSF used pesticides.

Table 89: Agricultural Operators and Large Scale Farmers Using Pesticides (%)

	Agricultural Operators	Large Scale Farmers
Kigali City	16.5	12.1
Southern	4.8	46.2
Western	15.7	31.3
Northern	11.3	47.6
Eastern	5.3	7.7
Rwanda	9.2	17.7

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Among Agricultural Operators, the proportion of pesticides users was highest in Kigali City (16.5%), and lowest in Southern Province (4.8%).

Among Large Scale farmers, Northern Province (47.6%) had the highest proportion of users of pesticides and the lowest proportion of pesticides users was in the Southern Province (4.8%).

Table 90: Type of Pesticides used by Agricultural Operators (%)

	DITHANE	RIDOMIL	DIMETHOATE	CYPERMETRINE	DURSIBAN	TILT	PILKARE	TOTAL
Kigali City	0.7	0.0	0.2	4.0	0.0		0.2	5.3
Southern	5.1	0.9	0.7	6.3	0.0		0.8	13.8
Western	21.0	11.3	5.0	10.5	0.5	0.0	1.4	49.7
Northern	7.1	1.8	0.8	7.8	0.9		0.4	18.8
Eastern	1.8	0.3	1.6	6.9	0.2		1.6	12.5
Rwanda	35.7	14.3	8.3	35.4	1.8	0.0	4.4	100

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Countrywide most of the Agricultural Operators used Dithane pesticide (35.7%), especially in Western Province (21%) followed by Cypermetrine (35.4%) mainly in the Western Province also and Ridomil (14.3%) mainly in the same Western Province (11.3%). The Western Province (49.7%) had the highest proportion of Agricultural Operators using pesticides followed by Northern Province (18.8%), Southern Province (13.8%), Eastern Province (12.5%) and Kigali City (5.3%).

Table 91: Type of Pesticide Used by Large Scale Farmers (%)

	DITHANE	RIDOMIL	DIMETHOATE	CYPERMETRINE	DURSIBAN	TILT	PILKARE	OTHER PE	TOTAL
Kigali City			2.8	0.7	0.7		0.7	3.5	8.3
Southern	5.6	3.5		11.1	0.7			3.5	24.3
Western	4.9	3.5	1.4	2.1	0.7			0.7	13.2
Northern	14.6	3.5	3.5	5.6	2.1	0.7	0.7	0.7	31.3
Eastern	1.4	0.7	6.9	8.3	2.1			3.5	22.9
Rwanda	26.4	11.1	14.6	27.8	6.3	0.7	1.4	11.8	100

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For LSF, pesticides were mostly used in Northern Pprovince (31.3%) followed by Southern Province (24.3%), Eastern Province (22.9%), Western Province (13.2%) and Kigali City (8.3%). Cypermetrine pesticide was the most used country wide (27.8%), followed by Dithane (26.4%), Dimethoate (14.6%) and Ridomil (11.1%).

5.4 Small Agricultural Equipment

The survey results showed that countrywide, most of the expenditure by Agricultural Operators was on the Hoe (43.85%) followed by the Bicycle (9.65%) (see Table 92). The expenditures on the other tools that were used for cultivation by Agricultural Operators were below 9 % each of the total expenditure.

Table 92: Expenditure on Small Agricultural Equipment by Types (%)

Small Agricultural Equipment	Agricultural Operators in Segments	Large Scale Farmers
Hoe	43.85	12.4
Spring Hoe	1.26	0.5
Hoe majagu	3.23	1.7
Rake	0.03	0.3
Pick/ Ipiki	0.85	1.0
Wheelbarrow	0.90	2.9
Shovel/igitiyo	1.07	0.9
Sprayer	3.42	8.0
Watering can	0.56	0.3
Saw	0.13	
Sickle	2.20	5.5
Sécataurs	0.10	0.0
Scythe	0.19	0.1
Axe/ishoka	0.90	0.5
Machete	2.62	2.2
Billhook	0.04	0.0
Mixer/umuvure	1.14	0.7
Mortar/isekuru	0.38	0.2
Mill/urusyo	0.05	0.0
Basket	1.91	1.4
Sack	4.65	15.4
Big basket	0.14	0.1
Pitcher	0.22	0.0
Winnower	1.06	6.1
Basket/ikibo	0.42	0.1
Basket/inkangara	0.07	0.0
Churn/igisabo	0.08	0.5
Calabash	0.04	0.2
Milk can/igicuba	0.28	5.2
Milk jug(icyansi)/ Milk container	0.16	0.9
Balance/Scales	1.45	
Jerry-can	5.28	2.6
Barrel	1.17	1.7
Bike	9.65	7.9
Craft bike/Igitogoto	0.17	
Bowl/ingeremeri	0.27	0.4
Scales		2.9
Craft bike		0.0
Scie		0.1
Sheeting	5.24	
Hoe Handle	1.83	
Others (specify)	3.00	17.5

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Country wide, expenditure on small agricultural equipment by LSF was mainly on Sacks (15.4%) and Hoes (12.4%). Expenditure on other tools that were used for cultivation by LSF were below 9% each of the total expenditure.

Table 93: Small Equipment Received from Non-agricultural Donors

	Agricultural Operators	LSF
Hoe	14.5	0.1
Spring Hoe	3.4	0.0
Hoe majagu	3.1	0.1
Rake	2.8	
Pick/ Ipiki	2.8	0.0
Wheelbarrow	2.8	0.1
Shovel/igitiyo	0.5	0.1
Sprayer	0.7	0.1
Watering can	3.2	0.0
Saw	0.6	
Sickle	1.9	0.3
Sécataurs	3.1	
Scythe	2.6	
Axe/ishoka	0.5	13.0
Machete	1.9	0.0
Billhook	0.5	
Mixer/umuvure	1.9	
Mortar/isekuru	1.5	
Mill/urusyo	1.4	
Basket	1.7	
Sack	8.7	30.9
Big basket	4.9	
Pitcher	1.5	
Winnower	2.0	
Basket/ikibo	0.6	0.0
Basket/inkangara	3.3	0.0
Churn/igisabo	1.4	0.0
Calabash	2.2	0.0
Milk can/igicuba	0.7	0.0
Milk jug(icyansi)/	2.8	
Balance/Scales	2.4	
Jerry-can	3.8	32.7
Barrel	2.0	17.1
Bike	2.5	0.0
Craft bike/Igitogot	0.7	
Bowl/ingeremeri	1.8	
Sheeting	2.1	
Scales		0.1
Craft bike		0.0
Hoe Handle	1.0	
Others (specify)	4.5	5.2

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Country wide, Agriculture Operators mostly received hoes (14.5%) as donation followed by Sacks (8.7%), Big basket (4.9%) while LSF received mostly jerry-cans (32.7%) followed by Sacks (30.9%), Barrel (17.7%), Axe/Ishoka (13.0%).

5.5 Use of Production

The majority of the crop production (50% or more) by Agricultural Operators was consumed by the households. The rest of the crop production for some crops was either sold or offered as gifts to others, seed or stored. A small percentage of the crop production for some crops was used for payment of hired labour. The survey results on the use of crop production by agricultural operators are given in Table 94.

Table 94: Use of Production by Agricultural Operators in Segments (%)

	Sold	Stored	Auto consumption	Used as wage for hired labour	Used as Farm rent	Offered as Gift to Other	Exchanged with other things	Used as seeds	Used as fodder	Total
Maize	11.8	1.5	75.4	0.6	0.3	3.4	0.3	5.9	0.9	100
Paddy rice	49.8	2.9	36.6	1.0	0.5	5.3	0.1	3.5	0.5	100
Sorghum	35.2	7.8	41.3	1.3	0.6	6.4	0.6	6.4	0.3	100
Wheat	19.9	3.6	51.1	-	1.8	3.1	2.0	18.5	-	100
Other cereals	12.6	0.8	65.3	1.7	0.7	2.5	-	16.4	-	100
Bush beans	11.9	4.8	61.5	0.6	0.2	2.9	0.8	16.8	0.5	100
Climbing beans	9.8	3.9	62.9	0.3	0.3	3.5	2.2	16.6	0.3	100
Peas	8.6	1.5	64.4	-	0.4	1.1	2.3	21.7	-	100
Other legumes & pulses	-	-	50.0	-	-	-	-	50.0	-	100
Cassava	23.9	1.4	69.5	1.1	0.2	3.3	0.0	0.4	0.2	100
Irish potatoes	14.8	2.0	66.0	0.2	0.1	2.3	0.7	13.7	0.1	100
Sweet potatoes	19.3	1.5	70.9	2.2	0.3	3.9	0.0	0.2	1.7	100
Yams & Taro	14.3	1.2	74.4	1.7	0.1	5.1	0.3	2.5	0.4	100
Tomotoes	71.5	-	24.6	0.6	-	3.1	-	0.2	-	100
White cabbage	51.8	-	39.9	-	0.5	7.8	-	-	-	100
Onion	53.3	0.9	32.1	7.5	-	2.2	0.3	1.8	1.9	100
Carrot	55.1	-	43.2	-	-	1.7	-	-	-	100
Eggplant	47.1	0.2	45.3	0.4	-	6.9	0.1	0.0	-	100
Other vegetables	60.0	-	27.0	-	-	7.5	0.1	5.4	-	100
Cooking Bananas	23.7	0.1	70.1	2.0	0.1	3.9	0.1	0.0	0.1	100
Banana Fruit	61.4	-	35.0	0.4	-	2.7	0.4	0.0	0.0	100
Banana for beer	75.5	-	20.2	0.3	0.0	3.7	0.2	0.0	0.0	100
Pineapple	48.2	0.6	37.4	1.5	-	10.7	-	1.5	-	100
Avocado	47.5	-	45.6	-	-	6.9	-	-	-	100
Passion fruits	100.0	-	-	-	-	-	-	-	-	100
Other fruits	57.1	1.0	39.5	-	-	2.3	-	-	-	100
Soya beans	11.9	4.8	56.3	0.3	-	2.1	1.5	22.1	1.0	100
Ground nuts	16.4	2.9	54.7	0.1	-	1.2	1.0	23.6	0.2	100
sun flower	1.9	-	88.9	3.9	-	-	-	5.3	-	100
coffee	96.5	-	2.8	0.1	-	-	-	-	0.6	100
Pyrethrum	79.4	-	20.6	-	-	-	-	-	-	100
Other crops	20.3	3.0	19.2	-	-	2.1	1.8	14.4	39.2	100

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Table 95: Use of Production by Large Scale Farmer (%)

	Sold	Stored	Auto Consumption	Used as wage for hired labour	Used as Farm rent	Offered as Gift to Other	Exchanged with other things	Used as seeds	Used as fodder	Total
Maize	44.7	2.1	44.0	2.8	0.5	1.7	-	3.6	0.6	100
Paddy rice	74.4	-	22.2	-	-	1.2	0.2	2.0	-	100
Sorghum	73.7	8.8	5.0	2.9	-	2.2	-	3.2	4.2	100
Wheat	-	-	-	-	-	100.0	-	-	-	100
Other cereals	50.0	-	25.0	-	-	-	-	25.0	-	100
Bush beans	33.4	3.6	47.1	3.4	0.1	1.6	-	9.8	0.9	100
Climbing beans	97.0	-	1.5	-	-	1.5	-	-	-	100
Peas	-	-	-	-	-	-	-	100.0	-	100
Cassava	18.8	17.5	47.5	5.0	-	11.3	-	-	-	100
Irish potatoes	25.3	-	56.9	-	-	1.4	-	13.5	2.9	100
Sweet potatoes	-	-	100.0	-	-	-	-	-	-	100
Tomotoes	90.0	-	10.0	-	-	-	-	-	-	100
White cabbage	42.0	-	58.0	-	-	-	-	-	-	100
Onion	85.2	-	14.8	-	-	-	-	-	-	100
Carrot	93.2	-	6.8	-	-	-	-	-	-	100
Other vegetables	47.4	-	51.5	-	-	1.2	-	-	-	100
Cooking Bananas	42.1	0.5	50.6	2.5	-	4.1	-	0.2	-	100
Banana Fruit	75.6	-	23.7	-	-	0.6	-	-	-	100
Banana for beer	100.0	-	-	-	-	-	-	-	-	100
Pineapple	99.2	-	0.5	-	-	0.4	-	-	-	100
Other fruits	100.0	-	-	-	-	-	-	-	-	100
Soya beans	80.0	-	16.0	-	-	2.4	-	1.6	-	100
Ground nuts	20.9	-	69.6	-	-	2.5	-	7.1	-	100
coffee	100.0	-	-	-	-	-	-	-	-	100
Other crops	3.3	-	23.8	-	-	-	-	6.2	66.7	100

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With respect to LSF, although the use of crop production was similar to that of Agricultural Operators, on the crop production consumed by the household, only Sweet potatoes was consumed 100 % by the LSF households. For some crops, a substantial percentage of the production was sold, used as wages for hired labour, offered as gifts to others and used as seed or put in storage.

Chapter 6: 2013 Season C Survey Results

6.1 Demographic and Social Characteristics of Agricultural Operators

Characteristics of Agricultural Operators describe the number, type, gender, age, education level, residency in segments, farming activities and cooperative membership.

6.1.1 Number of Agricultural Operators by Type

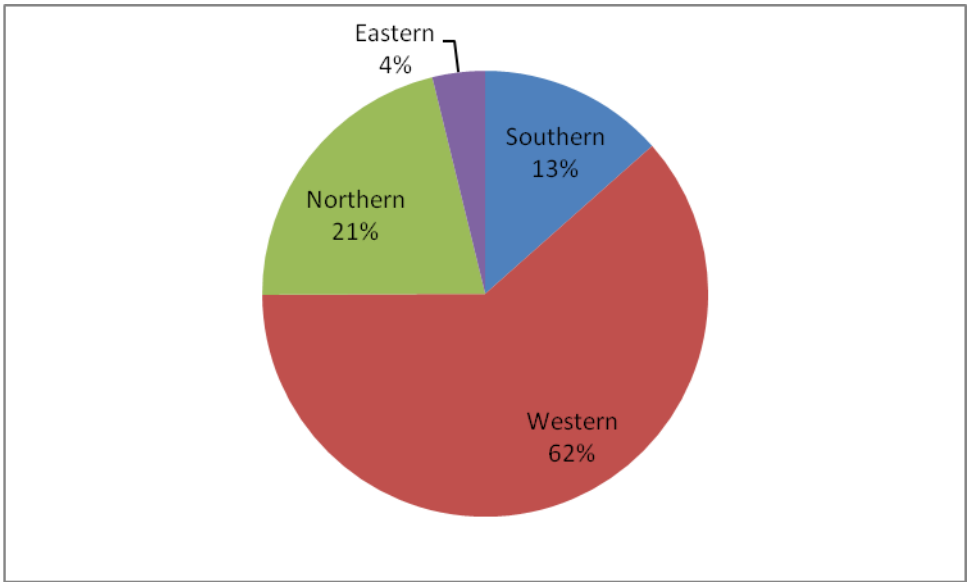
The numbers and percentages of Agricultural Operators by Province in 2013 Season C are given in Table 96 below. The total number of Agricultural Operators that were enumerated was 1,412. Most of the Agricultural Operators (99.2%) were individual farmers of which about 0.8 % only were members of cooperatives.

Table 96: Number of Agricultural Operators by Province

	Agricultural Operators in Segment				
	Number of Agricultural Operators by Provinces	Percent	Individual farmers(%)	Cooperatives(%)	Total (%)
Southern	190	13.5	98.4	1.6	100
Western	868	61.5	99.5	0.5	100
Northern	300	21.2	99.3	0.7	100
Eastern	54	3.8	96.3	3.7	100
Total	1,412	100	99.2	0.8	100
2013 Seasonal Agriculture Survey - Season C					

The Western Province was represented by 61.5% of the Agricultural Operators followed by Northern Province (21.2%) and Southern Province (13.5%). The Distribution of Agricultural Operators in Segments by Province is given in Figure 35.

Figure 35: Distribution of Agricultural Operators by Province (%)



6.1.2 Number of Agricultural Operators by Gender

The percentage distribution of Agricultural Operators by Gender is given in Table 97. In 2013 Season C, the percentage distribution of Agricultural Operators in Rwanda by gender was 70.4 % male and 29.6 % female.

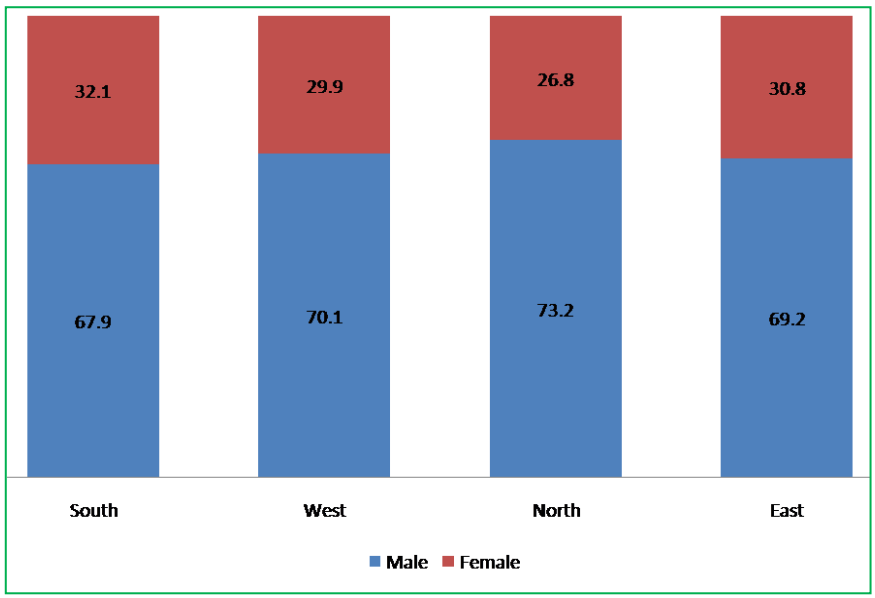
Table 97: Distribution of Agricultural Operators by Gender

	Agricultural Operators		
	Male	Female	Total
Province	Percent	Percent	Percent
Southern	67.9	32.1	100
Western	70.1	29.9	100
Northern	73.2	26.8	100
Eastern	69.2	30.8	100
Rwanda	70.4	29.6	100

2013 Seasonal Agriculture Survey - Season C

The comparison of gender distribution by Province showed that the largest number of male Agricultural Operators (73.2%) was in the Northern Province while the smallest number of male Agricultural Operators (67.9%) was in the Southern Province. The largest number of female Agricultural Operators (32.1%) was in the Southern Province while the smallest number of female Agricultural Operators (26.8%) was in the Northern Province. The distribution of Agricultural Operators by gender and Province is shown in Figure 36.

Figure 36: Distribution of Agricultural Operators by Gender and Province (%)



6.1.3 Age distribution of Agricultural Operators

The majority (27.5%) of Agricultural Operators in Rwanda were in the age group 25-34 (see Table 98). This was followed by 23.8 % of Agricultural Operators in age-group 35-44, 22.6 % were in the age group 55 and Above, 18.7 % of Agricultural Operators were in age-group 45-54 while 7.4 % were in age-group 14-24.

Table 98: Age Distribution of Agricultural Operators (%)

Province	14-24	25-34	35-44	45-54	55 and Above
Southern	4.8	21.4	27.8	23.5	22.5
Western	7.1	28.6	23.4	18.4	22.6
Northern	8.1	27.9	23.8	15.4	24.8
Eastern	17.3	28.8	17.3	25	11.5
Rwanda	7.4	27.5	23.8	18.7	22.6

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The age group distribution of Agricultural Operators by Province varied more in the age group 55 & Above with Northern Province (24.8%) being highest and Eastern Province (11.5%) being lowest. The least variation was in the age group 25-34 with the Eastern Province being the highest (28.8%) and Southern Province (21.4%) being the lowest.

The percentage distribution of male Agricultural Operators in Rwanda was high in the age-group 25-34 (33.3%) followed by 24.4 % of male Agricultural Operators in age-group 35-44, 17.7 % of male Agricultural Operators in age-group 55 and Above and 8.3 % in age-group 14-24 (see Table 99).

Table 99: Age Distribution of Male Agricultural Operators (%)

Province	14-24	25-34	35-44	45-54	55 & +
Southern	7.1	27.6	28.3	19.7	17.3
Western	7.6	34.5	23.6	16.3	18
Northern	9.2	32.6	26.1	14.2	17.9
Eastern	19.4	38.9	13.9	13.9	13.9
Rwanda	8.3	33.3	24.4	16.2	17.7
2013 Seasonal Agriculture Survey - Season C					

The within age group percentage distribution of male Agricultural Operators by Province varied more in the age group 35-44 with Southern Province (28.3%) being highest and Eastern Province (13.9%) being lowest. The least variation was in the age group 45-54 with the Southern Province being the highest (19.7%) and Eastern Province (16.2%) being the lowest.

The distribution of female Agriculture Operators in 2013 Season C was high in the age group 55 and Above (34.3%) followed by 24.6 % of female Agricultural Operators in age 45-54, 22.5% in age group 35-44, 13.5 % in age group 25-34 and 5.1 % in age group 14-24.

Table 100: Age Distribution of Female Agricultural Operators (%)

Province	14-24	25-34	35-44	45-54	55 and Above
Southern	0	8.3	26.7	31.7	33.3
Western	5.8	14.7	22.9	23.3	33.3
Northern	5	15	17.5	18.8	43.8
Eastern	12.5	6.3	25	50	6.3
Rwanda	5.1	13.5	22.5	24.6	34.3
2013 Seasonal Agriculture Survey - Season C					

The within age group percentage distribution of female Agricultural Operators by Province varied more in the age group 55 and Above with Northern Province (43.8%) being highest and Eastern Province (6.3%) being lowest. The least variation was in the age group 25-34 with the Northern Province being the highest (15.0%) and Eastern Province (6.3%) being the lowest.

6.1.4 Education Level of Agricultural Operators

Table 101 shows that in 2013 Season C , 63.1 % of Agricultural Operators had completed primary level education, 25.8 % had no education, 2.1 % attained secondary level education and only 2.1 % had completed tertiary level education. For those Agricultural Operators that completed primary level education their distribution by Province was reasonably uniform. For those Agricultural Operators that had attained secondary level education, the Northern Province had the highest proportion(11.1%).

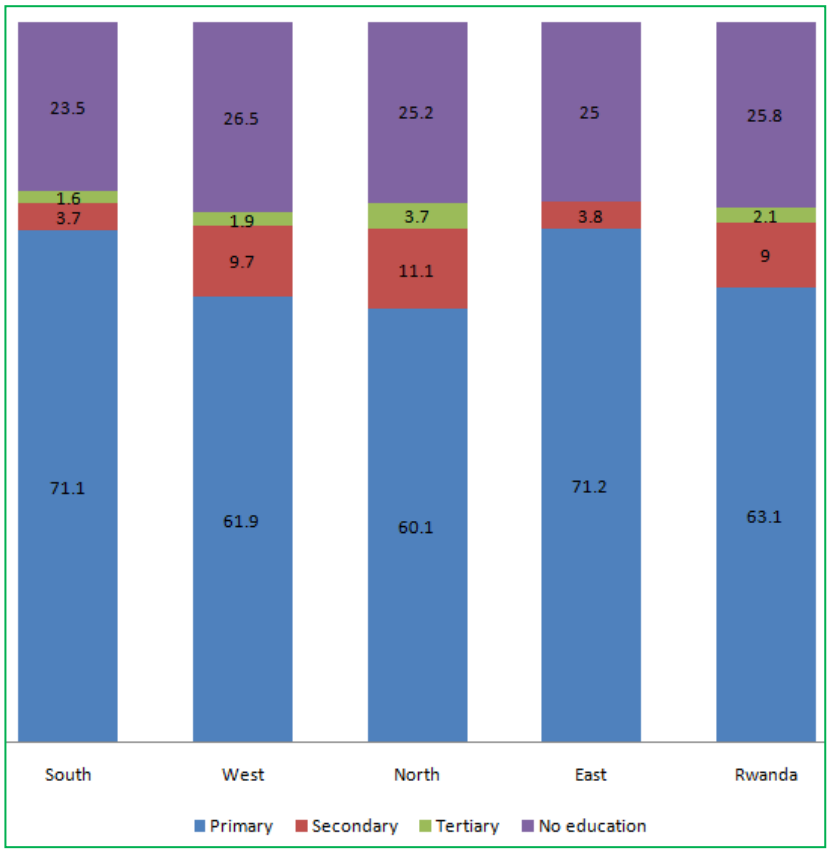
Table 101: Education level of Agricultural Operators

	Primary	Secondary	Tertiary	No education	Total
Southern	71.1	3.7	1.6	23.5	100
Western	61.9	9.7	1.9	26.5	100
Northern	60.1	11.1	3.7	25.2	100
Eastern	71.2	3.8	0	25	100
Rwanda	63.1	9	2.1	25.8	100

2013 Seasonal Agriculture Survey - Season C

For those Agricultural Operators that had completed primary level education the levels of education were reasonably close for the Western and Northern Provinces. Also the Southern and Eastern Provinces had levels that were very close. For those Agricultural Operators that had no education, the Western Province had the highest percentage level (26.5%) while the Southern Province had the lowest level of education (23.6%). For those that had completed secondary education, the Northern Province (11.1%) had the highest percentage while Southern Province had the lowest 3.7 %. For those that had completed Tertiary education the Northern Province (3.7%) had the highest proportion of Agricultural Operators while the Eastern Province had the lowest 0 % of Agricultural Operators. Figure 37 shows the level of education of Agricultural Operators by Province.

Figure 37: Education Level of Agricultural Operators (%)



In Rwanda 70.6 % of male Agricultural Operators had completed primary level education, 15.8 % had no education, 10.7 % completed secondary level education and 2.8 % had completed tertiary level education.

Table 102: Education Level of Male Agricultural Operators (%)

Province	Primary	Secondary	Tertiary	No education	Total
Southern	75.6	4.7	1.6	18.1	100
Western	69.5	11.7	2.5	16.3	100
Northern	70.2	12.8	5	11.9	100
Eastern	75	2.8	0	22.2	100
Rwanda	70.6	10.7	2.8	15.8	100

2013 Seasonal Agriculture Survey - Season C

For those male Agricultural Operators that completed primary level education, their levels of education was reasonably close for the Northern and Western Provinces while the Southern and Eastern Provinces were also close. For those operators that had no education, the Eastern Province had the highest proportion (22.2%) of Agricultural Operators while the Northern Province had the lowest proportion (11.9%) of Agricultural Operators (see Table 102).

Table 103: Education Level of Female Agricultural Operators (%)

	Primary	Secondary	Tertiary	No educatior	Total
Southern	61.7	1.7	1.7	35	100
Western	44.2	5	0.4	50.4	100
Northern	32.5	6.3	0	61.3	100
Eastern	62.5	6.3	0	31.3	100
Rwanda	45.2	4.8	0.5	49.5	100

2013 Seasonal Agriculture Survey - Season C

For those female Agricultural Operators that had no education, the Northern Province had the highest proportion (61.3%) of female Agricultural Operators followed by the Western Province with 50.4 %. For those female Agricultural Operators that had completed Primary level education, the Eastern Province had the highest proportion (62.5%) followed by the Southern Province (61.7%), Western Province (44.2%) and Northern Province (32.5%). For those that completed secondary level education, the Northern and Eastern Provinces had the same proportion of 6.3 % with the Western Province being at 5 % level and Southern Province being at the lowest level of 1.7 %. For those that reached the tertiary level, 1.7% were from the Southern Province and 0.4 % were from the Western Province.

6.2 Date of Sowing, Production Expectation Date and Harvest

The starting date of sowing by Agricultural Operators is summarized in Table 104. For the majority of Agricultural Operators, sowing for 2013 Season C crops was mainly done in May, June and July 2013.

Table 104: Agricultural Operators Indicating the Sowing Date in Segments by Crop (%)

Crop name	Before 15 Avril 2013	15-30 Avril 2013	1-31 May 2013	1-30 June 2013	1-31 July 2013	After July 2013
Bush beans	0.0	0.7	15.4	32.2	40.6	11.2
Climbing beans	17.4	34.8	30.4	0.0	17.4	0.0
Peas	0.0	16.7	8.3	45.8	29.2	0.0
Irish potatoes	2.8	14.9	24.8	37.7	19.3	0.5
Tomatoes	14.5	7.3	29.1	32.7	14.5	1.8
White cabbage	4.2	10.5	28.4	34.7	18.9	3.2
Flower cabbage	0.0	0.0	57.1	28.6	14.3	0.0
Onion	0.0	0.0	47.1	35.3	11.8	5.9
Carrot	0.0	3.2	35.5	41.9	19.4	0.0
Soya beans	0.0	0.0	6.9	27.6	65.5	0.0
Sweet pepper	0.0	0.0	25.0	75.0	0.0	0.0
Amaranths	0.0	0.0	35.7	39.3	17.9	7.1
Spinach	0.0	0.0	0.0	50.0	50.0	0.0
Sugar beat	0.0	0.0	75.0	0.0	0.0	25.0
Garlic	10.5	36.8	0.0	31.6	15.8	5.3
Leeks	0.0	0.0	8.0	36.0	48.0	8.0
French beans	0.0	0.0	11.1	44.4	33.3	11.1

2013 National Agriculture Survey - Season C

A few crops were sown earlier than May 2013 such as Climbing beans, Peas and Tomatoes. Very few Agricultural Operators sowed their 2013 Season C crops after July 2013.

6.2.1 Expectation of Crop Production by 31st August 2013

The majority of agricultural operators had high expectation to have the crop production of most of their 2013 Season C crops after 31st August 2013 with the exception of Amaranths (91.1%), Climbing beans (79.2%), Sugar beet (75%), Flower cabbage (57.1%), Tomatoes (55.8%), Spinach (50%), White cabbage (50.6%) that were expected to be harvested by 31st August 2013.

Table 105: Percentage of Agricultural Operators Expecting Production by 31st August 2013

Crop Name	Yes	No	Total
	%	%	%
Bush beans	20.3	79.7	100
Climbing beans	69.6	30.4	100
Peas	37.5	62.5	100
Irish potatoes	33.8	66.2	100
Tomatoes	47.3	52.7	100
White cabbage	49.5	50.5	100
Flower cabbage	57.1	42.9	100
Onion	52.9	47.1	100
Carrot	32.3	67.7	100
Soya beans	3.4	96.6	100
Sweet pepper	50.0	50.0	100
Amaranths	92.9	7.1	100
Spinach	50.0	50.0	100
Sugar beat	75.0	25.0	100
Garlic	42.1	57.9	100
Leeks	16.0	84.0	100
French beans	44.4	55.6	100

2013 National Agriculture Survey - Season C

The expected date of harvest reported by Agricultural Operators for their 2013 Season C crops is given in Table 106.

Table 106: Expected Date of Harvest as Reported by Agricultural Operators (%)

Crop name	Before 01 July 2013	01- 15 July 2013	15- 31 July 2013	1- 31 August 2013	After August 2013	Total
Bush beans	0.0	0.7	0.0	17.5	81.8	100
Climbing beans	0.0	4.3	0.0	65.2	30.4	100
Peas	0.0	0.0	8.3	29.2	62.5	100
Irish potatoes	0.2	0.6	4.1	28.6	66.5	100
Tomatoes	0.0	0.0	7.3	40.0	52.7	100
White cabbage	0.0	1.1	6.3	40.0	52.6	100
Flower cabbage	0.0	0.0	0.0	57.1	42.9	100
Onion	0.0	0.0	0.0	52.9	47.1	100
Carrot	0.0	0.0	3.2	29.0	67.7	100
Soya beans	0.0	0.0	0.0	0.0	100.0	100
Sweet pepper	0.0	0.0	0.0	50.0	50.0	100
Amaranths	3.6	10.7	25.0	53.6	7.1	100
Spinach	50.0	0.0	0.0	0.0	50.0	100
Sugar beat	0.0	0.0	0.0	75.0	25.0	100
Garlic	0.0	0.0	0.0	42.1	57.9	100
Leeks	0.0	0.0	0.0	4.0	96.0	100
French beans	0.0	11.1	0.0	33.3	55.6	100

2013 National Agriculture Survey - Season C

Although most of Agricultural Operators reported that most of their 2013 Season C crops would be harvested after August 2013, a few Season C crops were reported to be harvested between 1-31 August by a large number of Agricultural Operators. The crops included Climbing beans (65.2%), Amaranths (53.6%) and Sugar beet (75%). Only Flower Cabbage was reported by a large number of Agricultural Operators (57.1%) to be harvested before August 2013.

6.3 Farm Characteristics (Area, Yield and Production)

6.3.1 Crop Areas

Given the cultivated crops of Season C in Rwanda, the Seasonal Agriculture Survey 2013 covered crops that did not exceed four months to mature. The following were the crops: Irish Potatoes, Beans, Peas, Soya beans and Vegetables. Table 107 shows that in Rwanda, in terms of land area under crops the main crops grown in 2013 Season C were mostly Irish Potatoes occupying 70.9 % of the total Season C land followed by Beans (14.4%) -Mainly Bush beans- and vegetables (11.8%).

Table 107: Area (Ha) Cultivated by Crop and Group of Crops by Province

Crops	Kigali City	Southern	Western	Northern	Eastern	Rwanda	%
Tubers and Roots	**-**	**591**	**5,768**	**4,412**	**10**	**10,782**	**70.9**
Irish Potatoes		591	5,768	4,412	10	10,782	70.9
Pulses	**-**	**1,868**	**136**	**27**	**606**	**2,637**	**17.3**
Beans	-	1,496	119	7	569	2,191	14.4
Bush beans		1,408	44	2	569	2,023	13.3
Climbing beans		88	75	5		168	1.1
Peas		122	17	20		159	1.0
Soya beans		250		0	38	288	1.9
Vegetables and Fruits	**13**	**349**	**726**	**317**	**385**	**1,790**	**11.8**
Vegetables	13	349	726	317	385	1,789	11.8
Fruits		1				1	0.0
Other crops				**0**		**0**	**0.0**
Total Physical land	**13**	**2,968**	**7,346**	**4,887**	**1,063**	**15,209**	**100**
Total Physical land	**13**	**2,968**	**7,346**	**4,887**	**1,063**	**15,209**	**100**

Most of the Irish Potatoes were cultivated mainly in the Western and Northern Provinces of the country. Beans were mainly cultivated in the Southern Province of the country while Vegetables were generally well distributed in the Provinces with the highest level being in the Western Province.

Figure 38: Share of Agriculture Land by Crop (%)

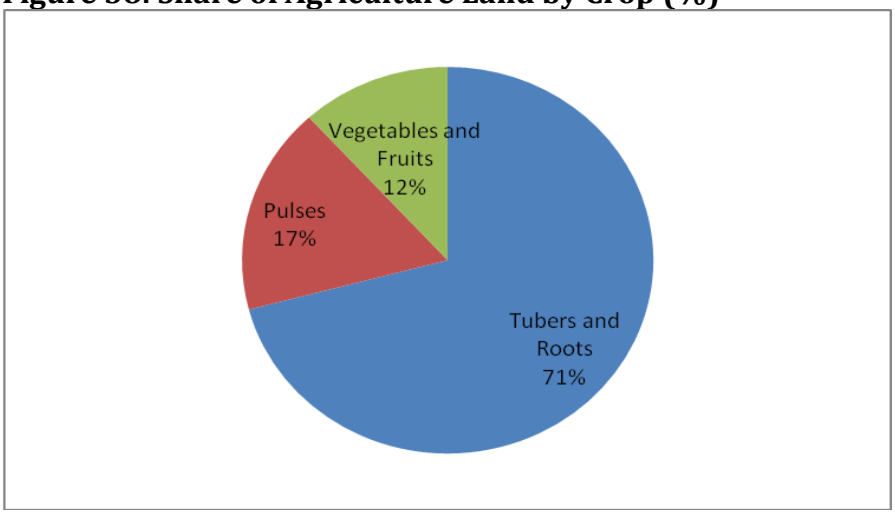


Figure 38 shows the percentage share of agricultural land cultivated by group of crops. The survey results showed that the important groups of agricultural crops in Rwanda in Season C continued to be Tubers and roots (70.9%) followed by Pulses (17.3%) and Vegetables and fruits (11.8%).

The average size of tracts for Season C 2013 is given in the Table 108. In Rwanda the average size of tracts for Agricultural Operator in 2013 Season C was 0.10Ha.

Table 108: Average Size of Tracts by Province (Hectares)

Province	Area(Ha)
South	0.06
West	0.10
North	0.14
East	0.08
National	0.10

2013 Seasonal Agriculture Survey

The Northern Province had the largest average size of tracts for Agricultural Operators (0.14 Ha) followed by the Western Province 0.10 Ha.

Table 109: Average Size of Cultivated Plots by Main Crops by Province in Segments (HA)

	Southern	Western	Northern	Eastern	National
Bush beans	0.06	0.05	0.02	0.07	0.06
Climbing beans	0.07	0.06	0.06		0.06
Peas	0.03	0.05	0.08		0.03
Irish potatoes	0.06	0.10	0.14	0.02	0.11
Tomotoes	0.03	0.03	0.07	0.12	0.06
White cabbage	0.02	0.04	0.04	0.03	0.03
Flower cabbage		0.05			0.05
Onion	0.03	0.12	0.01	0.01	0.04
Carrot	0.02	0.10	0.09	0.04	0.07
Eggplant			0.01		0.01
Other vegetables	0.02	0.08	0.02	0.02	0.02
Other fruits	0.01				0.01
Soya beans	0.04		0.01	0.03	0.04
Other crops			0.02		0.02
Sweet pepper	0.02			0.03	0.03
Amaranths	0.02	0.03	0.01	0.01	0.02
Celery	0.02			0.01	0.02
Spinach		0.01			0.01
Sugar beat	0.03	0.04	0.04		0.04
Garlic		0.08	0.09		0.08
Leeks		0.04		0.01	0.03
French beans	0.03	0.10		0.02	0.03
Lettuce	0.02				0.02
Fallow	0.03	0.05	0.09	0.05	0.05

The survey results (see Table 109) showed that the average size of cultivated plots in 2013 Season C in Rwanda were small. The majority of plots had an average size below 0.10 Ha with the exception of Irish potatoes (0.11 Ha).

6.3.2 Crop Yields

Crop yields also known as "Agricultural output" refer to the measure of yield of a crop per unit area of land cultivation (see Table 110).

Table 110: Crops Yield by Province (Kg/Ha)

Crops	Kigali City	Southern	Western	Northern	Eastern	Rwanda
Bush beans	-	625	847		918	712
Climbing beans	-	1,158	1,338			1,241
Peas	-	752	101	228		618
Irish Potatoes	-	4,033	5,654	5,095	1,767	5,333
Soya beans	-	467			1,261	571
Vegetables	-	20,311	26,847	7,959	14,893	19,606

2013 Seasonal Agriculture Survey - Season C - Phase I

In terms of crop yields countrywide in 2013 Season C, Irish potatoes were produced with high yields in the Western and Northern Provinces, Beans (Bush and Climbing beans) in western and Southern Provinces while and Soya beans had high yields in the Eastern Province and Peas in Southern Province.

6.3.2 Crop Production

The contribution of individual crop production by Province (see Table 111) was calculated by the product of Yield and Area under the crop.

Table 111:. Production of Main Crops by Province (MT)

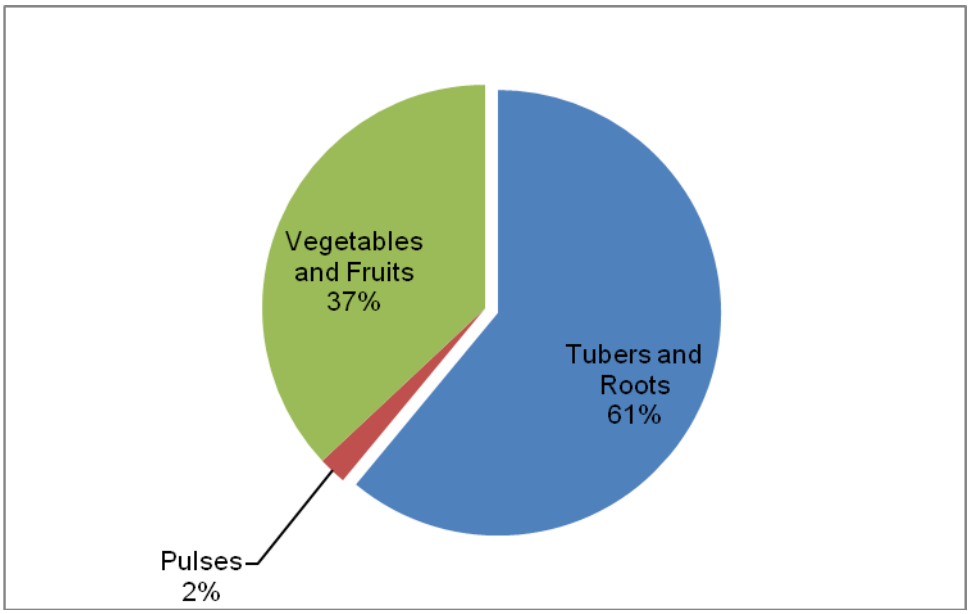
Crops	Southern	Western	Northern	Eastern	Rwanda	Percent
Tubers and Roots	**2,385**	**32,615**	**22,478**	**18**	**57,497**	**61.0**
Irish Potatoes	2,385	32,615	22,478	18	57,497	61.0
Pulses	**1,190**	**140**	**4**	**570**	**1,904**	**2.0**
Beans	982	138	-	522	1,642	1.7
Bush beans	880	37	-	522	1,440	1.5
Climbing beans	102	101	-	-	202	0.2
Peas	92	2	4	-	98	0.1
Soya beans	116	-	-	47	164	0.2
Vegetables and Fruits	**7,081**	**19,491**	**2,521**	**5,729**	**34,822**	**37.0**
Vegetables	7,081	19,491	2,521	5,729	34,822	37.0
Other crops	-	-	-	-	-	-
Total	**10,656**	**52,246**	**25,004**	**6,317**	**94,223**	**100.0**

2013 Seasonal Agriculture Survey - Season C

The share of crop production in 2013 Season C, by groups of crops in Rwanda was significantly high for Tubers and Roots (61%) followed by Vegetables and fruits (37%) and Pulses (2%).

Figure 40 shows the proportion of agricultural production by groups of crops.

Figure 39: Percentage Share of Agricultural Production by Group of Crops



6.4 Agricultural Practices

6.4.1 Pure and Mixed Cropping

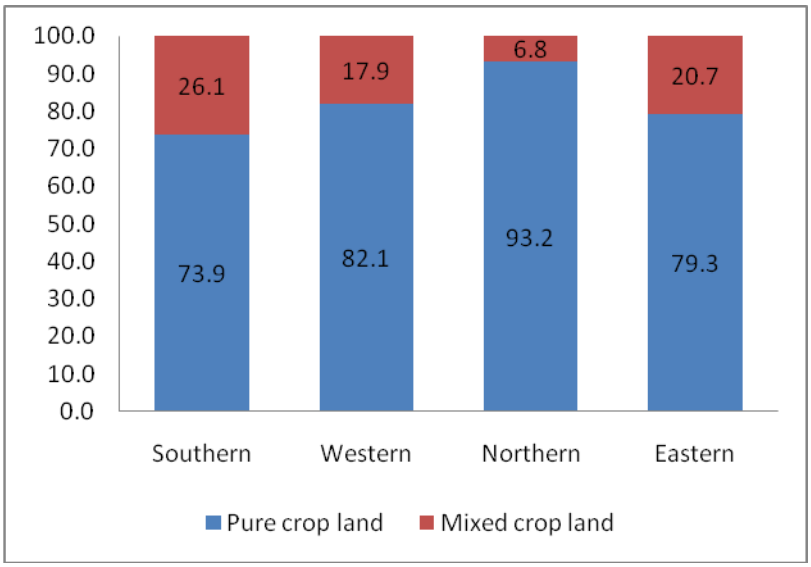
The survey results showed that the percentage share of agricultural land cultivated by Agricultural Operators in pure stand and mixed stand, in 2013 Season C was 83.7 % and 16.3 % respectively (see Table 112 and Figure 41).

Table 112: Share of Pure and Mixed Crop Agricultural Land (%)

Province	Pure Crop Land	Mixed Crop Land	Total
Kigali City			
Southern	73.9	26.1	100
Western	82.1	17.9	100
Northern	93.2	6.8	100
Eastern	79.3	20.7	100
Rwanda	83.7	16.3	100

2013 Seasonal Agriculture Survey - Season C

Figure 40: Share of Pure and Mixed Crop Land (%)



The use of agricultural land for growing main crops in pure stand in the country, in 2013 Season C is presented in Table 113. In Northern Province, Agricultural Operators cultivated 33.3 % of total land in pure stand while the Western Province cultivated 43.8 %, Southern Province (16.6%), and Eastern Province, 6.3% of total cultivated land in pure stand.

Table 113: Pure Crop Agricultural Land (Ha)

Province	Bush beans	Climbing beans	Peas	Irish potatoes	Tomotoes	White cabbage	Onion	Carrot	Other vegetables	Soya beans	French beans	Other Crop	Total	Percent
Southern	54.4	2.6	4.5	21.3	3.6	3.0	1.1	0.7	0.2	6.4	1.1	1.3	100	16.6
Western	1.1	0.9	0.3	88.7	0.9	3.1	0.6	1.2	0.0	0.0	0.0	3.1	100	43.8
Northern	0.0	0.0	0.3	93.8	1.3	1.4	0.0	1.2	0.0	0.0	0.0	2.0	100	33.3
Eastern	60.9	0.0	0.0	0.3	31.8	4.6	0.4	0.2	0.1	1.1	0.0	0.6	100	6.3
Rwanda	13.4	0.8	1.0	73.6	3.4	2.6	0.5	1.0	0.0	1.1	0.2	2.3	100	100.0

2013 Seasonal Agriculture Survey - Season C

Clearly most of the land was used for cultivating Irish potatoes (73.6%) in pure crop land, followed by Bush beans (13.4%), Tomatoes (3.4%) and White Cabbage (2.6%).

6.4.2 Use of Organic Fertilizers

The percentage number of Agricultural Operators that already used and those that did not use organic fertilizer are presented in Table 114. In 2013 Season C, 71.2 % Agricultural Operators reported that they used organic fertilizers while 28.8 % did not use organic fertilizer.

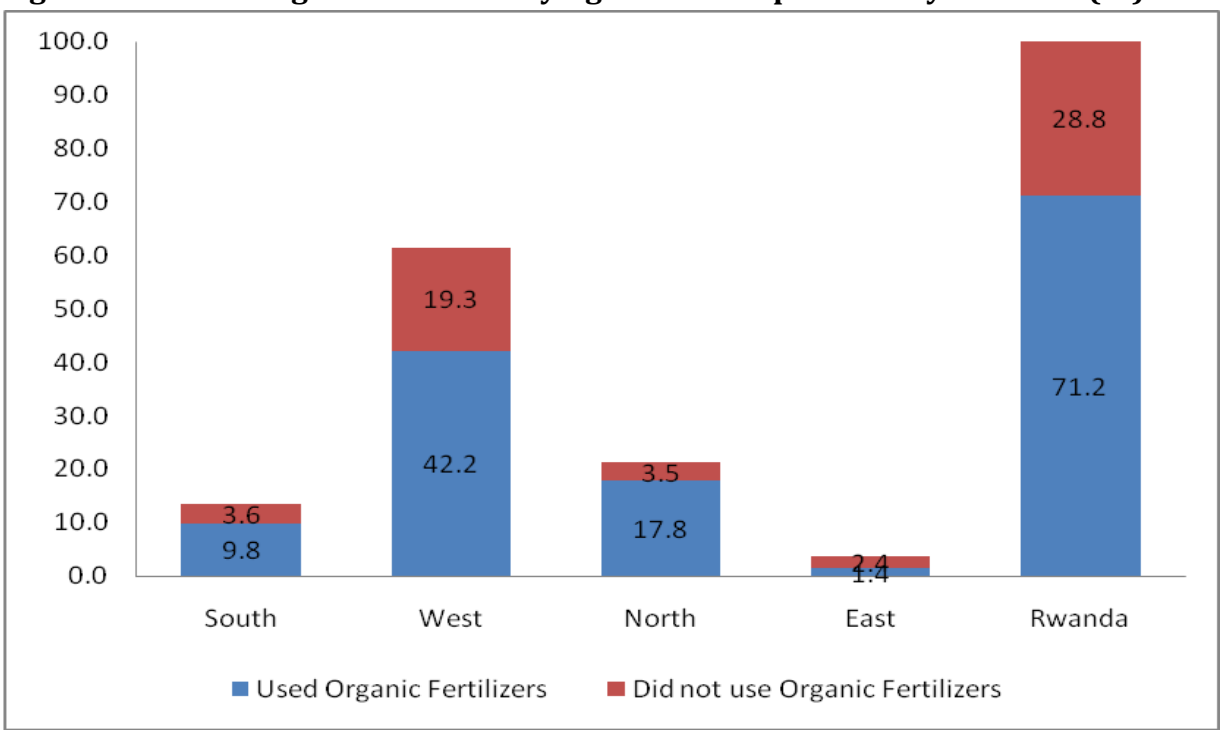
Table 114: Users of Organic Fertilizers (%)

Province	Used Organic Fertilizers	Did not use Organic Fertilizers
Southern	9.8	3.6
Western	42.2	19.3
Northern	17.8	3.5
Eastern	1.4	2.4
Rwanda	71.2	28.8

2013 National Agriculture Survey . Season C

Figure 41 shows the use of organic fertilizer by Agricultural Operators in the Provinces in 2013 Season C.

Figure 41: Use of Organic Fertilizer by Agricultural Operators by Province (%)



6.4.3 Use of Inorganic Fertilizers

The survey results showed that 65.9 % of Agricultural Operators used inorganic fertilizer while 34.1 % did not use inorganic fertilizer (see Table 115and Figure 42).

Table 115: Use of Inorganic Fertilizer (%)

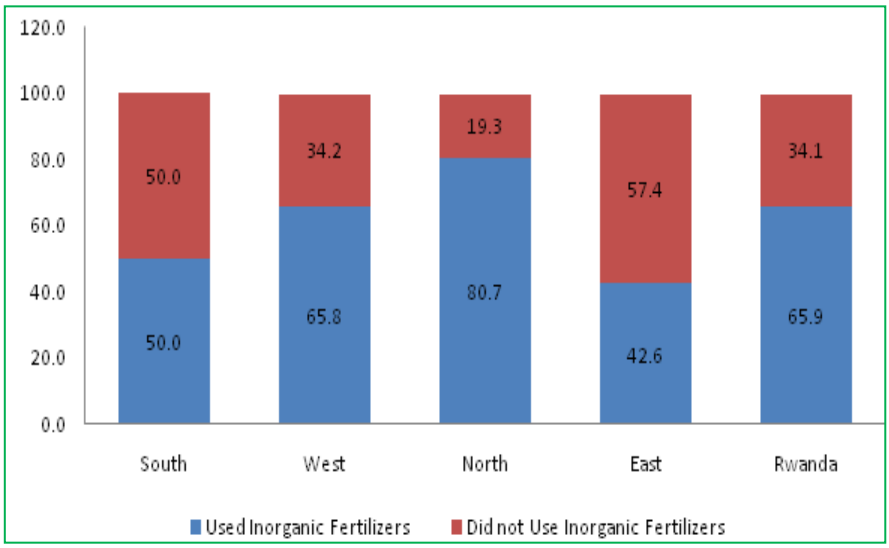
PROVINCE	Used Inorganic Fertilizers	Did not Use Inorganic Fertilizers
Southern	50.0	50.0
Western	65.8	34.2
Northern	80.7	19.3
Eastern	42.6	57.4
Rwanda	65.9	34.1

2013 National Agriculture Survey . Season C

On the use of inorganic fertilizer in the Provinces, the survey results showed that the Northern Province (80.7%) had the highest proportion of users followed by the Western Province (65.8%), Southern Province (50%) and Eastern Province (42.6%).

Figure 42 shows the number of Agricultural Operators that used and those that did not use inorganic fertilizers.

Figure 42: Distribution of Agricultural Operators and their Use of Inorganic Fertilizer (%)



On the type of inorganic fertilizer used by Agricultural Operators (see Table 116), the most used fertilizer was NPK (63.9%) followed by UREA (16.1%), DAP(12.8), UREA (LIQUID) (4.9%) and LIME (2.4%).

Table 116: Type of Fertilizer Used by Agricultural Operators by Province

	Agricultural Operators					
	NPK	UREA	UREA (LIQUID)	DAP	LIME	Total
Province	Percent	Percent	Percent	Percent	Percent	
Southern	3.6	3.6	0.2	3.4	0.8	11.6
Western	41.3	8.8	3.7	6.6	1.4	61.9
Northern	18.2	2.5	0.8	2.4	0.2	24.1
Eastern	0.8	1.1	0.2	0.4	0.0	2.5
Rwanda	63.9	16.1	4.9	12.8	2.4	100

2013 National Agriculture Survey . Season C

NPK fertilizer was used mostly in the Western Province (41.3%) followed by the Northern Province (18.2%). UREA was used mostly in Western Province (8.8%) followed by Southern Province (3.6%). DAP fertilizer was also used mostly in the Western Province (6.6%) followed by Southern Province (3.4%).

6.4.4 Use of Seeds

In 2013 Season C, Agricultural Operators that used traditional seed were 90.9% while those that used improved seeds were 9.1%. The use of traditional seeds or improved seeds by Agricultural Operators by Province is given in Table 117.

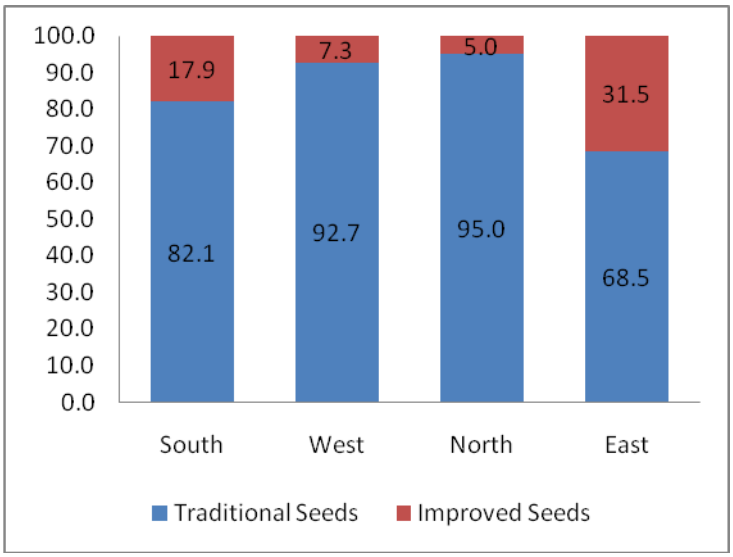
Table 117: Agricultural Operators by Type of Seeds Used (%)

Province	Use of Traditional Seeds	Use of Improved Seeds
Southern	82.1	17.9
Western	92.7	7.3
Northern	95.0	5.0
Eastern	68.5	31.5
Rwanda	90.9	9.1

2013 National Agriculture Survey . Season C

For those Agricultural Operators that used traditional seeds, the majority were in the Northern Province (95.1%) followed by Western Province (95.0%), Western Province (92.7%), and Southern Province (82.1%). For those that used improved seeds, the majority were in the Eastern Province (31.5%), followed by the Southern Province (17.9%), Western Province (7.3%) and Northern Province (5.0%). Figure 43 shows the distribution of Agricultural Operators that used traditional and those that used improved seeds at Province and national levels.

Figure 43: Use of Traditional and Improved Seeds at Province and national Levels (%)



The majority of Agricultural Operators used traditional seed mainly on Irish Potatoes (75.8%) (see Table 118). Traditional seeds were used mainly in Western Province (53.2%) followed by 18.6 % in the Northern Province.

Table 118: Distribution of Users of Traditional Seeds by Type of Crop (%)

	Southern	Western	Northern	Eastern	Rwanda
Bush beans	5.4	0.5	0.0	1.9	7.7
Climbing beans	0.3	0.9	0.0	0.0	1.2
Peas	1.1	0.3	0.2	0.0	1.6
Irish potatoes	3.8	53.2	18.6	0.1	75.8
Tomatoes	1.0	0.7	0.9	0.5	3.1
White cabbage	0.7	1.5	0.8	0.1	3.1
Flower cabbage	0.0	0.1	0.0	0.0	0.1
Onion	0.1	0.1	0.1	0.1	0.4
Carrot	0.1	0.0	0.3	0.0	0.4
Soya beans	1.5	0.0	0.0	0.4	1.9
Sweet pepper	0.1	0.0	0.0	0.0	0.1
Amaranths	0.5	1.2	0.0	0.1	1.8
Spinach	0.0	0.1	0.0	0.0	0.1
Garlic	0.1	0.4	0.9	0.0	1.3
Leeks	0.0	0.8	0.0	0.3	1.1
French beans	0.4	0.0	0.0	0.0	0.4

2013 National Agriculture Survey . Season C

A very small proportion of Agricultural Operators used traditional Bush beans mainly in the Southern Province (5.4%). In the case of Irish potatoes the traditional seeds were mainly used in the Western Province (53.2%) followed by Northern Province (18.6%) and Southern Province (3.8%).

In 2013 Season C, the majority of Agricultural Operators that used improved seeds used it mainly on White cabbage (32.4%) followed by Carrot (16.5%) and Irish potatoes (11.5%).

Table 119. Users of Improved Seeds by Type of Crop (%)

Province	Southern	Western	Northern	Eastern	Rwanda
Bush beans	7.2	0.0	0.0	1.4	8.6
Climbing beans	1.4	0.0	0.0	0.0	1.4
Irish potatoes	2.2	5.0	4.3	0.0	11.5
Tomatoes	2.9	0.0	0.0	2.2	5.0
White cabbage	6.5	15.1	3.6	7.2	32.4
Flower cabbage	0.0	4.3	0.0	0.0	4.3
Onion	3.6	1.4	0.7	0.7	6.5
Carrot	1.4	11.5	2.9	0.7	16.5
Sweet pepper	0.7	0.0	0.0	1.4	2.2
Sugar beat	0.0	2.9	0.0	0.0	2.9
Garlic	0.0	0.7	0.0	0.0	0.7
Leeks	0.0	6.5	0.0	0.0	6.5
French beans	0.7	0.7	0.0	0.0	1.4

2013 National Agriculture Survey . Season C

In the case of White cabbage, Carrots and Irish potatoes, the majorities of improved seeds users were respectively 15.1%, 11.5% and 5.0% and were all from the Western Province.

6.4.5 Irrigation Practice

Table 120 and Figure 44 show the distribution of Agricultural Operators practicing irrigation by Province and at national level.

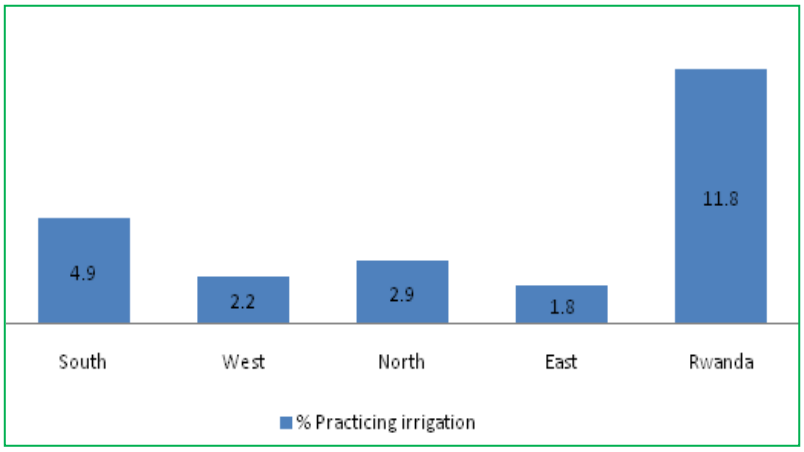
Table 120: Agricultural Operators Practicing Irrigation

Provinces	Percent Practicing irrigation
Southern	4.9
Western	2.2
Northern	2.9
Eastern	1.8
Rwanda	11.8

2013 National Agriculture Survey . Season C

In 2013 Season C, irrigation in Rwanda was practiced by 11.8% of all Agricultural Operators. The Southern Province (4.9%) had the largest proportion of Agricultural Operators practicing irrigation, followed by Northern Province (2.9%), Western Province (2.2%) and Eastern Province (1.8%).

Figure 44: Use of Irrigation Practice by Province



On the type of irrigation practiced by Agricultural Operators, the survey results showed that the majority of Agricultural Operators practiced the Watering can method (38.4%), followed by other irrigation methods (35.4%) and Water way method (18.2%) (See Table 121).

Table 121: Agricultural Operators by Type of Irrigation Practiced (%)

	Agricultural Operators in Segments				
	Pumps/tube wells/irrigation machines	Watering can	Water way	Other	Total
Province	Percent	Percent	Percent	Percent	Percent
Southern	1.0	14.6	9.1	19.7	44.4
Western	2.0	9.1	0.5	4.5	16.2
Northern	2.0	7.1	8.1	9.1	26.3
Eastern	3.0	7.6	0.5	2.0	13.1
Rwanda	8.1	38.4	18.2	35.4	100

2013 National Agriculture Survey . Season C

Pumps/tube wells/irrigation machines were used by a very small number of Agricultural Operators (8.1%). The Southern Province (44.4%) had the largest number of Agricultural Operators practicing irrigation followed by Northern Province (26.3%), Western Province (16.2%) and Eastern Province (13.1%).

6.4.6 Anti-erosion activities

Erosion refers to the process in which the earth's surface is worn away. In 2013 Season C, 78.8% of Agricultural Operators had plots with anti-erosion activities in Rwanda (see Table 122 and Figure 45).

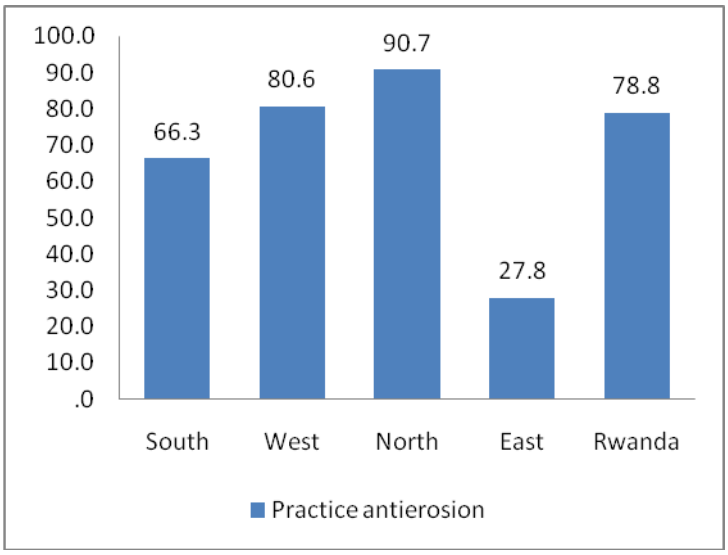
Table 122: Agricultural Operators Practicing Anti-erosion Activities (%)

Province	Percent
Southern	66.3
Western	80.6
Northern	90.7
Eastern	27.8
Rwanda	78.8

2013 National Agriculture Survey, Season C

The Northern Province (90.7%) had the largest proportion of Agricultural Operators having Plots with anti-erosion activities, followed by the Western Province (80.6%)

Figure 45: Agricultural Operators Practicing Anti-erosion Activities (%)



The survey results show that in 2013 Season C, in Rwanda, the most practiced anti-erosion measures by Agricultural Operators were Water drainage (44.8%), Ditches (20.3%) and Grasses (18%) (see Table 123).

Table 123: Agricultural Operators by Type of Anti-erosion Activities Practiced by Province

Province	Agricultural Operators							
	Ditches	Trees	Progressive terracing	Grasses	Water drainage	Mulching	Other	Total
Southern	1.7	0.0	0.0	1.7	25.0	1.2	0.6	30.2
Western	18.0	1.2	0.6	15.1	11.0	0.6	9.3	55.8
Northern	0.0	0.0	0.0	1.2	4.1	0.6	0.0	5.8
Eastern	0.6	0.0	0.0	0.0	4.7	2.9	0.0	8.1
Rwanda	20.3	1.2	0.6	18.0	44.8	5.2	9.9	100

2013 National Agriculture Survey, Season C

Ditches and grasses were mostly practiced in Western Province (18%), while Water drainage was practiced largely in Southern Province (25%). Anti-erosion activities were practiced mostly in the Western Province (55.8%) followed by the Southern Province (30.2%).

6.4.7 Use of Pesticides

Agricultural Operators that used Pesticides in 2013 Season C are shown in Table 124. Countrywide, 64 % of Agricultural Operators used pesticides while 36 % did not use any type of pesticides.

Table 124: Use of Pesticides (%)

Province	Use Pesticides	Not use Pesticides
Southern	50.0	50.0
Western	60.6	39.4
Northern	84.3	15.7
Eastern	55.6	44.4
Rwanda	64.0	36.0

2013 National Agriculture Survey . Season C

The Northern Province (84.3%) ranked high in the use of pesticides followed by the Western Province (60.6%), Eastern Province (55.6%) and Southern Province (50%).

Among pesticides that were used in 2013 Season C, DITHANE, DIMETHOATE, CYPERMETRINE, RIDOMIL were used respectively by 45.8 %, 21.3 %, 19.2 % and 13.6 % Agricultural Operators.

Table 125. Type of Pesticide used by Agricultural Operators by province (%)

	Agricultural Operators						
Province	DITHANE	RIDOMIL	DIMETHOATE	CYPERMETRINE	DURSIBAN	TILT	Total
Southern	2.0	0.2	0.7	4.4	-	-	7.3
Western	29.0	10.4	17.1	7.3	0.1	0.1	63.9
Northern	14.2	2.9	3.0	5.9	-	-	25.9
Eastern	0.6	0.1	0.5	1.6	-	-	2.9
Rwanda	45.8	13.6	21.3	19.2	0.1	0.1	100

2013 Seasonal Agriculture Survey, Season C

The Western Province (63.9%) and Northern Province (25.9%) ranked high in the use of pesticides. In the Western Province DITHANE, DIMETHOATE AND RIDOMIL were respectively used by 29 %, 17.1 % and 10.4 % of the Agricultural Operators. In the Northern Province, DITHANE was used by 14.2 % of the Agricultural Operators.

6.4.8 Small Agricultural Equipments

The survey results showed that, in 2013 Season C, Agricultural Operators expenditures on small equipment was mainly on Water pumps (39.7%), followed by Sprayer (13.7%) and Hoe (13.0%) (see Table 126). Expenditures on other tools that were used for cultivation by Agricultural Operators were below 10 % each of the total expenditure.

Table 126: Expenditure by Agricultural Operators on Small Agricultural Equipment

Small Agricultural Equipment	Amount Spent (percent)
Hoe	13.0
Spring Hoe	0.6
Fork Hoe	1.0
Rake	0.1
Pick/ Ipiki	0.3
Wheelbarrow	0.0
Shovel/igitiyo	1.2
Sprayer	13.7
Watering can	1.2
Saw	0.0
Sickle	0.9
Sécataurs	0.0
Scythe	0.0
Axe/ishoka	0.7
Machete	1.6
Billhook	0.0
Mortar/isekuru	0.1
Basket	1.8
Sack	7.2
Big basket	0.1
Winnower	0.5
Basket/ikibo	0.4
Basket/inkangara	0.1
Balance/Scales	1.5
Jerry-can	3.0
Barrel	0.7
Bike	3.5
Craft bike/Igitogoto	0.0
Bowl/ingeremeri	0.2
Sheeting	3.2
Hoe Sleeve	2.0
Water Pump	39.7
Other	1.7
Total	100.0

2013 National Agriculture Survey - Season C

The survey results showed that in terms of percentage number of donations received by Agricultural Operators, Craft bike/Igitogoto was the largest donation (10.2%) followed Basket (9.4%), Axe/Ishoka (7.0%), Mortar/Isekuru (6.4%), and Wheel barrow (7.3%).

Table 127: Number of Small Equipment Received from Non-agricultural Donors

Small Agricultural Equipment	Percent
Hoe	4.1
Spring Hoe	2.3
Fork Hoe	3.8
Rake	1.2
Pick/ Ipiki	1.2
Wheelbarrow	7.3
Shovel/igitiyo	4.1
Sprayer	4.4
Watering can	1.8
Saw	2.0
Sickle	1.5
Sécataurs	1.2
Scythe	1.5
Axe/ishoka	7.0
Machete	1.2
Billhook	1.2
Mortar/isekuru	6.4
Mill/urusyo	2.9
Basket	9.4
Sack	1.2
Big basket	2.6
Winnower	1.2
Basket/ikibo	2.6
Basket/inkangara	3.8
Balance/Scales	1.2
Jerry-can	4.7
Barrel	1.2
Bike	1.2
Craft bike/Igitogoto	10.2
Bowl/ingeremeri	1.2
Sheeting	1.2
Hoe Sleeve	1.2
Water Pump	1.2
Other	1.2
Total	100.0

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Donations on other small equipment received from non-agricultural donors were below 5 % each of the total number of donations received.

6.4.8 Use of Production in Segment (%)

Most of the production was either sold or consumed by the household. Small proportions of crop production were used to offer gifts to others and also used as seed. Table 128 shows the use of production by Agricultural Operators during 2013 Season C.

Table 128: Use of Crop Production (%)

Crops	Sold	Stored	Autoconsumption	Used as wage for hired labour	Used as farm rent	Offered as gift to other	Exchanged with other things	Used as seeds
Bush beans	15.9	0.6	64.1	0.4	0.0	4.7	0.5	13.6
Climbing bean	10.4	0.0	66.9	0.0	0.6	4.8	7.0	10.3
Peas	42.8	0.0	48.4	0.1	0.0	1.3	0.4	6.9
Other legume:	46.7	0.0	25.9	0.0	0.0	3.3	0.0	24.2
Irish potatoes	31.0	0.2	48.1	0.6	0.1	3.7	0.4	15.6
Tomotoes	72.8	0.0	16.9	0.9	0.0	5.7	0.0	1.2
White cabbage	63.3	0.0	26.0	0.2	0.1	8.7	0.0	0.0
Flower cabbag	74.0	0.0	21.9	0.0	0.0	3.8	0.0	0.0
Onion	90.9	0.0	6.0	0.0	0.0	3.0	0.0	0.0
Carrot	92.3	0.0	4.8	0.0	0.2	1.6	0.0	0.0
Soya beans	9.8	0.0	77.9	0.0	0.0	0.2	0.6	11.5
Other crops	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Sweet pepper	94.6	0.0	2.3	0.0	0.0	2.9	0.0	0.3

Conclusion

The 2013 Seasonal Agriculture Survey highlighted efforts being made in agriculture sector in to increase crop productivity. It clearly shows the link between agriculture modernization and output levels and supports further interventions with evidence.

And most important, although Rwanda has experienced substantial growth in agriculture recently due to reforms introduced in the sector, evidence indicates that there is still considerable opportunities to boost production further and contribute more to food security, poverty reduction and overall development.

This pioneer agriculture survey identified room for improvement in agriculture sector, leading to further policy perspectives taking into account some key elements such as increase in the use of improved seeds, fertilizers and pesticides. This would be supported by strengthening irrigation and anti-erosion activities.

Finally, in all cases, a combination of improved farmer knowledge and farmers' operational capacity and high value crop prioritization are necessary. Moreover, linkage with agro processing and markets are keys to sustain value addition.