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NATIONAL INSTITUTE OF STATISTICS OF RWANDA

Seasonal Agriculture Survey 2015

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Seasonal Agriculture Survey 2015

January 2016

The 2015 Seasonal Agriculture Survey (SAS 2015) report is produced by the National Institute of Statistics of Rwanda (NISR).

Additional information about the SAS 2015 Report may be obtained from the NISR:

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Foreword

The Government of Rwanda conducted the 2015 Seasonal Agriculture Survey (SAS) from November 2014 to October 2015 to gather up-to-date information for monitoring progress on agriculture programs and policies in Rwanda, including the Second Economic Development and Poverty Reduction Strategy (EDPRS II) and Vision 2020.

The 2015 SAS covered three agricultural seasons (A, B and C) for the year 2015 in Rwanda. Respondents have been grouped in two categories: Agricultural Operators (or Small Scale Farmers) 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 inputs, agricultural equipment and use of crop production.

The 2015 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 2015 SAS indicated that the main crops grown in 2015 Season A were Banana followed by Cassava, beans, Sorghum and maize. In Season B, the main crops grown were banana followed by cassava, beans, sorghum and maize. Season C was quite different as the main crops were Irish potatoes followed by Sweet Potatoes, vegetables and Beans.

This report is an important tool that addresses key agricultural information needs that inform policy makers and other stakeholders of priority areas of intervention.

We are grateful to the NISR staff and other partners who worked tirelessly to ensure the survey was successfully implemented.

We hope this report will be of value to users.

Yusuf Murangwa
Director General, NISR

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ACRONYMS

AAIC	Agricultural Assessment International Corporation
AfDB	African Development Bank
CSPro	Census and Survey Processing System
GIS	Geographic Information System
GPS	Global Positioning System
Ha	Hectare
Kg	Kilogram
Kg/Ha	Kilogram per Hectare
LSF	Large Scale Farmers
MFS	Multiple Frame Survey
MINAGRI	Ministry of Agriculture and Animal Resources
MT	Metric Tones
NISR	National Institute of Statistics of Rwanda
PDA	Personal Digital Assistant
PPS	Probability Proportional to Size
PSU	Primary Sampling Units
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.

EXECUTIVE SUMMARY

The National Institute of Statistics of Rwanda (NISR) conducts the annual Seasonal Agricultural Surveys (SAS) covering all three agricultural seasons in Rwanda:

- ✓ Season A that starts in September and ends with February of the following year;
- ✓ Season B that starts in March and ends with June of the same year; and
- ✓ Season C that starts in July and ends in September of the same year.

Sampling methodology and sample size

The SAS sample is composed of two categories of respondents: Agricultural Operators[1] and Large Scale Farmers (LSF)[2].

For the 2015 SAS, NISR used as sampling method a dual frame sampling design combining selected area frame sample[3] segments and a list of Large Scale Farmers.

NISR used also imagery from RNRA with a very high resolution of 25 centimeters to divide the total land of the country into twelve strata.

A total number of 540 segments were spread throughout the country as coverage of the survey with 25,495 and 24,911 agricultural operators in Season A and Season B respectively. From these numbers of agricultural operators, sub-samples were selected during the Second Phases of Season A and B.

Furthermore, enumerated Large Scale Farmers were 558 in 2015 Season A and 558 in Season B. Season C considered 152 segments counting 9,387 Agricultural Operators from which 644 Agricultural Operators were selected for survey interviews.

Field work

The field work consisted of screening land areas on maps and completing screening forms and farm questionnaires and it has been conducted as follows:

- In Season A, the fieldwork commenced on 5 November 2014 and concluded on 31st January 2015;

[1] Agricultural operators: These are Small Scale Farmers within the Segments

[2] Large Scale Farmer: 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.

[3] Area frame 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.

- In Season B, the fieldwork started on 08th March and ended on 18th June 2015;
- In Season C, the field work started on 10th September and ended on 2nd October 2015.

Data analysis

The main areas of data analysis included the demographic and social characteristics of Agricultural Operators and LSF; farm characteristics i.e. Area, yield and production; agricultural practices; agricultural inputs, small agricultural equipment; and use of crop production.

Results from 2015 SAS

Crop land

In 2015 Season A, the main crops were Banana (22.9% of the total cultivated area), Cassava (21.5% of the total cultivated area), Beans (19.8% of the total cultivated area), and Maize (12.4% of the total cultivated area). Other crops took 23.4% of the total cultivated area.

In 2015 Season B, the main crops were Banana (23.1% of the total cultivated area), Cassava (22.8% of the total cultivated area), Beans (16.6% of the total cultivated area), Sorghum (8.8% of the total cultivated area) and Maize (5.2% of the total cultivated area). Other crops took 23.5% of the total cultivated area.

Season C was quite different as the main crops were Irish Potatoes (34.5%of the total cultivated area), Sweet Potatoes (20.5% of the total cultivated area), Vegetables (16.9%of the total cultivated area) and Beans (17.2% of the total cultivated area). Other crops took 10.9% of the total cultivated area.

The average size of farm land was 0.23 hectares in both Season A and Season B, 0.15 Hectares in Season C for each Agricultural Operator. However, fallow land represented 20.4% in season A and 21% in season B of the total arable land of Rwanda with more than 80 % in Stratum 1.1.

Agricultural Inputs

Use of seeds and fertilizers:

For Agricultural operators, the survey illustrated the following information:

- ***The use of traditional seeds***: between 84% and 88% of Agricultural operators used traditional seeds during all seasons,
- ***The use of improved seeds***: between 12% and 15% of Agricultural operators used improved seeds during all agricultural seasons
- ***The use of organic fertilizers***: between 43% and 65% of Agricultural operators used organic fertilizers during all seasons,
- ***The use of inorganic fertilizers***: between 14% and 21% of Agricultural operators used inorganic fertilizers in season A and B while in season C they were 46%.

For Large Scale Farmers (LSF) and during all seasons, the survey provided the following information:

- ***The use of traditional seeds***: between 60% and 79% of all LSF,
- ***The use of improved seeds:*** *between 20% and 39% of all LSF*
- ***The use of organic fertilizers***: between 42% and 66% of all LSF,
- ***The use of inorganic fertilizers***: between 51% and 54% of all LSF.

Use of pesticides:

The survey illustrated that the use of pesticides varies with agriculture seasons. Therefore:

- In season A and B, they have been 9.1% and 7.9% of all Agricultural Operators respectively,
- In season C, they reached 53.3% of all Agricultural Operators.

Among the Large Scale farmers, the percentage of those who used pesticides was 46.7% and 32.9% during Season A and B respectively.

Agricultural practices

Land use

The survey results illustrated that the share of agricultural land used to grow crops varies with seasons and type of plots.

Therefore:

- In Season A: 21.2% in pure stand[4] and 78.8% in mixed stand[5],
- In Season B: 23.7%in pure stand and 76.3% in mixed stand,

[4] Pure stand is a plot of land which is planted with one crop.

[5] Mixed stand is a plot of land which is planted with various crops.

- In season C: 85.0% in pure stand and 15.0% in mixed stand.

For LSF the share between pure stand and mixed stand in season A was 84.5 and 15.5 percent respectively while in season B, the percentage share was 75.4 and 24.6 percent respectively.

Irrigation practices

In season A and B, between 1.1% and 1.5% of all agriculture operators practiced irrigation but in season C, their percentage was 20.5%.
The share of Large Scale Farmers who practiced irrigation was between 24%and 28% during season A and B.

Anti-erosion activities

In seasons A and B, 41.3% and 65.2% of all agricultural operators practiced anti-erosion activities but in season C, their percentage was 69.8%.
The share of Large Scale Farmers who practiced anti-erosion activities was 59.2 % and 53.1% in Season A and B, respectively.

Production

Season A

In Season A, Tubers and Roots (37.4%) gained the highest share of crop production by groups of crops in Rwanda followed by Banana (27.9%) and Cereals (10.5%). The contributions of the group of Vegetables and Fruits and the group of Legumes and Pulses were respectively 4.7% and 7.8%.

Season B

In Season B, the group of Tubers and Roots had again the highest share of crop production (41.4%) followed by Banana (27.2%) and Cereals (7.5%).Other crop groups contributed as follows: Legumes and Pulses (6.4%) and Vegetables and Fruits (4.4%)

Season C

In season C, the highest share of crop production was Irish Potatoes (55.7%) followed by Vegetables (34.0%), Sweet potatoes (8.0%) and Beans (2.2%). Other individual crops contributed less than 2.0%.

Chapter 1: Introduction

1.1 Need for Agricultural Statistics

During the last decades, agriculture had a lot of transformation. It contributed more than 30% of the GDP and employing over 70% of the population. Over the course of EDPRS I, agriculture contributed significantly to poverty reduction. In recognition to its potential in economic development, food security and poverty reduction, the government has set a very ambitious agriculture agenda aiming at an annual average growth of 8.5% over the course of EDPRS II (2012-2017).

Therefore, to provide timely and reliable statistics for agriculture sector, 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 since2013 agriculture year to regularly and accurately provide needed statistics. This is the Seasonal Agricultural Surveys (SAS).

1.2 Objectives of the survey

The main objective of the Seasonal Agriculture Survey is to provide timely, accurate, reliable and comprehensive agricultural statistics that describe the structure of agriculture in Rwanda in terms of land use, crop production and livestock to monitor current agricultural and food supply conditions and to facilitate evidence based decision making for the development of Agriculture sector.

1.3 Time frame

The 2015 SAS fieldwork commenced on 5 November 2014 and continued up to 12February 2015 for Season A; from 8March to 18 June 2015 for Season B and Season C started from 10 September to 2 October 2015 for Season C. The field work consisted of screening land areas on maps and completing screening forms and farm questionnaires.

Chapter 2: Methodology of the Survey

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 that were selected from the area frame, with a list of LSF that were enumerated with certainty.

2.3 Area Frame and List Frame Construction

2.3.1 Area Frame Construction

The area frames were constructed using satellite imagery. The total land cover was divided into land-use and homogeneous domain strata according to crop intensity.

In this regard, unless otherwise stated, when referring to an area sample, the word stratum will be used to denote land-use and domain definition strata.

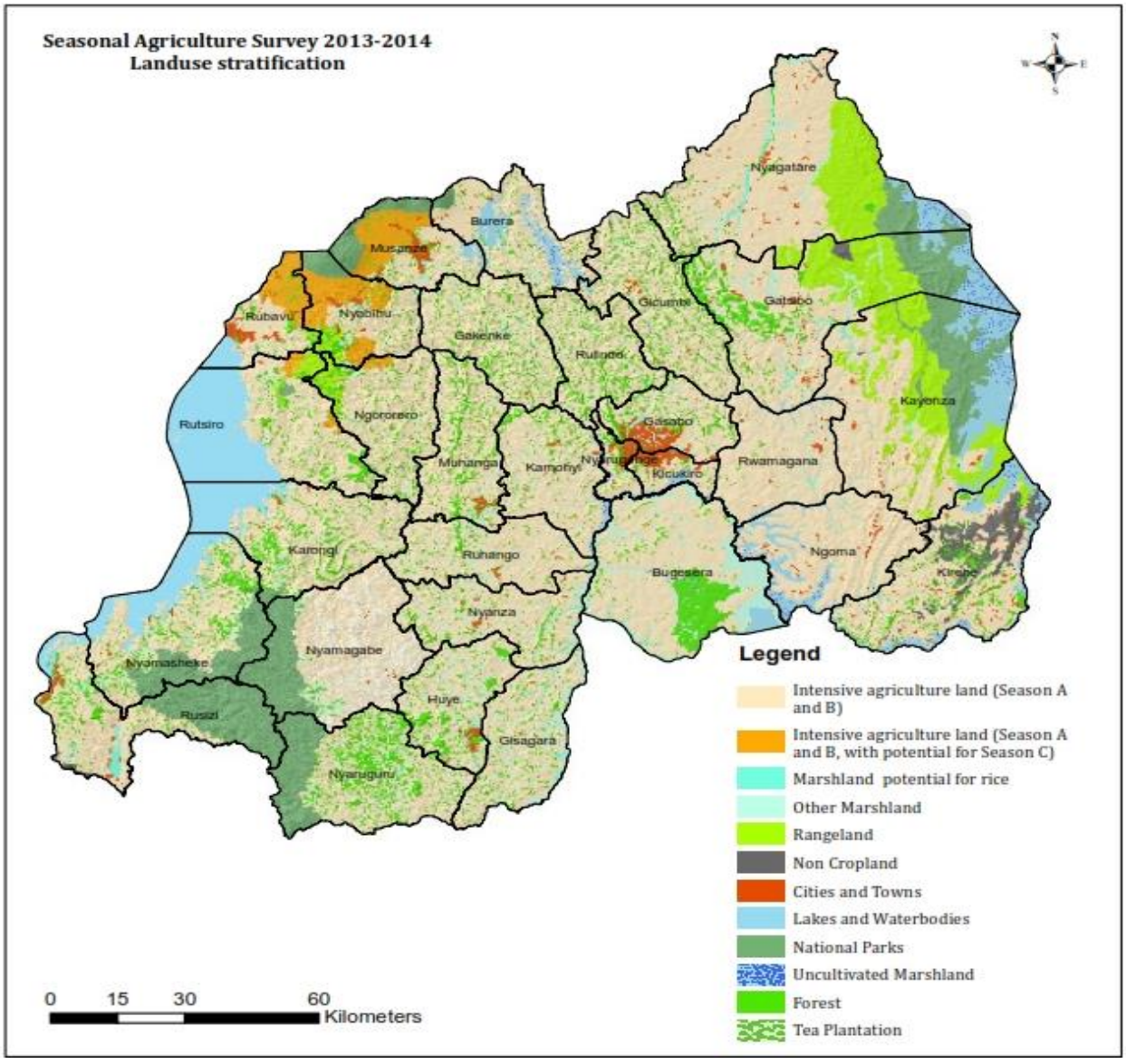
During the construction of the area sampling frame, the entire land area of Rwanda was subdivided into 12 non-overlapping land-use strata defined by proportion of cultivated land or other land-use characteristics, as shown in Table 1 and Figure 1.

Table 1. Land-Use Strata Codes, Definitions and Area

Stratum	Description	Total (Hectares)	Percent
1.1	Intensive agriculture land (Season A and B)	**1,479,081.4**	**81.9**
1.2	Intensive agriculture land (Season A and B, with potential for Season C)	**48,388.2**	**2.7**
2.1	Other marshlands	**95,820.7**	**5.3**
2.2	Marshlands potential for rice	**20,200.9**	**1.1**
3.0	Rangeland	**133,848.5**	**7.4**
10.0	Tea plantation	**28,763.1**	**1.6**
Total agriculture land		**1,806,102.9**	**100.0**

2015 Seasonal Agriculture Survey

Figure 1: Land Use Stratification



2014 Seasonal Agriculture Survey Season A

Among the 12 strata described in figure 1, only the first five strata in legend were used for sampling in 2015 SAS. The following table shows how Strata are spread across the country and their share in districts by the descending order.

Table 2. Share (%) of Area occupied by Strata within Districts by descending order

	District	Stratum '1.1	District	Stratum1.2	District	Stratum'2.1	District	Stratum 2.2	District	Stratum 3.0
1	Nyagatare	7.9%	Nyabihu	37.7%	Bugesera	23.3%	Gisagara	12.1%	Kayonza	37.0%
2	Bugesera	5.4%	Musanze	31.5%	Gisagara	8.8%	Rusizi	11.5%	Nyagatare	29.9%
3	Kayonza	5.2%	Rubavu	21.8%	Gatsibo	8.7%	Nyanza	11.5%	Gatsibo	22.0%
4	Ngoma	4.7%	Rutsiro	5.9%	Nyagatare	7.9%	Huye	11.2%	Ngororero	3.3%
5	Gatsibo	4.6%	Ngororero	3.1%	Ruhango	4.9%	Bugesera	11.0%	Rutsiro	2.9%
6	Kirehe	4.3%	Nyagatare	0.0%	Nyanza	4.9%	Nyagatare	7.4%	Kirehe	2.1%
7	Gicumbi	4.2%	Bugesera	0.0%	Nyaruguru	4.4%	Gatsibo	6.7%	Nyabihu	2.1%
8	Rwamagana	4.1%	Kayonza	0.0%	Kamonyi	4.2%	Kayonza	5.9%	Rubavu	0.7%
9	Karongi	4.0%	Ngoma	0.0%	Nyamagabe	3.6%	Rwamagana	5.0%	Gisagara	0.0%
10	Nyamagabe	3.8%	Gatsibo	0.0%	Kayonza	3.1%	Ngoma	4.5%	Rusizi	0.0%
11	Gakenke	3.8%	Kirehe	0.0%	Huye	3.1%	Nyamasheke	4.5%	Nyanza	0.0%
12	Kamonyi	3.6%	Gicumbi	0.0%	Rwamagana	3.1%	Muhanga	2.6%	Huye	0.0%
13	Nyanza	3.6%	Rwamagana	0.0%	Gasabo	3.0%	Ruhango	2.2%	Bugesera	0.0%
14	Ruhango	3.5%	Karongi	0.0%	Gakenke	2.7%	Gasabo	1.7%	Rwamagana	0.0%
15	Muhanga	3.4%	Nyamagabe	0.0%	Rulindo	2.0%	Kirehe	0.9%	Ngoma	0.0%
16	Gisagara	3.3%	Gakenke	0.0%	Gicumbi	1.7%	Gakenke	0.4%	Nyamasheke	0.0%
17	Ngororero	3.3%	Kamonyi	0.0%	Ngororero	1.4%	Kamonyi	0.3%	Muhanga	0.0%
18	Rutsiro	3.2%	Nyanza	0.0%	Rusizi	1.2%	Ngororero	0.3%	Ruhango	0.0%
19	Nyamasheke	3.2%	Ruhango	0.0%	Muhanga	1.2%	Nyamagabe	0.2%	Gasabo	0.0%
20	Nyaruguru	3.2%	Muhanga	0.0%	Karongi	1.2%	Karongi	0.1%	Gakenke	0.0%
21	Burera	3.0%	Gisagara	0.0%	Burera	1.1%	Rulindo	0.1%	Kamonyi	0.0%
22	Rulindo	2.8%	Nyamashek	0.0%	Nyamasheke	1.0%	Nyabihu	0.0%	Nyamagabe	0.0%
23	Rusizi	2.8%	Nyaruguru	0.0%	Nyabihu	0.9%	Musanze	0.0%	Karongi	0.0%
24	Huye	2.7%	Burera	0.0%	Musanze	0.8%	Rubavu	0.0%	Rulindo	0.0%
25	Gasabo	1.8%	Rulindo	0.0%	Rutsiro	0.8%	Rutsiro	0.0%	Musanze	0.0%
26	Nyabihu	1.3%	Rusizi	0.0%	Kirehe	0.5%	Nyaruguru	0.0%	Nyaruguru	0.0%
27	Musanze	1.2%	Huye	0.0%	Kicukiro	0.2%	Gicumbi	0.0%	Gicumbi	0.0%
28	Rubavu	1.1%	Gasabo	0.0%	Nyarugenge	0.2%	Burera	0.0%	Burera	0.0%
29	Kicukiro	0.6%	Kicukiro	0.0%	Ngoma	0.1%	Kicukiro	0.0%	Kicukiro	0.0%
30	Nyarugenge	0.5%	Nyarugenge	0.0%	Rubavu	0.1%	Nyarugenge	0.0%	Nyarugenge	0.0%

2015 Seasonal Agriculture Survey

2.3.2 List Frame Construction

The list of LSF (sometimes called Big Farmers) included those farmers with the largest area for crops or those with the largest number of livestock as reporting unit is the farm.

2.3.3. Distribution of Strata

Definitions of various strata

- ***Stratum 1.1***: Intensive cropland for Season A and B essentially on hillsides. Almost all crops can be found in this Stratum.

- ***Stratum 1.2***: Intensive cropland for Season A, B and C on hillsides. The difference with stratum1.1 is that stratum 1.2 has potential for season C.
- ***Stratum 2.1***: Is located in marshlands and is cultivated during Seasons A, B and C. The crops found in it are comprised of all crops with the exception of perennial crops.
- ***Stratum 2.2***: Is also in Marshlands and is potentially cultivated with Paddy rice.
- ***Stratum 3.0***: Is Rangeland which is mainly lowland.

Only Strata 1.1, 1.2, 2.1, 2.2 and 3.0 were taken for the SAS purpose, as it is where the majority of cropland can be found.

Chapter 3: Sampling and Data Collection Methodology

3.1 Sampling

3.1.1 Sampling Design and Selection of Segments in 2015

The country was demarcated into 12 Strata. Only the first five strata (defined above) were subject to agricultural land sampling. In the 2015Seasonal 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 Secondary Sampling Unit (SSU) or in this case Segment was randomly selected.

If for example stratum 1.1 is divided into large PSUs, Secondary Sampling units of 10-hectares will be assigned to each PSU. Then, if a PSU had 225 hectares, it would be divided into (22) sampling units of 10-hectares each. And if this PSU is selected, one of its 22 sampling units will be selected as the segment for data collection. However, the SSUs from Stratum 3.0 are 50 hectares instead of 10 hectares.

3.1.2 Distribution of Sampled Primary Sampling Units

In the entire country, 540 PSUs were selected in the five main agricultural strata with probability proportionally to the size. Table 3 below shows the distribution of selected PSUs in each of the five Strata.

Table 3. Selected Segments by Strata for SAS 2015

Stratum	Area (Km2)	Number of Sampled Segments
1.1	14,791	340
1.2	484	48
2.1	958	64
2.2	202	40
3.0	1,338	48
All Rwanda		540
2015 Seasonal Agriculture Survey		

Each selected PSU having a size of 100 – 200 Hectares was subdivided into Second Stage Sampling Units (SSUs) of around 10 Hectares each, following natural boundaries. Note that for Stratum 3.0 PSUs, a segment had a size of around 50 Hectares.

All of the 540 segments are eligible to Season A and B while Season C considers only 152 Segments from Stratum 1.2, 2.1 and 2.2.

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 Selection of Respondents in Phase I

Phase I was mainly used to collect data on area under crops, and crops planted. Phase II was mainly devoted to the collection of data on demographic, social characteristics of interviewees, yield and production of crops.

i. Large Scale Farmers

Enumerated Large Scale Farmers were 558in both 2015 Season A and B. The LSF were engaged in either Crop farming activities only or Livestock farming activities only or both Crop and Livestock farming activities.

ii. Agricultural Operators

Agricultural Operators are the Small Scale Farmers within the Segment. Every selected Segment was firstly screened using the appropriate materials among others: the segment maps, GIS devices and the Screening Form. That means enumerators accounted for every plot inside the segment. All Tracts[6] were classified as either Agricultural (cultivated land, pasture, 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 540 selected Segments was undertaken and counted 25,495and

[6]Tract: is the sum of all lands operated by one Agricultural Operator 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.

24,911agricultural operators respectively in Season A and B. Season C considered only 152 segments counting 3,445 Agricultural Operators.

3.1.5 Selection of respondents in Phase II

i. Large Scale Farmers

In phase II, 50 % of the Large Scale Farmers undertaking Crop farming activities only and 50% of the Large Scale Farmers undertaking both Crop and Livestock farming are selected for interview. A sample of 199 and 194 Large Scale Farmers were interviewed in Season A and B respectively, using a Farm Questionnaire.

ii. Agricultural Operators

From Agricultural Operators enumerated in segments during Phase I, a sample of Agricultural Operators has been designed for Phase II as follows: 5,502 for Season A, 5,337 for Season B and 644 for Season C. The method of Probability Proportional to Size (PPS) at National Level has been used.

3.1.6 Estimation Methodology

i. Definition of the Notations and Parameters

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

- 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;
- The 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 $(j_i = 1,...,n_i)$,
- $f_i = \frac{n_i}{N_i}$ 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.

ii. 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 $\bar{Y}_{st} = \sum_{i=1}^{k} W_i \bar{y}_i$

iii. 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 $E[\hat{\bar{Y}}] = \bar{Y}$

iv. Variance of the Mean Estimator and the Total Estimator Abbreviated as Var

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

v. Estimation of Variances of 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

i. 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 -questionnaire was to account for every square meter of land inside the Segment or Large Scale Farm.

If a segment had about 10 hectares, then approximately 10 hectares was accounted for on the screening form. The objective was to ensure that not only all farm lands but also all non-agricultural land such as buildings, forest, etc. are taken into account as shown and delineated on the segment or Large Scale Farm map.

ii. Farm Questionnaire

The Phase II of the survey concerned the collection of data on characteristics of Agricultural Operators and large scale farmers, crop identification, inputs (seeds, fertilizers, labor …), agricultural practices, crop production and use of production.

3.2.2 Data Collection

i. Teams and Supervision

The 2015 SAS used 120 enumerators grouped in 30 field teams and 30 Team leaders, i.e one Team leader to 4 Enumerators. All field work staff in 2015possesses a degree in Agronomy Science and were trained before starting data collection. Higher level supervision staff from NISR visited the field teams during each phase of data collection to ensure quality control.

ii. Field work Materials

Each Enumerator and Team leader had adequate materials composed of Enumerator's instruction manual, Screening questionnaire, Farm questionnaires, Measuring tapes, Ruler, Divider, 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.

iii. Field Procedures

Before proceeding to the field, Enumerators and their Team leaders used to check if they have all required materials for their field work. All staff was required to arrive early on the field (Segment or LSF).

Upon arrival in the field, the enumerators and their Team Leaders took the related geographical coordinates 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 taking of geographical coordinates for 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.

iv. 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 and area measurement 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.

v. Farm Interview and Data Quality Assurance

A Farm questionnaire was used during the second phase of each season. 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 II (mainly for agricultural practices, inputs estimation and production).

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 20 staff trained in 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 using SPSS and Excel.

Chapter 4: Results of the 2015 Season A

Details of demographic information, use of inputs, other agricultural practices, and production aspects are captured in phase II as described above.

A sample of 199 out of 558 LSF and 5,502 out of 25,495 Agricultural Operators were interviewed.

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, farming activities and cooperative membership.

4.1.1 Number of Agricultural farmers by type

Table 4 : Agricultural Operators and LSF by Stratum

	Strata	Total	
		Number	%
Agricultural Operators	1.1	3,665	66.6
	1.2	530	9.6
	2.1	646	11.7
	2.2	367	6.7
	3.0	294	5.3
	All Rwanda	5,502	100
LSF		199	100

2015 Seasonal Agriculture Survey - Season A

The distribution of Agricultural Operators (in segments) was highest in Stratum 1.1 (66.6%), followed by Stratum 2.1 (11.7%). In 2015 Season A phase II, 199 Large Scale Farmers were listed and enumerated in Rwanda.

Table 5. Agricultural Operators by type (%)

	Strata	Individual		Cooperative		Total	
		Number	%	Number	%	Number	%
Agricultural Operators	1.1	3,651	100	14	0.4	3,665	100
	1.2	529	100	1	0.2	530	100
	2.1	637	98.6	9	1.4	646	100
	2.2	367	100.0	0	0.0	367	100
	3.0	293	100	1	0.3	294	100
	All Rwanda	5,477	99.5	25	0.5	5,502	100
LSF						199	100

2015 Seasonal Agriculture Survey - Season A

The survey results showed that most of the Agricultural Operators in segments (99.5%) were individual Farmers and only about 0.5 % was in cooperatives.

Table 6. Cooperative Membership

		Yes	No	Total
	Strata	Percent	Percent	Percent
Agricultural Operators	1.1	16.5	83.5	100
	1.2	11.1	88.9	100
	2.1	35.3	64.7	100
	2.2	61.6	38.4	100
	3.0	14.3	85.7	100
	All Rwanda	16.8	83.2	100
LSF		63.3	36.7	100

2015 Seasonal Agriculture Survey - Season A

For the cooperative membership of Agricultural Operators, Stratum 2.2 had the highest proportion (61.6%) followed by the Stratum 2.1 (35.3%). For LSF, 63.3 percent were members of agricultural cooperatives.

4.1.2 Number of Agricultural Operators by Gender

In 2015 Season A, the distribution of Agricultural Operators in Rwanda by gender was 68.9% male and 31.1% female. The distribution of Agricultural Operators in Rwanda by Gender and strata is shown in Table 7.

Table 7.Distribution of Agricultural Operators by Gender and Stratum

	Agricultural Operators		
Strata	Male	Female	Total
1.1	68.9	31.1	100
1.2	65.8	34.2	100
2.1	68.0	32.0	100
2.2	63.5	36.5	100
3.0	78.8	21.2	100
All Rwanda	68.9	31.1	100

2015 Seasonal Agriculture Survey - Season A

4.1.3 Age distribution of Agricultural Operators

As it is illustrated, the majority of Agricultural Operators in Rwanda were in the age group of 55 years and above (26.8%) followed by Agricultural Operators in age-group of 25-34 years (24.2%). The age group distribution of Agricultural Operators by Stratum varied more in the age group of between 45 and 54 with Stratum 2.1 (22.3%) being highest, Stratum 1.2 (17.8%) being lowest.(see Table 8).

Table 8. Distribution of Agricultural Operators by Age groups

	Agricultural Operators				
Strata	14-24	25-34	35-44	45-54	55 and Above
1.1	5.4	24.3	22.4	21.2	26.8
1.2	6.4	27.6	25.7	17.8	22.5
2.1	2.2	20.1	24.5	22.3	30.9
2.2	5.2	24.0	27.8	20.7	22.3
3.0	4.4	28.3	24.9	19.8	22.5
All Rwanda	5.4	24.2	22.4	21.2	26.8

2015 Seasonal Agriculture Survey - Season A

The majority (27.7%) of male Agricultural Operators in Rwanda were in the age group of between 25 and 34 (see Table 9). This is followed by 24.3 percent of Agricultural Operators in agegroup of between 35 and 44.

Table 9. Distribution of Male Agricultural Operators Age groups

	Agricultural Operators				
Strata	14-24	25-34	35-44	45-54	55 and Above
1.1	5.0	27.7	24.3	20.8	22.3
1.2	6.6	34.5	26.7	15.2	17.0
2.1	2.1	23.1	26.3	22.9	25.6
2.2	4.3	26.2	27.0	21.0	21.5
3.0	4.8	28.1	26.4	17.7	22.9
All Rwanda	5.0	27.7	24.3	20.8	22.3

2015 Seasonal Agriculture Survey - Season A

The distribution of female Agricultural Operators in Rwanda was high in the age group of 55 and above (36.7%) followed by 22.2 percent of female Agricultural Operators in agegroup of between 45 and 54, 18.2 percent of female Agricultural Operators in age group of between 35and 44, 16.6 percent in age groupof between 25 and 34 and 6.3 percent in age group of between 14 and 24 (see Table 10).

Table 10. Distribution of Female Agricultural Operators Age groups

	Agricultural Operators				
Strata	14-24	25-34	35-44	45-54	55 and Above
1.1	6.3	16.6	18.1	22.2	36.7
1.2	6.1	14.4	23.8	22.7	33.1
2.1	2.5	13.7	20.6	21.1	42.2
2.2	6.7	20.1	29.1	20.1	23.9
3.0	3.2	29.0	19.4	27.4	21.0
All Rwanda	6.3	16.6	18.2	22.2	36.7

2015 Seasonal Agriculture Survey - Season A

4.1.4 Education Level of Agricultural Operators

The Survey results of the 2015 SAS Season A illustrated that 67.1% of Agricultural Operators had attended primary level education, 27% had no education, 5.2% attended secondary level education and only 0.8 % had attended tertiary level education. (see Table 11).

Table 11. Education Level of Agricultural Operators by Stratum (%)

	Agricultural Operators				
Strata	**Primary**	**Secondary**	**Tertiary**	**No education**	**Total**
1.1	67.1	5.1	0.8	27.0	100
1.2	56.1	11.5	1.9	30.4	100
2.1	66.9	6.3	1.4	25.4	100
2.2	73.3	5.7	0.0	21.0	100
3.0	71.0	3.4	0.3	25.3	100
All Rwanda	67.1	5.2	0.8	27.0	100

2015 Seasonal Agriculture Survey - Season A

Among Agricultural Operators who had attended primary level education (67.1%) their distribution across Strata was reasonably uniform with Stratum 2.2 and Stratum 3.0 having higher percentages.

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

	Agricultural Operators				
Strata	**Primary**	**Secondary**	**Tertiary**	**No education**	**Total**
1.1	73.0	5.7	1.0	20.3	100
1.2	66.1	12.4	2.9	18.7	100
2.1	71.4	6.5	0.9	21.2	100
2.2	76.8	5.6	0.0	17.6	100
3.0	75.3	3.5	0.4	20.8	100
All Rwanda	72.9	5.7	0.0	20.3	100

2015 Seasonal Agriculture Survey - Season A

In Rwanda, 72.9% of male Agricultural Operators attended primary level education, 20.3% had no education and 5.7% attended secondary level education (see Table 12).

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

	Agricultural Operators				
Strata	**Primary**	**Secondary**	**Tertiary**	**No education**	**Total**
1.1	54.0	3.8	0.2	42.0	100
1.2	37.0	9.9	0.0	53.0	100
2.1	57.4	5.9	2.5	34.3	100
2.2	67.2	6.0	0.0	26.9	100
3.0	54.8	3.2	0.0	41.9	100
All Rwanda	54.0	3.9	0.2	41.9	100

2015 Seasonal Agriculture Survey - Season A

2015 SAS illustrated that 54.0% of female Agricultural Operators attended primary education. Stratum 2.2 had the highest female Agricultural Operators with primary education level (67.2%). The lowest percentage of female agricultural operators had tertiary education (0.2%).

4.1.5 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 non-resident of a segment if his/her agricultural activities are undertaken in the segment but lives outside the same segment.

Results of the 2015 SAS showed that in Rwanda the majority of Agricultural Operators (76.4%) were nonresident while 23.6 % were residents. (See Table 14)

Table 14. Agricultural Operators by Residency (%)

	Agricultural Operators		
Strata	**Resident**	**Non residen**	**Total**
1.1	26.9	73.1	100
1.2	25.1	74.9	100
2.1	4.6	95.4	100
2.2	0.9	99.1	100
3.0	96.8	3.2	100
All Rwanda	23.6	76.4	100

2015 Seasonal Agriculture Survey - Season A

In general, the Stratum 3.0 had the biggest percentage of resident's operators (96.8%), while in the rest of the Strata, resident Agricultural Operators are less than 28% of all Agricultural Operators.

4.2 Date of Sowing

For Agricultural Operators, sowing for some crops started before September 2014. The starting dates of sowing by Agricultural Operators in Segments and LSF for each main crop is summarized respectively in the Tables 15 and 16.

Table 15. Agricultural Operators Indicating the Sowing Date in Segments by Crop (%)

Crop name	Before September 2013	01-15 September 2013	16-30 September 2013	After September 2013	N/A	Total
Maize	12.6	38.9	20.7	27.8	0.0	100
Paddy rice	76.3	7.3	5.4	11.0	0.0	100
Sorghum	48.0	40.9	7.7	3.4	0.0	100
Wheat	25.8	16.1	9.7	48.4	0.0	100
Bush beans	4.0	32.9	26.4	36.7	0.0	100
Climbing beans	9.4	48.9	21.7	20.0	0.0	100
Peas	14.5	43.6	21.8	20.0	0.0	100
Cassava	10.5	15.1	7.2	12.2	55.0	100
Irish potatoes	24.1	35.4	16.1	24.4	0.0	100
Sweet potatoes	37.2	17.4	11.2	34.1	0.0	100
Yams	27.6	31.0	10.3	31.0	0.0	100
Taro	42.3	19.0	9.4	22.8	6.5	100
Cooking Banana	1.1	1.2	0.6	0.9	96.2	100
Dessert Banana	0.7	0.7	0.4	1.7	96.5	100
Banana for beer	1.0	1.1	0.4	0.7	96.7	100
Soya beans	3.1	28.6	23.4	44.8	0.0	100
Ground nuts	10.0	43.8	20.5	25.7	0.0	100

2015 Seasonal Agriculture Survey - Season A

For the majority of crops, sowing of crops by Agricultural Operators started in September 2014. For climbing beans, Peas and Maize, the majority of Agricultural Operators indicated September as the sowing date while for Paddy rice and Sorghum, the date indicated by the majority of Agricultural Operators was before September 2014.

When comparing 2015 Season A with 2014 Season A, it is shown that the majority of crops in both seasons have been sown in September.

Sowing dates for crops such as dessert Banana, 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 especially with banana being perennial.

Table 16. Large Scale Farmers Indicating Sowing Date for Crops (%)

Crop name	Before September 2014	01-15 September 2014	16-30 September 2014	After September 2014	N/A	Total
Maize	16.6	43.1	14.7	25.6	0.0	100
Paddy rice	96.5	3.5	0.0	0.0	0.0	100
Sorghum	27.9	63.9	4.9	3.3	0.0	100
Wheat	9.1	0.0	18.2	72.7	0.0	100
Bush beans	12.2	49.4	24.4	14.1	0.0	100
Climbing beans	9.4	40.6	34.4	15.6	0.0	100
Peas	22.2	22.2	11.1	44.4	0.0	100
Cassava	19.5	12.6	2.3	4.6	60.9	100
Irish potatoes	24.7	15.3	7.1	52.9	0.0	100
Sweet potatoes	45.5	13.6	9.1	31.8	0.0	100
Yams & Taro						
Cooking Banana	4.2	1.7	0.0	5.1	89.0	100
Dessert Banana	0.0	0.0	0.0	0.0	100.0	100
Banana for beer	0.0	0.0	0.0	7.7	92.3	100
Soya beans	9.1	18.2	31.8	40.9	0.0	100
Ground nuts	23.8	52.4	14.3	9.5	0.0	100

2015 Seasonal Agriculture Survey - Season A

The majority of LSF (96.5%) indicated that they sowed Paddy rice before September 2014 (see Table 16). The majority of main crops were sown in September with the exception of Irish potatoes and Wheat which were sown by the majority of LSF after September 2014.

Sowing dates for crops such as dessert Banana, Cooking Banana and Cassava were also not applicable for the majority of LSF.

4.3 Farm Characteristics (Area, Yield and Production)

This section presents the key points from the detailed tables on area under crops, yield and crop production for the 2015 Season A (see Tables 17, 21 and 22).

4.3.1 Crop Areas

In Rwanda, in terms of land area under crops the main crops grown in Season A were Banana (22.9%), Cassava (21.5%), Beans (19.8%), and Maize (12.4%) (See Table 17).

Table 17. Area (Ha) Cultivated by Crop and Group of Crops by Stratum (Hectares)

	Agricultural Operators						LSF	All Rwanda	
Crops / Strata	1.1	1.2	2.1	2.2	3.0	S/Total_1	S/Total_2	Total	Percent
Cereals	**152,285**	**8,206**	**18,156**	**9,658**	**10,453**	**198,758**	**10,203**	**208,962**	**15.2**
Maize	137,154	5,592	14,368	2,019	6,105	165,238	4,323	169,561	12.4
Sorghum	9,992	1,875	742	102	4,267	16,978	138	17,116	1.2
Paddy rice	921	-	2,964	7,534	-	11,419	5,660	17,079	1.2
Wheat	1,972	699	-	-	-	2,671	78	2,749	0.2
Other cereals	2,246	40	82	3	82	2,452	5	2,457	0.2
Tubers and Roots	**395,050**	**12,647**	**13,131**	**904**	**5,469**	**427,200**	**498**	**427,697**	**31.2**
Cassava	283,458	30	6,385	241	4,627	294,740	285	295,025	21.5
Sweet Potatoes	60,071	721	4,303	421	388	65,905	19	65,924	4.8
Irish Potatoes	36,278	11,863	752	51	391	49,336	194	49,529	3.6
Yams & Taro	15,242	33	1,690	190	63	17,219	0	17,219	1.3
Banana	**306,099**	**151**	**3,317**	**179**	**3,954**	**313,700**	**543**	**314,242**	**22.9**
Cooking Banana	107,648	17	1,158	84	2,961	111,867	364	112,231	8.2
Dessert banana	35,877	7	491	19	147	36,542	123	36,664	2.7
Banana for beer	162,573	127	1,668	77	846	165,291	57	165,347	12.1
Legumes & Pulses	**296,691**	**6,302**	**9,268**	**1,039**	**8,059**	**321,358**	**852**	**322,210**	**23.5**
Beans	***250,470***	***4,907***	***7,268***	***926***	***7,109***	***270,681***	***600***	***271,281***	***19.8***
Bush beans	161,897	16	6,857	866	7,044	176,681	543	177,224	12.9
Climbing beans	88,573	4,891	411	60	65	94,000	57	94,057	6.9
Peas	15,131	1,394	90	1	507	17,124	14	17,138	1.2
Groundnuts	11,869	-	351	10	391	12,622	13	12,635	0.9
Soya beans	19,183	-	1,559	101	51	20,894	224	21,118	1.5
Other legumes & Pulses	37	-	0	-	-	37	0	38	0.0
Vegetables and Fruits	**16,390**	**627**	**2,005**	**291**	**457**	**19,770**	**612**	**20,382**	**1.5**
Vegetables	9,110	267	1,951	256	111	11,695	52	11,746	0.9
Fruits	7,280	360	54	35	347	8,075	561	8,636	0.6
Other crops	**67,513**	**3,639**	**3,309**	**379**	**2,472**	**77,312**	**1,152**	**78,464**	**5.7**
Total developped crop land	**1,234,027**	**31,570**	**49,186**	**12,449**	**30,864**	**1,358,097**	**13,861**	**1,371,958**	**100**
Total Physical crop land	**932,474**	**31,228**	**42,811**	**7,888**	**19,471**	**1,033,872**	**13,322**	**1,047,194**	**100**
Fallow land	**187,755**	**4,612**	**14,853**	**2,468**	**2,073**	**211,761**	**2,338**	**214,099**	**20.4**

2015 Seasonal Agriculture Survey - Season A

In general, all crops are highly cultivated in Stratum 1.1. However, Paddy Rice makes an exception as it is mainly found in Strata 2.2 and 2.1.

The total developed crop land means simply the cropland with regards to perennial crops cultivation standards and being sometimes mixed with seasonal crops while the physical cropland means the real size in terms of cultivated plot area.

Figure 2: Share of Agriculture Land by Crops

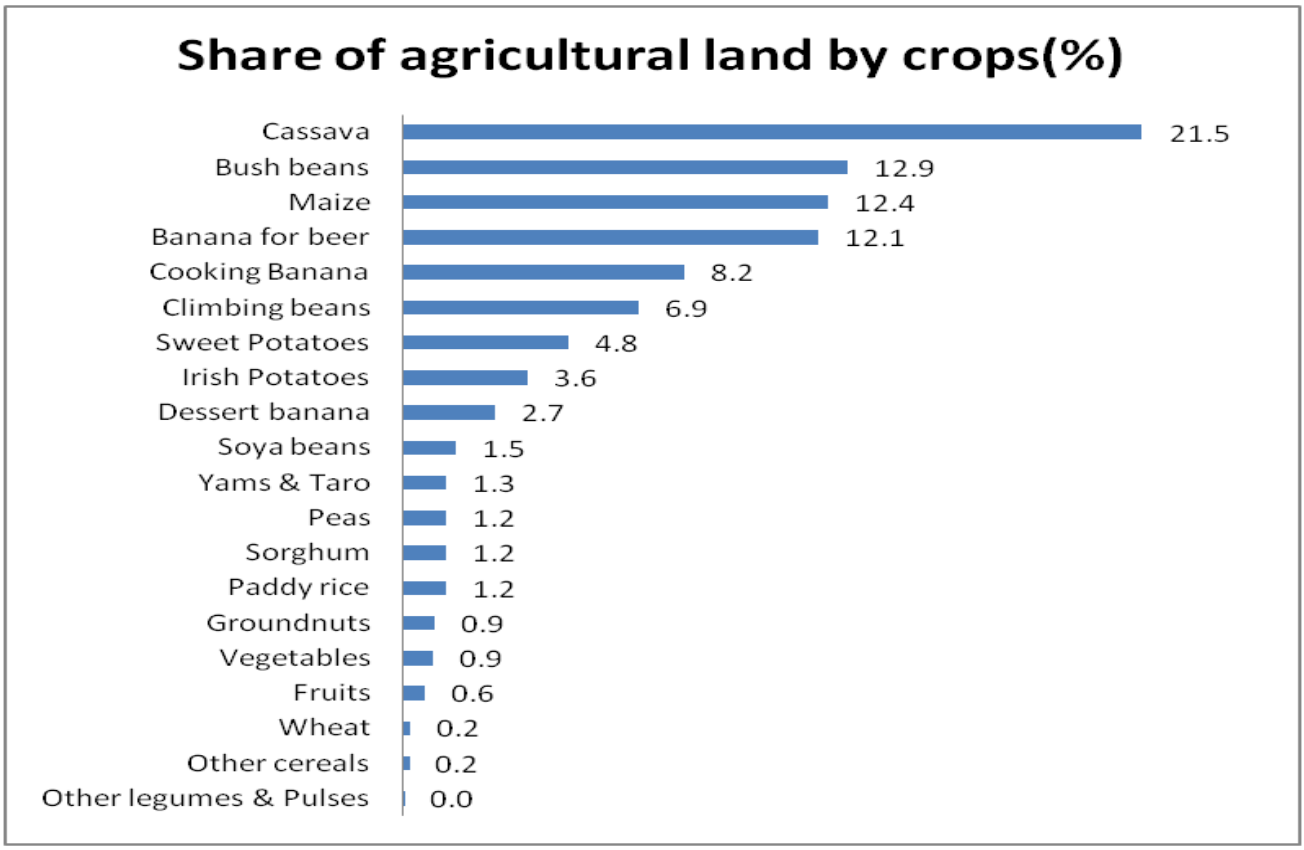
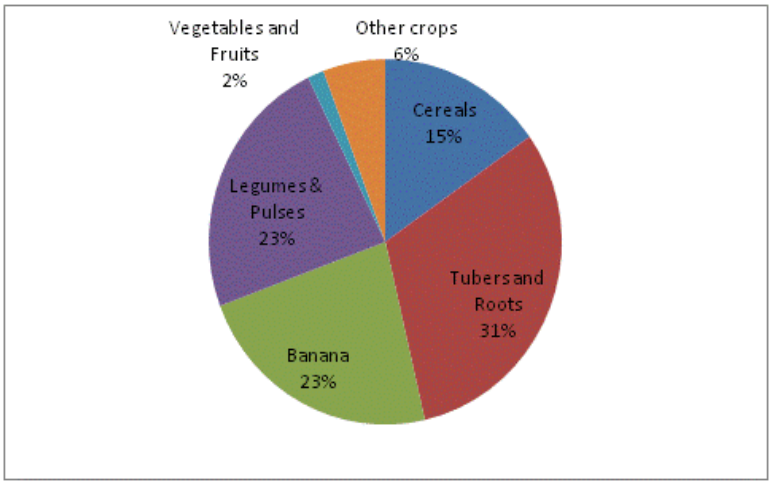


Figure 3 : Share of Agriculture Land by Group of Crops (%)



The Figure 3 shows the percentage share of agricultural land cultivated by group of crops. The survey results showed that the dominant groups of agricultural crops in

Rwanda continued to be: Tubers and Roots (31%), Banana (22.5%), Legumes and Pulses and Banana (23%), Cereals (15%), while Fruits and Vegetables and other crops accounted for less than 10 % of the total share of agricultural land.

The survey results (see Table 18) showed that the average size of tracts for Agricultural Operators in Rwanda was 0.23 hectares.

Table 18. Average Size of Tract by Stratum

Strata	Average (Ha)
1.1	0.22
1.2	0.17
2.1	0.16
2.2	0.16
3.0	2.34
All Rwanda	0.23

2015 Seasonal Agriculture Survey-Season A

The Stratum 3.0 had the largest average size of tract for Agricultural Operators (2.34 Ha) followed by Stratum 1.1 (0.22 Ha.), Stratum 2.1 (0.16 Ha), Stratum 2.2(0.16 Ha.) and Stratum 1.2 (0.17 Ha.).

The average size of crop area was below 0.10 Ha with the exception of Pyrethrum (0.17 Ha), flower cabbage (0.12) and Sorghum (0.11 ha). Fallow land in Segments had an average size of 0.11 hectares whereby the Stratum 3.0 has the largest fallow land average size of 0.29 Hectares.

Table 19.Average Size of crop area per Agricultural Operators (Ha)

crop / Strata	1.1	1.2	2.1	2.2	3.0	Average Size
Maize	0.05	0.04	0.05	0.08	0.20	0.05
Paddy rice	0.30	-	0.07	0.12	-	0.10
Sorghum	0.10	0.06	0.19	0.14	0.36	0.11
Wheat	0.05	0.09	-	-	-	0.06
Other cereals	0.01	0.24	-	-	-	0.03
Bush beans	0.07	0.01	0.06	0.04	0.25	0.07
Climbing beans	0.05	0.05	0.03	0.04	0.06	0.05
Peas	0.02	0.03	0.02	0.01	0.09	0.02
Other legumes & pulses	0.04	-	0.00	-	-	0.04
Cassava	0.06	0.01	0.04	0.03	0.15	0.06
Irish potatoes	0.03	0.10	0.02	0.02	0.08	0.04
Sweet potatoes	0.03	0.04	0.03	0.03	0.05	0.03
Yams	0.02	-	0.00	0.02	-	0.02
Taro	0.02	0.01	0.02	0.02	0.03	0.02
Tomotoes	0.03	0.07	0.04	0.03	0.02	0.03
White cabbage	0.01	0.03	0.02	0.03	0.09	0.01
Flower cabage	0.00	0.03	0.57	-	-	0.12
Onions	0.02	0.06	0.07	0.01	0.01	0.02
Carrots	0.01	0.11	0.01	0.02	-	0.01
Eggplant	0.02	-	0.04	0.03	0.03	0.02
Other seasonal vegetables	0.02	-	0.02	-	-	0.02
Other annual vegetables	0.01	0.00	-	-	-	0.01
Other perennial vegetables	0.01	-	-	-	-	0.01
Cooking Banana	0.04	0.01	0.06	0.03	0.08	0.04
Dessert banana	0.03	0.00	0.03	0.04	0.04	0.03
Banana for beer	0.06	0.03	0.05	0.04	0.07	0.06
Pineapple	0.05	-	0.02	0.00	0.13	0.05
Avocado	0.01	0.01	0.03	-	0.05	0.02
Passion fruits	0.02	0.02	0.04	-	0.01	0.02
Other fruits	0.01	-	-	0.46	0.11	0.04
Soya beans	0.03	-	0.04	0.02	0.02	0.03
Ground nuts	0.04	-	0.05	0.03	0.08	0.04
sun flower	0.01	0.02	0.02	0.01	0.01	0.01
coffee	0.04	-	0.02	0.03	0.04	0.04
Pyrethrum	-	0.17	-	-	-	0.17
Other seasonal crops	0.05	0.01	0.03	-	-	0.05
Other annual crops	0.05	0.05	-	0.25	-	0.05
Other perennial crops	0.14	0.12	0.04	0.21	-	0.13
Pasture	2.24	0.96	2.47	1.03	8.14	3.31
Fallow land	0.11	0.12	0.09	0.10	0.29	0.11
Non agriculture land	0.12	0.09	0.94	0.88	2.38	0.14

2015 Seasonal Agriculture Survey - Season A

Table 20.Average Size of crop area per Large Scale Farmers (Ha)

Crops	Average Size
Maize	15.88
Paddy rice	169.99
Sorghum	1.77
Wheat	7.06
Bush beans	2.71
Climbing beans	1.60
Peas	0.87
Cassava	2.44
Irish potatoes	3.88
Sweet potatoes	0.32
Taro	0.11
Tomotoes	0.70
White cabbage	0.75
Flower cabbage	0.03
Onion	0.56
Carrot	0.41
Eggplant	0.32
Other seasonal vegetat	0.06
Cooking Banana	1.96
Dessert banana	2.40
Banana for beer	2.83
Pineapple	5.23
Avocado	4.98
Passion fruits	0.69
Soya beans	8.01
Ground nuts	0.26
sun flower	0.29
coffee	8.56
Pyrethrum	2.33

Crops	Average Size
Other seasonal crop	3.10
Other annual crops	1.04
Other perennial crop	37.51
Sweet pepper	0.60
Pepper	1.23
Amaranths	0.91
Sugar beet	0.19
Leeks	0.11
Napia grass	2.63
Sugar cane	1.72
Fodder crop	6.71
Macadamia	4.75
Olive crop	6.78
Mango	7.61
Apple	5.77
Papaya	1.01
Tree tomato	4.85
Orange	3.59
Lemon	0.72
White Mulberry	6.02
Mucuna	2.19
Millet	0.48
Jatropha	86.76
Pumpkins	0.27
Fallow land	18.28
Non agriculture land	3.54

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For LSF, the average size of crop area was as follows: Paddy Rice (169.99 Ha), Maize (15.88 Ha).

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 21).

Table 21. Crops Yield by Stratum (Kg/Ha)

Crops	Strata					
	1.1	1.2	2.1	2.2	3.0	All Rwanda
Maize	1,615	1,231	2,543	1,879	1,729	1,742
Paddy rice	-	-	2,582	2,843	-	2,914
Sorghum	2,008	2,025	860	3,765	1,404	1,820
Wheat	890	1,299	-	-	-	1,009
Other cereals	832	362	225	-	1,057	809
Cassava	1,351	-	1,604	4,830	1,719	1,364
Sweet Potatoes	7,462	12,483	9,228	9,008	4,975	7,626
Irish Potatoes	5,263	11,631	4,679	1,853	1,467	6,772
Yams & Taro	4,491	-	4,774	8,641	6,380	4,563
Cooking Banana	3,396	-	467	-	3,975	3,373
Dessert banana	2,692	-	-	-	2,352	2,645
Banana for beer	3,056	-	2,040	-	9,659	3,075
Beans	908	933	860	827	804	904
Bush beans	829	-	832	792	796	828
Climbing beans	1,051	936	1,329	1,332	1,619	1,047
Peas	755	617	581	645	249	728
Groundnuts	473	-	397	-	412	468
Soya beans	563	-	483	467	410	565
Vegetables	11,804	2,776	7,923	8,524	6,758	11,028
Fruits	4,622	916	41	-	4,157	4,118

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4.3.3 Crop Production

The contribution of individual crop production by Stratum (see Table 22) was calculated using the product of yield and area under the crop.

Table22. Production of Main Crops (MT)

	Agricultural Operators						LSF	All Rwanda	
Crops \ Strata	1.1	1.2	2.1	2.2	3.0	S/Total_1	S/Total_2	Total	Percent
Cereals	**245,215**	**11,601**	**44,850**	**14,448**	**16,635**	**332,750**	**37,216.0**	**369,966**	**10.5**
Maize	221,529	6,882	36,541	3,794	10,557	279,302	16,062.2	295,365	8.4
Paddy rice	-	-	7,653	10,269	-	17,922	20,772.8	38,695	1.1
Sorghum	20,062	3,798	638	384	5,992	30,875	271.5	31,147	0.9
Wheat	1,755	908	-	-	-	2,663	109.1	2,772	0.1
Other cereals	1,869	14	18	-	86	1,988	0.4	1,988	0.1
Tubers and Roots	**1,090,443**	**146,980**	**61,543**	**6,697**	**10,859**	**1,316,522**	**2,586.6**	**1,319,108**	**37.4**
Cassava	382,835	-	10,244	1,162	7,951	402,192	243.8	402,436	11.4
Sweet Potatoes	448,232	8,997	39,711	3,794	1,933	502,666	43.3	502,709	14.3
Irish Potatoes	190,924	137,983	3,519	95	573	333,094	2,299.5	335,394	9.5
Yams & Taro	68,452	-	8,070	1,646	402	78,570	-	78,570	2.2
Banana	**958,986**	**-**	**3,943**	**-**	**20,286**	**983,215**	**774.1**	**983,989**	**27.9**
Cooking Banana	365,597	-	540	-	11,770	377,908	591.0	378,499	10.7
Dessert banana	96,598	-	-	-	346	96,944	37.8	96,981	2.7
Banana for beer	496,791	-	3,403	-	8,170	508,364	145.3	508,509	14.4
Legumes & Pulses	**255,158**	**5,438**	**7,193**	**814**	**6,022**	**274,624**	**874.2**	**275,498**	**7.8**
Beans	227,313	4,577	6,248	766	5,713	244,618	561.7	245,179	7.0
Bush beans	134,216	-	5,702	686	5,607	146,211	471.2	146,682	4.2
Climbing beans	93,098	4,577	546	80	106	98,407	90.5	98,497	2.8
Peas	11,430	860	52	1	126	12,470	4.9	12,474	0.4
Groundnuts	5,611	-	139	-	161	5,911	7.6	5,919	0.2
Soya beans	10,804	-	753	47	21	11,625	299.9	11,925	0.3
Vegetables and Fruits	**141,188**	**1,071**	**15,488**	**2,180**	**2,188**	**162,116**	**3,027.9**	**165,144**	**4.7**
Vegetables	107,538	742	15,486	2,180	748	126,693	2,882.2	129,576	3.7
Fruits	33,650	329	2	-	1,441	35,422	145.7	35,568	1.0
Other crops	**364,365**	**1,553**	**35,730**	**1,232**	**58**	**402,937**	9,975.1	**412,912**	11.7
All Rwanda	**3,055,354**	**166,644**	**168,747**	**25,371**	**56,048**	**3,472,163**	**54,454**	**3,526,617**	**100**

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The share of crop production by groups of crops in Rwanda was significantly high for Tubers and Roots (37.4%) followed by Banana (27.9%). Other crop groups contributed as follows: Cereals (10.5%), Legumes and Pulses (7.8%), and Vegetables and Fruits (4.7%). The share of crop production for individual crop was highest for Banana for Beer (14.4%), followed by Sweet Potatoes (14.3%), Cassavas (11.4%), Cooking Banana (10.7%) and Irish Potatoes (9.5).

Figure4: Share of production by main crops (%)

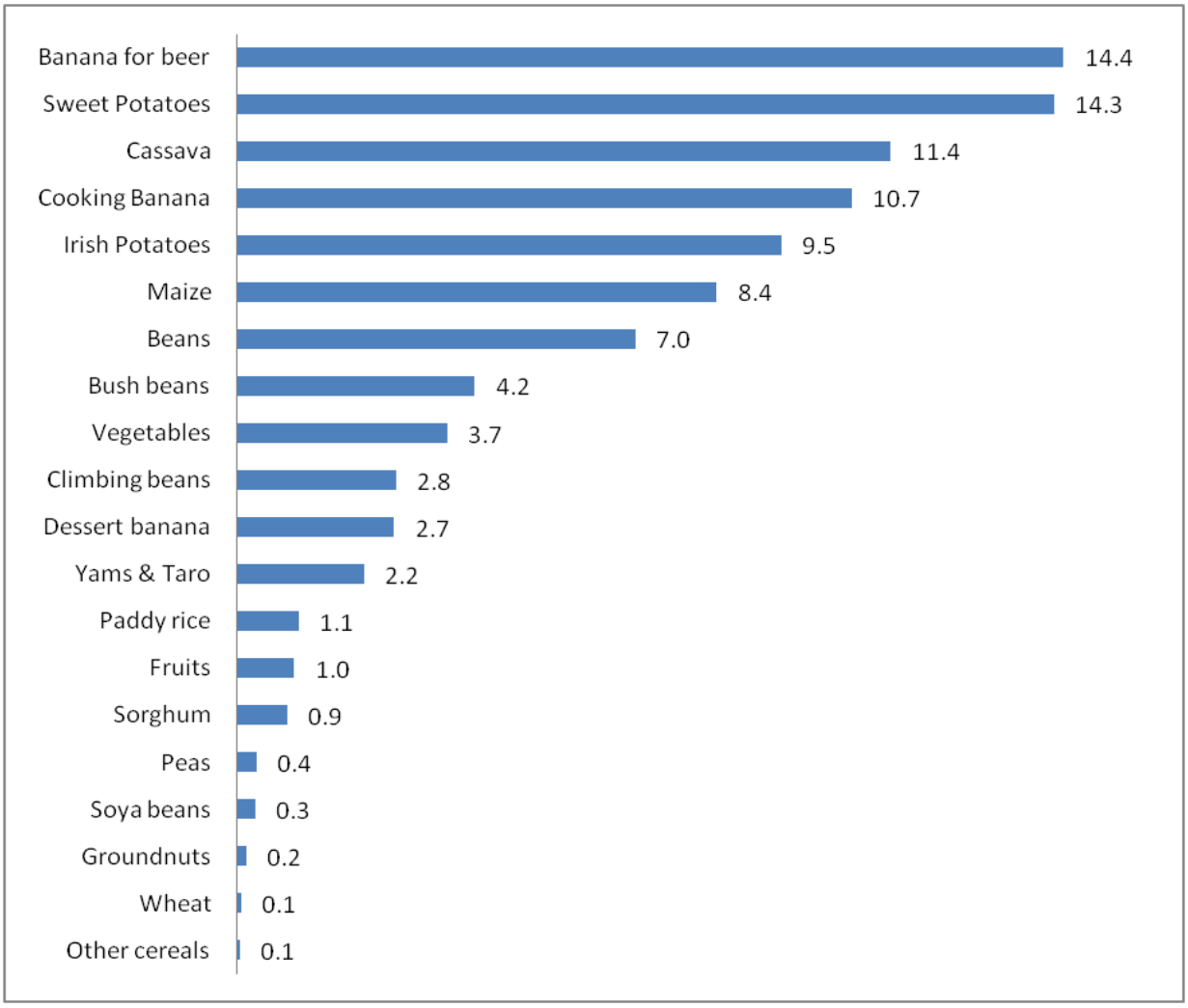
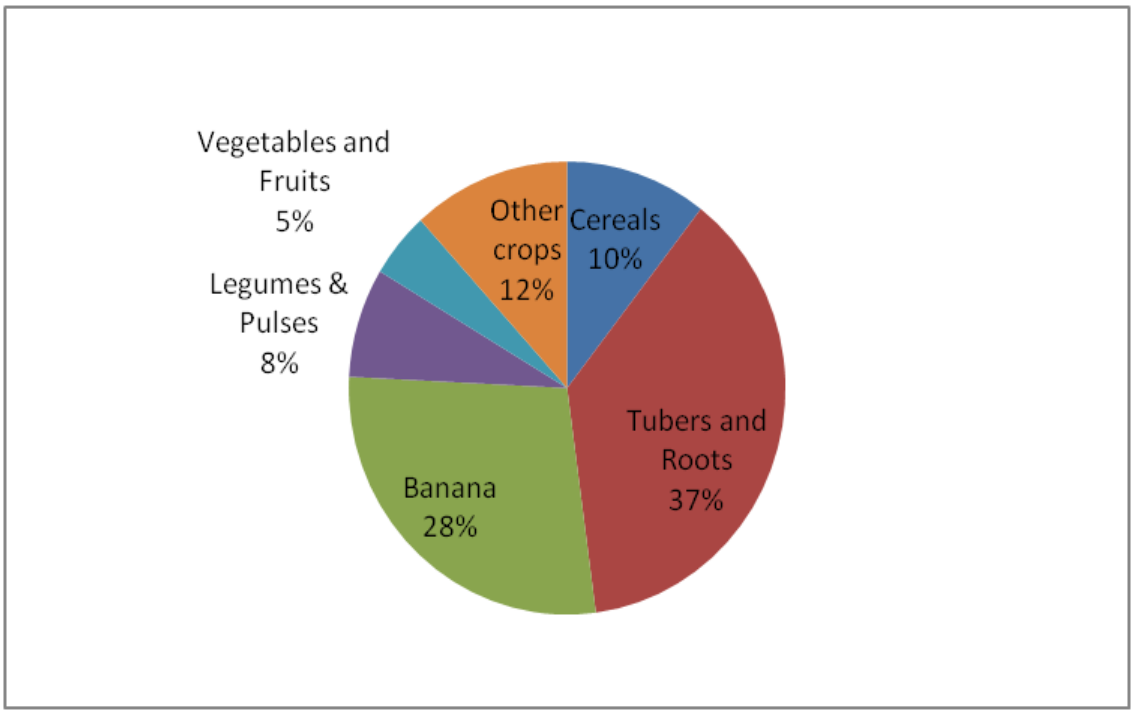


Figure 5 : Share of production by group of crops (%)



4.4 Agricultural Practices

4.4.1 Pure and Mixed Cropping

The survey results showed that the share of agricultural land used by Agricultural Operators to grow crops in pure stand and mixed stand in Rwanda was 21.2% and 78.8% respectively (see Table 23). For LSF, the share between pure stand and mixed stand was 84.5% and 15.5% respectively.

Table 23. Share of Pure and Mixed Crop Agricultural Land (%)

	Strata	Pure Crop Land	Mixed Crop Land	Total
Agricultural Operators	**1.1**	19.1	80.9	100
	1.2	42.1	57.9	100
	2.1	43.7	56.3	100
	2.2	82.3	17.7	100
	3.0	24.0	76.0	100
	All Rwanda	21.2	78.8	100
LSF		84.5	15.5	100

2015 Seasonal Agriculture Survey - Season A

In general, except stratum, 2.2, Agricultural Operators in all strata used most of their agricultural land to cultivate mixed crops while LSF devoted most of their agricultural land to cultivate crops in pure stand.

Table 24. Distribution of Pure Crop Agricultural Land (Ha) in Segments by Type of Crop (%)

Strata \ Crop	Maize	Paddy rice	Sorghum	Cassava	Sweet potatoes	Irish potatoes	Banana	Bush beans	Climbing beans	Peas	Others	Total
1.1	10.5	0.4	0.6	31.2	11.1	4.2	10.2	3.3	9.4	1.9	17.3	100
1.2	7.7	-	3.7	0.0	2.5	42.4	-	-	11.1	3.5	29.2	100
2.1	35.9	13.8	1.0	10.5	12.7	0.8	2.2	3.6	0.4	0.1	19.1	100
2.2	23.5	57.1	0.1	1.5	4.8	0.0	0.2	4.2	0.2	-	8.4	100
3.0	20.6	-	15.8	16.3	1.4	1.5	2.2	5.4	-	3.0	33.8	100
All Rwanda	12.9	2.6	1.2	27.1	10.4	5.5	8.7	3.3	8.4	1.8	18.2	100

2015 Seasonal Agriculture Survey - Season A

Table 24 shows the use of agricultural land for growing main crops in pure stand in the country. Stratum 1.1 used 31.2 percent of total land for pure stand in mainly Cassava cultivation followed by Sweet potatoes (11.1%) and Maize (10.5%). Stratum 1.2 used 42.4percent of total land for pure stand cropping mainly for Irish Potatoes. Stratum 2.1 used 35.9 percent of total land for pure stand cropping mainly for Maize and Stratum 2.2 used 57.1 percent of total land for pure cropping for Paddy rice.

4.4.2 Use of Organic Fertilizer

In segments, 51.3% of all Agricultural Operators in Rwanda reported that they used organic fertilizer (see Table 25). The organic fertilizers were mostly used in Stratum 2.1 (60.8%) followed by Stratum 1.1 (51.3%), Stratum 1.2 (46.2%), Stratum 2.2 (25.1%) and Stratum 3.0 (13.9%).

Table 25. Users of Organic Fertilizers (%)

	Strata	Used organic fertilizers
Agricultural Operators	1.1	51.3
	1.2	46.2
	2.1	60.8
	2.2	25.1
	3.0	13.9
	All Rwanda	51.3
LSF		66.8

2015 Seasonal Agriculture Survey - Season A

For Large Scale Farmers, 66.8% of LSF reported that they used organic fertilizers.

Table 26. Users of organic fertilizers by crops (%)

Crop \ Strata	Agricultural operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	66.8	52.7	83.6	61.0	18.2	66.9	62.9
Paddy rice	0.0	0.0	0.0	2.4	0.0	0.9	30.6
Sorghum	36.4	0.0	0.0	50.0	8.5	35.9	29.5
Wheat	66.7	27.3	0.0	0.0	0.0	65.5	100.0
Bush Beans	55.1	0.0	69.6	48.8	19.2	55.2	73.7
Climbing beans	81.3	42.4	95.8	40.0	0.0	80.9	90.6
Peas	70.7	61.7	45.5	100.0	0.0	70.5	100.0
Cassava	45.2	0.0	47.6	30.0	10.5	45.2	60.9
Irish potatoes	77.2	71.2	86.3	66.7	6.9	77.1	95.3
Sweet potatoes	48.8	58.3	59.5	28.3	9.8	48.9	72.7
Taro	66.7	0.0	81.4	52.5	25.0	67.1	
Cooking banana	54.5	100.0	25.0	100.0	30.4	54.4	72.9
Dessert banana							70.8
Banana for beer	50.5	0.0	50.0	0.0	17.9	50.5	100.0
Soybeans	61.4	0.0	61.4	60.0	37.5	61.4	63.6
Groundnuts	29.5	0.0	25.0	0.0	7.1	29.5	76.2
Vegetables	86.8	0.0	86.5	70.6	37.5	86.7	
Fruits	56.4	75.0	80.0	50.0	22.2	56.5	

2015 Seasonal Agriculture Survey - Season A

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

The survey results showed that 21.1 percent of Agricultural Operators used inorganic fertilizers while 54.8 % of LSF used inorganic fertilizers during 2015 Season A (see Table 27). This shows that a larger proportion of LSF used inorganic fertilizer than Agricultural Operators during this agricultural season.

Table 27. Use of Inorganic Fertilizer (%)

	Strata	Used inorganic fertilizers
Agricultural Operators	1.1	20.6
	1.2	43.4
	2.1	43.2
	2.2	62.9
	3.0	4.8
	All Rwanda	21.1
LSF		54.8

2015 Seasonal Agriculture Survey - Season A

For Agricultural Operators in segments, DAP was the most used (41.4%) followed by UREA (38.8%) and NPK (19.8%) while UREA was the most highly used by LSF (38.8%) followed by DAP (28.6%) and NPK (27.4%).

Table 28. Users of Inorganic Fertilizers by Type and by Stratum (%)

	Strata	NPK	UREA	UREA (LIQUID)	DAP	OTHER Fertilizers	Total
Agricultural Operators	1.1	19.4	38.0	0.5	42.0	0.1	100
	1.2	79.5	4.5	7.6	8.3	-	100
	2.1	10.1	49.6	1.0	39.3	-	100
	2.2	41.2	45.1	0.5	13.2	-	100
	3.0	11.8	35.3	5.9	47.1	-	100
	All Rwanda	19.8	38.1	0.6	41.4	0.1	100
LSF		27.4	38.8	0.3	28.6	4.9	100

2015 Seasonal Agriculture Survey - Season A

In Stratum 1.1 and Stratum 3.0, the survey showed that DAP was used by 42.0and 47.1 percent of all agricultural operators within the Stratum respectively and NPK was mostly used in Stratum 1.2 (79.5% of all agricultural operators). UREA was also ranked first in the Strata 2.1 and 2.2 (respectively 49.6% and 45.1%).

Table 29.Users of inorganic fertilizers by crops (%)

Crops \ Strata	Agricultural operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	24.5	3.8	55.1	49.2	3.6	24.9	48.6
Paddy rice	100.0	0.0	85.5	81.3	0.0	85.3	98.8
Sorghum	5.1	0.0	0.0	0.0	1.1	4.9	1.6
Wheat	6.7	0.0	0.0	0.0	0.0	6.5	90.9
Bush Beans	6.4	0.0	14.9	16.3	0.6	6.4	36.5
Climbing beans	13.0	0.4	16.7	0.0	0.0	12.8	71.9
Peas	8.7	0.9	0.0	0.0	0.0	8.6	61.1
Cassava	2.2	0.0	2.8	5.0	0.0	2.2	17.2
Irish potatoes	19.5	74.2	20.5	0.0	0.0	20.4	83.5
Sweet potatoes	0.7	0.0	1.5	0.0	0.0	0.7	18.2
Taro	3.5	0.0	5.6	2.5	0.0	3.6	
Cooking banana	1.2	0.0	0.0	0.0	0.0	1.2	22.0
Dessert banana							25.0
Banana for beer	1.4	0.0	0.0	0.0	0.0	1.4	61.5
Soybeans	5.5	0.0	10.0	15.0	0.0	5.6	72.7
Groundnuts	1.6	0.0	25.0	0.0	0.0	1.6	19.0
Vegetables	26.9	0.0	42.3	47.1	25.0	27.3	
Fruits	3.3	25.0	20.0	0.0	5.6	3.3	

2015 Seasonal Agriculture Survey - Season A

Agricultural operators used inorganic fertilizers mostly on Paddy rice (85.3%), Vegetables (27.3%), Maize (24.9 %) and Irish potatoes (20.4%), while LSF mostly used inorganic fertilizers on Paddy rice (98.8%) and Irish potatoes (90.9%).

4.4.4 Use of Seeds

In 2015, Agricultural Operators used traditional seeds more than improved ones (84.5 % and 15.5% respectively). For LSF, on country level, traditional seeds are used at (79.8 %). The use of traditional seeds and improved seeds by Stratum is given in Table 31.

Table 30.Agricultural Operators by Type of Seeds Used (%)

	Strata	Traditional seeds	Improved seeds
Agricultural Operators	**1.1**	84.7	15.3
	1.2	94.6	5.4
	2.1	67.6	32.4
	2.2	75.3	24.7
	3.0	93.2	6.8
	All Rwanda	84.5	15.5
LSF		79.8	20.2

2015 Seasonal Agriculture Survey - Season A

Table 31. Users of Traditional Seeds by Type of Crop (%)

	Agricultural operators						LSF
Crops \ Strata	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	79.6	94.2	44.4	57.6	96.4	79.1	50.4
Sorghum	100.0	0.0	100.0	100.0	100.0	100.0	100.0
Wheat	100.0	90.9	0.0	0.0	0.0	99.7	44.4
Bush Beans	98.7	100.0	97.6	97.5	96.2	98.7	83.1
Climbing beans	98.9	99.6	95.8	100.0	100.0	98.9	47.6
Peas	100.0	100.0	100.0	100.0	100.0	100.0	78.6
Cassava	99.7	0.0	100.0	100.0	100.0	99.7	93.9
Irish potatoes	98.8	99.3	98.6	100.0	100.0	98.9	77.4
Sweet potatoes	99.8	100.0	99.0	100.0	100.0	99.7	100.0
Taro	99.6	0.0	99.4	100.0	93.8	99.6	100.0
Cooking banana	99.3	100.0	100.0	0.0	99.2	99.3	89.6
Banana for beer	99.1	100.0	100.0	100.0	100.0	99.1	62.5
Soybeans	97.9	0.0	97.1	100.0	93.8	97.9	58.8
Groundnuts	100.0	0.0	100.0	0.0	100.0	100.0	100.0
Vegetables	79.7	0.0	80.8	73.5	87.5	79.8	34.6
Fruits	98.2	91.7	100.0	75.0	100.0	98.2	60.0

2015 Seasonal Agriculture Survey - Season A

Traditional seeds were used for almost all crops by Agricultural operators as well as by LSF.

Table 32. Users of Improved Seeds by Type of Crop (%)

Crops \ Strata	Agricultural operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	23.4	8.8	59.1	48.3	4.5	23.9	52.1
Wheat	0.0	9.1	0.0	0.0	0.0	0.3	66.7
Bush Beans	2.0	0.0	3.6	2.5	5.1	2.0	21.7
Climbing beans	1.6	0.0	4.2	0.0	0.0	1.6	52.4
Peas	0.8	0.0	0.0	0.0	0.0	0.8	14.3
Cassava	0.3	0.0	0.0	0.0	0.0	0.3	6.1
Irish potatoes	1.9	1.0	0.0	0.0	0.0	1.8	25.8
Sweet potatoes	0.2	0.0	0.5	0.0	0.0	0.2	0.0
Taro	0.2	0.0	0.0	0.0	0.0	0.2	0.0
Cooking banana	0.2	0.0	0.0	0.0	0.0	0.2	16.9
Banana for beer	0.2	0.0	0.0	0.0	2.6	0.2	37.5
Soybeans	1.2	0.0	2.9	0.0	6.3	1.2	41.2
Vegetables	23.6	0.0	23.1	38.2	25.0	23.6	76.9
Fruits	2.0	8.3	0.0	25.0	0.0	2.0	47.5

2015 Seasonal Agricultural Survey -Season A

Agricultural operators used improved seeds mostly to grow Maize (23.9%) and Vegetables (23.6%). Among LSF, the highest use of improved seeds has been to grow Vegetables (76.9%) followed by Wheat and Climbing beans as their percentages are (66.7% and 52.4% respectively).

4.4.5 Irrigation Practices

In Rwanda only 1.1% of Agricultural Operators practised irrigation in 2015. The few Agricultural Operators that practised irrigation were in the Stratum 2.2 (60.2%), Stratum 2.1 (15.5%), Stratum 3.0 (1.4%), Stratum 1.1 (0.8%) and Stratum 1.2 (0%). The distribution of Agricultural Operators and LSF that practised irrigation in Rwanda by Stratum is given in Table 33.

Table 33. Agricultural Operators and Large Scale Farmers Practicing Irrigation (%)

	Strata	Practised Irrigation
Agricultural Operators	1.1	0.8
	1.2	-
	2.1	15.5
	2.2	60.2
	3.0	1.4
	All Rwanda	1.1
LSF		24.6

2015 Seasonal Agriculture Survey - Season A

The 2015 SAS results showed that about 1.1% of agricultural operators and 24.6 % of LSF practiced irrigation (see Table 33).

On the type of irrigation used by Agricultural Operators, the survey results showed that the majority of Agricultural Operators used Water channels for irrigation (71.5%), followed by those that used Watering can (22.0%) (SeeTable34).

Table 34. Agricultural Operators and LSF by Type of Irrigation Practised (%)

Strata	Pumps/tube wells/irrigation machines	Watering can	Water channels	Others	Total
11	0.0	83.3	6.7	10.0	100.0
21	.9	26.9	55.6	16.7	100.0
22	0.0	10.4	88.7	.9	100.0
30	0.0	100.0	0.0	0.0	100.0
Total	.3	22.0	71.5	6.2	100.0

2015 Seasonal Agricultural Survey -Season A

The survey results showed that the use of Watering can for irrigation was predominantly used by agricultural operators in Strata 3.0, 1.1, and 2.1 (100%, 83.3% and 26.9% respectively).

Agricultural operators from Strata 2.2 and 2.1 mostly used Water Channels as the irrigation practice (88.7% and 55.6% respectively).

Table 35. Practice of irrigation by crop (%)

Crops \ Strata	Agricultural operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	0.0	0.0	4.8	3.4	0.5	0.1	7.6
Paddy rice	100.0	0.0	98.2	98.1	0.0	98.3	96.8
Sorghum	0.0	0.0	0.0	0.0	1.1	0.0	0.0
Bush Beans	0.0	0.0	3.6	6.3	0.0	0.0	1.2
Cassava	0.0	0.0	4.1	0.0	0.0	0.0	0.0
Irish potatoes	0.0	0.0	5.5	0.0	0.0	0.0	0.0
Sweet potatoes	0.2	0.0	3.9	0.0	0.0	0.2	0.0
Taro	0.2	0.0	5.6	5.0	0.0	0.3	0.0
Cooking banana	0.0	0.0	0.0	0.0	0.8	0.0	1.3
Soybeans	0.0	0.0	7.1	5.0	0.0	0.1	11.8
Groundnuts	0.0	0.0	50.0	0.0	0.0	0.1	0.0
Vegetables	12.7	0.0	50.0	64.7	12.5	13.7	42.3
Fruits	0.5	0.0	20.0	0.0	5.6	0.5	12.5

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4.4.6 Anti-erosive Activities

Erosion refers to the process in which the earth's surface is worn away. Due to the mountainous landscape of Rwanda, most of the Agricultural Operators practice anti-erosive activities to prevent the wasting away of the topsoil. The survey results show the distribution of Agricultural Operators and LSF practicing anti-erosive activities (see Table 36).

Table 36. Anti-erosive Activities by Agricultural Operators and Large Scale Farmers (%)

	Strata	Practised Anti-erosion
Agricultural Operators	1.1	40.7
	1.2	57.6
	2.1	60.7
	2.2	66.6
	3.0	8.4
	All Rwanda	41.3
LSF		59.2

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Anti-erosion was practised by 41.3% of Agricultural Operators and 59.2% of LSF. Most of the anti-erosion activities were practised by Agricultural Operators in the Stratum 2.2 (66.6%), followed by Stratum 2.1 (60.7%), Stratum 1.2 (57.6%), Stratum 1.1 (40.7%) and Stratum 3.0 (8.4%).

Table 37. Anti-erosive Activities by Agricultural Operators and LSF (%)

	Strata	Ditches	Trees	Radical Terracing	Progressive terracing	Grasses	Water drainage	Mulching	Beds	Other	Total
Agricultural Operators	**1.1**	5.3	3.0	4.9	12.9	69.1	1.3	1.0	1.9	0.6	100
	1.2	6.9	1.6	1.3	5.6	21.5	0.0	0.0	62.8	0.3	100
	2.1	2.0	1.2	0.1	0.8	23.1	56.8	0.5	15.3	0.1	100
	2.2	0.2	0.0	4.3	0.3	8.9	77.3	0.1	4.8	4.1	100
	3.0	12.4	15.7	-	-	45.0	9.9	10.7	5.8	0.4	100
	All Rwanda	5.2	2.9	4.8	12.6	68.0	2.4	1.0	2.4	0.6	100
LSF		23.0	5.4	7.9	5.2	30.7	15.0	8.1	4.6		100

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The Survey shows that, in Rwanda the most practised erosion control measures by Agricultural Operators in all Strata were Grasses (68.0%) and Progressive Terracing (12.6%) followed by Ditches (5.2%) (See Table 37).

Other erosion control measures such as planting of trees, radical terracing, waterway and mulching were also practiced but with a small number of Agricultural Operators.

Table 38. Practice of anti-erosive activities by crops (%)

Crops \ Strata	Agricultural operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	69.2	89.2	77.7	56.8	10.9	69.4	54.2
Paddy rice	100.0	0.0	96.4	99.0	0.0	97.8	96.8
Sorghum	56.6	0.0	0.0	100.0	10.6	57.0	16.1
Wheat	86.7	100.0	0.0	0.0	0.0	87.1	100.0
Bush Beans	66.4	100.0	56.0	72.5	12.2	66.2	38.6
Climbing beans	74.7	88.7	75.0	60.0	25.0	74.9	71.4
Peas	81.5	80.4	54.5	100.0	0.0	81.4	92.9
Cassava	68.0	0.0	55.9	55.0	11.1	67.9	28.6
Irish potatoes	78.5	90.8	87.7	66.7	6.9	78.7	74.2
Sweet potatoes	72.2	91.7	65.9	73.6	13.7	72.1	31.6
Taro	67.3	0.0	79.5	80.0	18.8	67.7	0.0
Cooking banana	67.1	100.0	50.0	0.0	18.4	67.0	42.9
Banana for beer	66.4	0.0	60.0	50.0	35.9	66.4	75.0
Soybeans	71.8	0.0	62.9	50.0	6.3	71.7	76.5
Groundnuts	61.8	0.0	25.0	0.0	10.7	61.7	31.3
Vegetables	75.9	0.0	86.5	79.4	31.3	76.2	50.0
Fruits	72.3	83.3	60.0	75.0	44.4	72.3	55.0

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The anti- erosive activities were generally undertaken on cropland. With regards to cropland for Paddy rice, Wheat, Peas, Climbing beans, Irish potatoes and Sweet Potatoes, Soybeans, fruits and vegetables, more than 70.0% of agricultural operators reported that their plots are protected against erosion.

4.4.7 Use of Pesticides

The survey results showed that in Rwanda 9.1% of Agricultural Operators used pesticides in their farming activities against 46.7% of LSF. (See Table 39).

Table 39. Agricultural Operators and LSF using Pesticide (%)

	Strata	Used Pesticides
Agricultural Operators	1.1	8.9
	1.2	44.7
	2.1	16.3
	2.2	49.6
	3.0	1.7
	Rwanda	9.1
LSF		46.7

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The use of pesticides is less than 50% of Agricultural operators in all strata. Stratum 2.2 (49.6%) and Stratum 1.2 (44.7%) were having the highest Agricultural Operators who used pesticides followed by Strata 2.1, 1.1 and 3.0 (16.3%, 8.9% and 1.7% respectively).

The Table 40 shows that, Countrywide, for Agricultural Operators, Dithane is the most used pesticide (35.4% of all Agricultural operators) followed by Cypermetrine (34.7%). For the LSF, most of them used Cypermetrine (33.7%), followed by Dithane (14.4%), Dimethoate (8.8%), Ridomil (7.7%), and Dursiban (1.1%).

Table 40.Type of Pesticide used by Agricultural operators and LSF

	Strate	DITHANE	RIDOMIL	DIMETHOATE	CYPERMETRINE	DURSIBAN	TILT	OTHER PESTICIDE	Total
Agricultural Operators	11	35.8	7.4	14.6	34.4	1.4		5.5	100
	12	43.8	30.5	12.0	13.5	-		0.2	100
	21	7.9	1.4	5.0	64.3	1.4		19.3	100
	22	0.9	-	23.6	53.6	-		21.9	100
	30	25.0	-	37.5	12.5	12.5		12.5	100
	All Rwanda	35.4	8.3	14.4	34.7	1.4		5.8	100
LSF		14.4	7.7	8.8	33.7	1.1	0.6	33.7	100

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The survey results showed that agricultural operators used pesticides mostly on Paddy rice (75.7%), vegetables (29.8%), and Irish potatoes (15.8%).

The use of pesticides by agricultural operators was less than 10% for other grown crops.

For LSF, the percentage of users of pesticides was also high on Wheat (90.9%), Paddy rice (88.2%), Peas (83.3%) and Irish potatoes (80.0%).

Table 41. Users of pesticides by crops (%)

Crops \ Strata	Agricultural operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	4.2	0.0	13.4	14.4	0.0	4.3	35.5
Paddy rice	100.0	0.0	72.7	73.1	0.0	75.7	88.2
Sorghum	1.0	0.0	0.0	0.0	0.0	1.0	1.6
Wheat							90.9
Bush Beans	1.1	0.0	2.4	6.3	0.0	1.1	29.5
Climbing beans	4.1	0.8	0.0	20.0	0.0	4.1	68.8
Peas	2.4	0.0	0.0	0.0	0.0	2.4	83.3
Cassava	0.4	0.0	0.0	0.0	0.0	0.4	14.9
Irish potatoes	14.7	78.0	15.1	0.0	0.0	15.8	80.0
Sweet potatoes	0.1	0.0	0.5	0.0	0.0	0.1	18.2
Taro	0.6	0.0	0.6	0.0	0.0	0.6	
Cooking banana	0.1	0.0	0.0	0.0	0.0	0.1	22.0
Dessert banana							25.0
Banana for beer	0.1	0.0	0.0	0.0	0.0	0.1	69.2
Soybeans	0.2	0.0	1.4	5.0	0.0	0.3	59.1
Groundnuts	0.4	0.0	25.0	0.0	0.0	0.4	19.0
Vegetables	29.7	42.9	30.8	58.8	25.0	29.8	
Fruits	1.5	41.7	20.0	25.0	0.0	1.6	

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4.5 Small Agricultural Equipment

Expenditure on small agricultural equipment by agricultural operators was mainly on the Hoe (28.3%) followed by Bike and Sacks for agricultural operators (12.2% and 7.5% respectively) while LSF spent mainly on Sheeting, Sacks and Hoe (36.8%, 31.6% and 16.2%respectively). Expenditures on the other tools that were used for

cultivation by Agricultural operators and LSFs were below 10% each of the total expenditure.

Table 42.Expenditureby Type of Small Agricultural Equipment (%)

Small Agricultural Equipment	Agricultural Operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Hoe	27.0	20.3	57.6	24.3	17.4	28.3	16.2
Spring Hoe	1.9	0.5	0.6	1.1	0.5	1.8	0.0
Fork hoe	7.2	4.2	0.3	3.3	10.8	6.9	0.4
Rake	0.1	-	0.0	0.1	-	0.1	0.0
Pick/ Ipiki	1.0	0.2	0.7	0.1	6.0	1.0	0.0
Wheelbarrow	1.5	0.5	0.1	2.6	-	1.4	0.2
Shovel/igitiyo	1.2	1.8	0.7	0.9	0.6	1.2	0.6
Watering pump	0.1	-	-	-	-	0.1	0.2
Sprayer	3.2	28.3	4.4	3.0	1.8	3.3	
Watering can	1.1	0.4	1.9	4.1	0.5	1.1	0.1
Scie	0.0	0.1	0.1	0.1	-	0.0	
Sickle	2.7	1.5	1.5	4.2	0.6	2.7	1.9
Secataur	0.1	-	0.1	0.1	-	0.1	0.0
Scythe	0.3	-	0.1	0.1	0.3	0.3	0.0
Machete	3.4	3.1	1.3	2.9	4.1	3.3	2.3
Billhook	0.1	0.1	0.0	0.0	0.2	0.1	0.0
Basket	3.0	1.9	2.0	2.3	0.7	2.9	0.4
Sack	7.5	20.8	4.3	13.3	12.8	7.5	31.6
Big basket	0.0	0.1	0.0	0.2	-	0.0	
Winnower	2.5	0.5	1.4	3.1	2.7	2.4	2.7
Basket(ikibo)	0.9	0.6	0.3	0.4	0.6	0.8	
Basket(inkangara)	0.1	-	0.1	0.2	0.0	0.1	
Scale	2.2	1.0	0.6	0.2	6.7	2.2	0.5
Jerry-can	5.0	4.3	1.2	2.1	3.9	4.8	0.1
Barrel	0.6	0.0	0.2	0.7	0.5	0.6	0.0
Bike	12.6	-	5.4	9.4	10.8	12.2	0.1
Craft bike	0.3	-	0.0	-	-	0.3	
Bowl	0.4	0.2	0.1	0.4	0.2	0.4	0.0
Sheeting	8.4	4.9	12.2	15.7	14.6	8.6	36.8
Hoe sleeve	3.2	3.5	1.6	2.3	3.5	3.1	2.7
Others (Specify)	2.3	1.2	1.3	2.6	0.1	2.2	0.2
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**

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The survey results on the value of donations received by Agricultural operators, Hoes (25.5%) were the largest donation followed by Crops Sprayer (23.6%). For LSF, Sacks were the largest donation (54.5%).

Table 43. Value of Small Equipment Received from Non Agricultural Donors (%)

Small Agricultural Equipment	Agricultural Operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Hoe	25.0	-	52.9	60.0	-	25.5	
Spring Hoe	1.2	-	-	-	-	1.2	
Fork hoe	5.2	-	-	-	-	5.1	0.1
Pick/ Ipiki	-	-	7.4	-	-	0.1	
Wheelbarrow	-	-	-	-	-	-	0.1
Shovel/igitiyo	-	-	5.5	-	-	0.1	0.1
Crops Sprayer	24.1	-	-	-	-	23.6	0.1
Watering can	6.0	100.0	10.4	-	-	6.2	
Scie	4.0	-	-	-	-	3.9	
Sickle	-	-	1.8	-	-	0.0	
Machete	0.8	-	-	-	-	0.8	
Sack	4.1	-	7.6	40.0	-	4.2	54.5
Jerry-can	5.0	-	5.5	-	-	5.0	0.1
Bowl	-	-	-	-	-	-	0.1
Sheeting	10.4	-	-	-	-	10.2	0.1
Hoe sleeve	12.6	-	4.4	-	-	12.4	
Others (Specify)	1.6	-	4.4	-	-	1.7	45.0
Total	100	100	100	100	100	100	100

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

The majority of the crop production was consumed by the agricultural operator households (auto-consumption). The rest of the crop production for some crops was sold, offered as gifts to others, used as seeds or stored. A small percentage of the crop production for some crops was used for payment of hired labour.

With respect to LSF, a substantial percentage of the production was sold. The rest of the crop production for some crops was consumed by the household, 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 44 and 45.

Table 44. Use of Production by Agricultural Operators (%)

	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	Used as fodder	Damaged	Used in any other way	Total
Maize	16.8	.2	74.4	.4	.1	3.7	.1	3.7	.2	.1	.2	100
Paddy rice	63.6	.4	26.8	1.3	1.4	2.6	.2	3.3	.0	.4	.0	100
Sorghum	46.9	1.0	42.9	.5	.0	3.3	.6	4.8	.1	.0	.0	100
Wheat	20.9	.0	60.4	.0	.0	3.2	.0	15.5	.0	.0	.0	100
Other cereals	50.0	.0	30.0	.0	.0	10.0	.0	10.0	.0	.0	.0	100
Bush beans	10.7	.3	73.8	.5	.1	1.9	.3	12.2	.0	.0	.1	100
Climbing beans	9.1	.3	73.6	.3	.2	3.2	.2	13.1	.0	.0	.0	100
Peas	9.3	.0	76.6	.0	.0	1.2	.0	12.6	.0	.3	.0	100
Cassava	19.3	.2	76.3	.6	.1	2.9	.1	.0	.1	.1	.2	100
Irish potatoes	19.1	.0	67.2	.4	.0	2.9	.1	9.8	.0	.3	.2	100
Sweet potatoes	13.1	.0	81.7	1.2	.1	3.5	.1	.0	.4	.0	.0	100
Tomotoes	65.1	.0	29.1	.1	.0	3.6	.0	.0	.0	2.0	.0	100
White cabbage	42.7	.0	48.5	.0	.0	8.2	.0	.0	.0	.6	.0	100
Onions	60.6	.0	38.3	.0	.0	1.2	.0	.0	.0	.0	.0	100
Carrots	17.5	.0	80.6	.0	.0	1.9	.0	.0	.0	.0	.0	100
Eggplant	46.7	.0	45.6	.1	.0	6.9	.0	.1	.0	.5	.1	100
Cooking Bananas	17.0	.0	79.6	.3	.0	2.4	.0	.0	.0	.1	.7	100
Dessert banana	56.2	.0	41.3	.0	.0	1.2	.0	.0	.0	.0	1.3	100
Banana for beer	63.1	.0	32.6	.0	.0	3.4	.0	.0	.0	.2	.7	100
Pineapple	33.9	.0	57.5	.1	.0	6.7	.0	.0	.0	.8	1.0	100
Avocado	58.9	.0	34.1	2.7	.0	4.4	.0	.0	.0	.0	.0	100
Passion fruits	72.2	.0	1.2	.0	.0	1.0	.0	.0	.0	25.6	.0	100
Soya beans	9.9	.2	71.3	.3	.0	1.3	.3	16.8	.0	.0	.0	100
Ground nuts	16.6	.3	56.7	.3	.0	1.9	.1	24.0	.0	.0	.0	100
sun flower	5.7	.0	85.9	.4	.0	1.8	.6	5.8	.0	.0	.0	100
coffee	99.8	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	100
Pyrethrum	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Black eggplants	70.0	.0	30.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Sweet pepper	77.6	.0	18.9	.0	.0	2.3	.0	1.3	.0	.0	.0	100
Pepper	98.0	.0	1.5	.0	.0	.5	.0	.0	.0	.0	.0	100
Amaranths	24.3	.0	67.5	.0	.0	8.3	.0	.0	.0	.0	.0	100
Celery	90.0	.0	5.0	.0	.0	5.0	.0	.0	.0	.0	.0	100
Spinach	.0	.0	100.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Small red beans	13.3	.0	73.3	.0	.0	.0	.0	13.3	.0	.0	.0	100
Sugar beet	53.1	.0	36.1	.0	.0	10.8	.0	.0	.0	.0	.0	100
Garlic	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Leeks	30.4	3.6	63.0	.0	.0	3.0	.0	.0	.0	.0	.0	100

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Table 45. Use of Production by Large Scale Farmer (%)

	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	Used as fodder	Damaged	Used in any other way	All Rwanda
Maize	64.4	.0	22.7	1.3	.0	1.6	.0	5.1	4.5	.1	.3	100
Paddy rice	84.5	.0	14.1	.9	.0	.0	.0	.4	.0	.1	.0	100
Sorghum	88.6	.0	8.1	.0	.0	.0	.0	3.3	.0	.0	.0	100
Wheat	79.0	.0	15.9	.0	.0	.8	.0	4.3	.0	.0	.0	100
Bush beans	49.3	.3	37.1	1.0	.3	1.0	.0	10.7	.0	.1	.1	100
Climbing beans	58.6	.8	22.8	.0	.0	.5	.0	17.4	.0	.0	.0	100
Peas	55.8	.0	27.9	.0	.0	2.5	1.4	12.3	.0	.0	.0	100
Cassava	37.8	.0	47.6	9.1	.0	.2	.0	.0	5.3	.0	.0	100
Irish potatoes	54.0	.3	37.8	.7	.0	1.0	.0	4.9	.0	.4	.9	100
Sweet potatoes	34.2	.0	52.0	5.4	.0	1.5	.0	.0	6.9	.0	.0	100
Tomotoes	71.7	.0	28.3	.0	.0	.0	.0	.0	.0	.0	.0	100
White cabbage	55.9	.0	40.9	.0	.0	.9	.0	.0	.0	2.3	.0	100
Flower cabage	.0	.0	.0	.0	.0	.0	.0	.0	.0	100.0	.0	100
Onions	82.9	.0	17.1	.0	.0	.0	.0	.0	.0	.0	.0	100
Carrots	95.0	.0	.0	.0	.0	5.0	.0	.0	.0	.0	.0	100
Eggplant	82.1	.0	15.7	.0	.0	2.1	.0	.0	.0	.0	.0	100
Cooking Bananas	44.2	.0	53.3	.5	.0	1.4	.0	.0	.0	.7	.0	100
Dessert banana	80.9	.0	16.2	.0	.0	.2	.0	.0	.0	2.7	.0	100
Banana for beer	82.1	.0	9.7	.0	.0	2.9	.0	.0	.0	5.3	.0	100
Pineapple	87.9	.0	6.4	.0	.0	5.7	.0	.0	.0	.0	.0	100
Avocado	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Other fruits	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Soya beans	55.2	5.9	13.1	.0	.0	.0	.0	14.3	11.6	.0	.0	100
Ground nuts	29.5	.0	48.0	.9	.0	5.1	.6	15.8	.0	.0	.0	100
sun flower	.0	.0	.0	.0	.0	.0	.0	100.0	.0	.0	.0	100
coffee	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100

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Use of Production by Large Scale Farmer (%) (Cont.)

	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	Used as fodder	Damaged	Used in any other way	All Rwanda
Pyrethrum	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Black eggplants	70.0	.0	30.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Sweet pepper	77.6	.0	18.9	.0	.0	2.3	.0	1.3	.0	.0	.0	100
Pepper	98.0	.0	1.5	.0	.0	.5	.0	.0	.0	.0	.0	100
Amaranths	24.3	.0	67.5	.0	.0	8.3	.0	.0	.0	.0	.0	100
Celery	90.0	.0	5.0	.0	.0	5.0	.0	.0	.0	.0	.0	100
Spinach	.0	.0	100.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Small red beans	13.3	.0	73.3	.0	.0	.0	.0	13.3	.0	.0	.0	100
Sugar beet	53.1	.0	36.1	.0	.0	10.8	.0	.0	.0	.0	.0	100
Garlic	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Leeks	30.4	3.6	63.0	.0	.0	3.0	.0	.0	.0	.0	.0	100
French beans	78.7	.0	18.3	.0	.0	3.0	.0	.0	.0	.0	.0	100
Lettuce	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Napia grass	.0	.0	.0	.0	.0	.0	.0	.0	5.0	.0	95.0	100
Sugar cane	34.1	.0	58.6	.0	.0	7.2	.0	.0	.0	.0	.0	100
Fodder crop	10.4	.0	.0	.5	.0	1.4	.8	1.8	84.9	.0	.1	100
Macadamia	.0	.0	.0	.0	.0	70.0	.0	.0	.0	.0	30.0	100
Mango	25.9	.0	57.4	.0	.0	12.8	.2	.0	.0	.0	3.7	100
Papaya	70.0	.0	20.0	.0	.0	10.0	.0	.0	.0	.0	.0	100
Tree tomato	68.0	.0	20.7	.0	.0	2.2	.0	.0	.0	5.5	3.6	100
Orange	.0	.0	50.0	.0	.0	50.0	.0	.0	.0	.0	.0	100
Lemon	37.0	.0	26.1	.0	.0	37.0	.0	.0	.0	.0	.0	100
Guava	59.0	.0	41.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Millet	16.5	1.4	59.9	2.5	.0	2.5	5.8	11.3	.0	.0	.0	100
Pumpkins	10.5	.0	77.1	.0	.0	9.8	.0	.5	.0	1.1	1.0	100
Cucumber	99.0	.0	1.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Taro	13.9	.0	81.3	.9	.0	3.1	.0	.3	.0	.0	.5	100
Yams	33.4	.0	61.1	.0	.0	2.4	.0	3.2	.0	.0	.0	100
Other annual vegetable	25.0	.0	65.0	.0	.0	10.0	.0	.0	.0	.0	.0	100
Other perennial vegeta	.0	.0	100.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Other seasonal crops	.0	.0	100.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Other annual crops	76.7	.0	1.1	.0	.0	.0	.0	.0	.0	.0	22.2	100
Other perennial crops	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100

2015 Seasonal Agriculture Survey - Season A

Chapter 5: Results of the 2015 Season B

Details of demographic information, use of inputs, other agricultural practices, and production aspects are captured in phase II as described above.

A sample of 194 out of 558LSF and 5,337 out of 24,911 Agricultural Operators were interviewed.

5.1 Demographic and Social Characteristics of Agricultural Operators

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

5.1.1 Agricultural Operators and Large Scale Farmers by Stratum

The distribution of Agricultural Operators (in segments) was highest in Stratum 1.1(67.8%), followed by Stratum 1.2 (9.9%). In 2015 Season B Phase II, 194 Large Scale Farmers were listed and enumerated in Rwanda.

Table 46: Agricultural Operators and LSF by Stratum

	Strata	Total	
		Number	%
Agricultural Operators	1.1	3,621	67.8
	1.2	527	9.9
	2.1	492	9.2
	2.2	425	8.0
	3.0	272	5.1
	All Rwanda	5,337	100
LSF		194	100

2015 Seasonal Agriculture Survey - Season B

The survey results showed that most of the Agricultural Operators in segments (99.6%) were individual Farmers and only 0.4 % of them were cooperatives.

Table 47. Agricultural Operators by type (%)

	Strata	Individual		Cooperative		Total	
		Number	%	Number	%	Number	%
Agricultural Operators	1.1	3,605	99.6	16	0.4	3,621	100
	1.2	527	100.0	0	0.0	527	100
	2.1	487	99.0	5	1.0	492	100
	2.2	423	99.5	2	0.5	425	100
	3.0	271	99.6	1	0.4	272	100
	All Rwanda	5,313	99.6	24	0.4	5,337	100
LSF						194	100

2015 Seasonal Agriculture Survey - Season B

According to the 2015 SAS results, countrywide 15.2% of agricultural operators reported to be members of agricultural cooperatives, where 70.6% of Agricultural Operators in Stratum 2.2 are part of Agricultural Cooperatives, compared with 33.3% of Stratum 2.1.

Among LSF, 58.8% of them are members of agricultural cooperatives.

Table 48. Cooperative Membership

		Yes	No	Total
	Strata	Percent	Percent	Percent
Agricultural Operators	1.1	14.9	85.1	100
	1.2	13.5	86.5	100
	2.1	33.3	66.7	100
	2.2	70.6	29.4	100
	3.0	9.6	90.4	100
	All Rwanda	15.2	84.8	100
LSF		58.8	41.2	100

2015 Seasonal Agriculture Survey - Season B

5.1.2 Number of Agricultural Operators by Gender

In 2015 Season B, the percentage distribution of Agricultural Operators in Rwanda by gender was 68.0 % male and 32.0 % female. The percentage distribution of Agricultural Operators in Rwanda by Gender is shown in Table 49.

Table 49. Percentage of Agricultural Operators by Gender and Stratum

	Agricultural Operators		
Strata	Male	Female	Total
1.1	68.0	32.0	100
1.2	66.6	33.4	100
2.1	66.3	33.7	100
2.2	70.4	29.6	100
3.0	75.3	24.7	100
All Rwanda	68.0	32.0	100

2015 Seasonal Agriculture Survey - Season B

5.1.3 Distribution of Agricultural Operators by Age

The majority (27.9%) of Agricultural Operators in Rwanda were in the age groups of 55 and above followed by the group of between 25 and 34(24.1%). The age group distribution of Agricultural Operators by Stratum varied more in the age group of between 25-34 with Stratum 1.2 (28.7%) being the highest and Stratum 2.1 (22.6%) being lowest. The least variation was in the age group of 35-44 with the Stratum 1.2 being the highest (23.1%) and Stratum 2.2 (21.7%) being the lowest.

Table 50. Distribution of Agricultural Operators by Age

	Agricultural Operators				
Strata	14-24	25-34	35-44	45-54	55 and Above
1.1	4.5	24.1	21.9	21.7	27.9
1.2	5.9	28.7	23.1	20.3	22.0
2.1	3.3	22.6	22.6	22.8	28.7
2.2	6.9	24.8	21.7	23.6	22.9
3.0	5.9	26.6	22.5	19.6	25.5
All Rwanda	4.5	24.1	21.9	21.7	27.9

2015 Seasonal Agriculture Survey - Season B

The majority (28.4%) of male Agricultural Operators in Rwanda were in the age group of between 25 and 34, followed by 23.4 percent of Agricultural Operators in age group of between 35 and 44 (see Table 51).

Table 51. Age Distribution of Male Agricultural Operators

	Agricultural Operators				
Strata	14-24	25-34	35-44	45-54	55 and Above
1.1	4.5	28.4	23.4	20.1	23.6
1.2	6.8	33.9	25.1	19.7	14.5
2.1	3.7	28.8	22.6	21.1	23.8
2.2	7.7	26.2	22.5	21.8	21.8
3.0	4.9	27.9	24.5	18.6	24.0
All Rwanda	4.5	28.4	23.4	20.1	23.6

2015 Seasonal Agriculture Survey - Season B

The distribution of female Agricultural Operators in Rwanda was high in the age groupof 55 and above (37.1%) followed by 24.9 percent of female Agricultural Operators in age groupof between 45 and 54, 18.7 percent of female Agricultural Operators in age group of between 35 and 44, 14.9 percent in age groupof between 25 and 34 and 4.4 percent in age group of between 14 and 24 (see Table52).

Table 52. Age Distribution of Female Agricultural Operators

	Agricultural Operators				
Strata	14-24	25-34	35-44	45-54	55 and Above
1.1	4.4	14.9	18.7	24.9	37.1
1.2	4.0	18.2	19.3	21.6	36.9
2.1	2.4	10.4	22.6	26.2	38.4
2.2	4.8	21.6	20.0	28.0	25.6
3.0	9.0	22.4	16.4	22.4	29.9
All Rwanda	4.4	14.9	18.7	24.9	37.1

2015 Seasonal Agriculture Survey - Season B

5.1.4 Education Level of Agricultural Operators

The Survey results of the 2015 Season B showed that in Rwanda, 65.3% of Agricultural Operators had attended primary level education, 27.8% had no education, 6.0% attended secondary level education and only 0.8% had attended tertiary level education. Among Agricultural Operators who had attended primary level education (65.3%) their distribution across Strata was reasonably uniform with Stratum 2.2 and Stratum 3.0 having higher percentages of 75.4 and 71.2 percent respectively.(see Table53).

Table 53.Distribution of Agricultural Operators by Education Level and Stratum (%)

	Agricultural Operators				
Strata	**Primary**	**Secondary**	**Tertiary**	**No education**	**Total**
1.1	65.3	6.0	0.8	27.8	100
1.2	60.2	7.8	1.9	30.2	100
2.1	65.7	5.5	0.8	27.9	100
2.2	75.4	4.3	0.5	19.9	100
3.0	71.2	5.5	0.7	22.5	100
All Rwanda	65.3	6.0	0.8	27.8	100

2015 Seasonal Agriculture Survey - Season B

In Rwanda, 71.4% of male Agricultural Operators attended primary level education, 21.0% had no education and 6.4% attended secondary level education (see Table 54).

Table 54.Distribution of Male Agricultural Operators by Education level (%)

	Agricultural Operators				
Strata	**Primary**	**Seconda**	**Tertiary**	**No education**	**Total**
1.1	71.5	6.4	1.1	21.0	100
1.2	69.8	9.1	2.8	18.2	100
2.1	68.4	5.9	1.2	24.5	100
2.2	79.9	3.0	0.3	16.8	100
3.0	74.5	6.9	1.0	17.6	100
All Rwanda	71.4	6.4	0.0	21.0	100

2015 Seasonal Agriculture Survey - Season B

2015 SAS illustrated that 52.2% of female Agricultural Operators attended primary education. Stratum 2.2 had the highest female Agricultural Operators with primary education level (64.8%). The lowest percentage of female agricultural operators had tertiary education (0.3%).

Table 55. Education Level of Female Agricultural Operators (%)

	Agricultural Operators				
Strata	**Primary**	**Seconda**	**Tertiary**	**No educatic**	**Total**
1.1	52.2	5.2	0.3	42.4	100
1.2	40.9	5.1	0.0	54.0	100
2.1	60.4	4.9	0.0	34.8	100
2.2	64.8	7.2	0.8	27.2	100
3.0	61.2	1.5	0.0	37.3	100
All Rwanda	52.2	5.2	0.3	42.3	100

2015 Seasonal Agriculture Survey - Season B

4.1.5 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 non-resident of a segment if his/her agricultural activities are undertaken in the segment but lives outside the same segment.

Results of the 2015 SAS showed that in Rwanda the majority of Agricultural Operators (76.2%) were nonresident while 23.8% were residents. In general, the Stratum 3.0 had the biggest percentage of resident's operators (95.9%), while in the rest of the Strata, resident Agricultural Operators are less than 27.0% of all Agricultural Operators. (See Table 56)

Table 56. Agricultural Operators by Residency (%)

	Agricultural Operators		
Strata	**Resident**	**Non resident**	**Total**
1.1	26.9	73.1	100
1.2	25.3	74.7	100
2.1	2.1	97.9	100
2.2	0.6	99.4	100
3.0	95.9	4.1	100
All Rwanda	23.8	76.2	100

2015 Seasonal Agriculture Survey - Season B

4.2 Date of Sowing

For Agricultural Operators, sowing for some crops started before February 2015. The starting dates of sowing by Agricultural Operators in Segments and LSF for each main crop is summarized respectively in the Tables 57 and 58.

For the majority of crops, sowing of crops by Agricultural Operators started in January 2015. For climbing beans, Paddy rice and Maize, the majority of Agricultural Operators indicated January as the sowing date while for Wheat; the date indicated by the majority of Agricultural Operators was before January 2015.

Sowing dates for crops such as dessert Banana, 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 especially with banana being perennial.

Table 57. Agricultural Operators Indicating the Sowing Date in Segments by Crop (%)

Crop name	Before 31/12/2014	01-31/01/2015	01-28/02/2015	After February 2015	N/A	All Rwanda
Maize	2.0	11.2	49.8	37.0	0.0	100
Paddy rice	6.4	29.2	49.3	15.1	0.0	100
Sorghum	12.6	67.3	17.9	2.3	0.0	100
Wheat	0.8	2.3	11.5	85.4	0.0	100
Bush beans	0.6	4.7	49.8	45.0	0.0	100
Climbing beans	0.4	4.7	48.5	46.5	0.0	100
Peas	1.8	12.7	35.1	50.5	0.0	100
Cassava	10.4	4.0	4.3	3.1	78.2	100
Irish potatoes	5.9	19.7	32.8	41.6	0.0	100
Sweet potatoes	24.5	21.8	23.2	30.5	0.0	100
Yams	82.5	12.5	0.0	5.0	0.0	100
Taro	73.8	10.2	6.3	7.5	2.2	100
Cooking Banana	1.4	0.4	0.5	0.4	97.4	100
Dessert Banana	1.0	0.3	0.9	0.3	97.4	100
Banana for beer	1.0	0.3	0.2	0.2	98.3	100
Soya beans	1.4	7.6	52.0	39.0	0.0	100
Ground nuts	0.0	4.2	60.1	35.7	0.0	100

2015 Seasonal Agriculture Survey - Season B

For LSF, the majority of main crops were sown after February 2015, with the exception of Sorghum and Paddy rice sown in February.

Table 58. Large Scale Farmers Indicating Sowing Date for Crops (%)

Crop name	Before 31/12/2014	01-31/01/2015	01-28/02/2015	After February 2015	N/A	All Rwanda
Maize	1.3	5.2	43.2	50.3	0.0	100
Paddy rice	29.2	46.4	24.4	0.0	0.0	100
Sorghum	5.9	56.5	28.2	9.4	0.0	100
Wheat	12.5	0.0	6.3	81.3	0.0	100
Bush beans	0.0	3.2	39.0	57.8	0.0	100
Climbing beans	5.9	0.0	11.8	82.4	0.0	100
Peas	20.0	0.0	20.0	60.0	0.0	100
Cassava	3.8	0.0	6.0	4.5	85.7	100
Irish potatoes	1.9	0.0	17.0	81.1	0.0	100
Sweet potatoes	25.0	21.4	25.0	28.6	0.0	100
Yams & Taro						
Cooking Banana	0.8	0.0	0.0	0.8	98.3	100
Dessert Banana	1.9	1.9	1.9	0.0	94.2	100
Banana for beer	0.0	0.0	0.0	0.0	100.0	100
Soya beans	0.0	6.8	45.8	47.5	0.0	100
Ground nuts	3.5	6.9	41.4	48.3	0.0	100

2015 Seasonal Agriculture Survey - Season B

5.3 Farm Characteristics (Area, Yield and Production)

From the detailed tables on area under crops, yield and crop production, the following are some of the highlights on the estimated production, area under crops and yield for the 2015 Season B (see Tables 59, 63 and 64)

5.3.1 Crop Areas

In Rwanda, in terms of land area under crops, the main crops grown in Season B were Banana (23.1%), Cassava (22.8%), Beans (16.6%), Sorghum (8.8%) and Maize (5.2%) (See Table 59).

In general, all crops are highly cultivated in Stratum 1.1. However, Paddy Rice makes an exception as it is mainly found in Strata 2.2 and 2.1. The total developed crop land means simply the cropland with regards to perennial crops cultivation standards and being sometimes mixed with seasonal crops. Physical crop land means the real size in terms of cultivated plot area.

Table 59. Area (Ha) Cultivated by Crop and Group of Crops by Stratum (Hectares)

	Agricultural Operators						LSF	All Rwanda	
Crops / Strata	1.1	1.2	2.1	2.2	3.0	S/Total_1	S/Total_2	Total	Percent
Cereals	**176,177**	**5,248**	**12,455**	**9,235**	**9,007**	**212,121**	**2,925**	**215,046**	**15.6**
Maize	59,854	3,948	3,967	711	2,677	71,156	996	72,152	5.2
Sorghum	106,905	56	6,378	603	6,310	120,252	327	120,580	8.8
Paddy rice	1,698	-	2,060	7,916	-	11,674	1,450	13,125	1.0
Wheat	6,020	1,244	-	4	-	7,267	99	7,366	0.5
Other cereals	1,701	-	49	0	20	1,771	52	1,823	0.1
Tubers and Roots	**414,991**	**21,950**	**13,922**	**802**	**7,306**	**458,971**	**711**	**459,682**	33.4
Cassava	300,262	46	6,041	292	6,702	313,342	434	313,777	**22.8**
Sweet Potatoes	63,739	695	4,242	325	194	69,195	74	69,269	5.0
Irish Potatoes	33,963	21,115	1,924	42	307	57,350	202	57,552	4.2
Yams & Taro	17,027	94	1,716	143	104	19,084	1	19,084	1.4
Banana	**309,344**	**210**	**2,662**	**165**	**4,538**	**316,920**	**544**	**317,464**	23.1
Cooking Banana	111,367	47	841	70	3,528	115,854	347	116,201	**8.5**
Dessert banana	38,878	3	387	13	275	39,555	135	39,690	2.9
Banana for beer	159,099	160	1,433	83	736	161,511	62	161,573	11.8
Legumes & Pulses	**255,044**	**2,838**	**9,663**	**1,138**	**9,374**	**278,056**	**2,346**	**280,402**	20.4
Beans	***209,429***	***1,570***	***6,339***	***514***	***8,638***	***226,490***	***1,984***	***228,474***	**16.6**
Bush beans	131,331	-	4,875	472	8,600	145,278	1,948	147,226	***10.7***
Climbing beans	78,097	1,570	1,464	42	38	81,211	37	81,248	5.9
Peas	12,259	1,266	54	3	111	13,693	51	13,744	1.0
Groundnuts	13,086	-	424	20	525	14,054	22	14,077	1.0
Soya beans	20,241	3	2,846	601	99	23,790	288	24,078	1.8
Other legumes & Pulses	30	-	-	-	-	30	-	30	0.0
Vegetables and Fruits	**20,629**	**1,584**	**2,737**	**386**	**877**	**26,213**	**550**	**26,763**	1.9
Vegetables	10,608	978	2,674	372	211	14,843	126	14,969	**1.1**
Fruits	10,021	606	64	14	665	11,370	424	11,794	0.9
Other crops	**66,729**	**3,554**	**2,857**	**306**	**1,537**	**74,982**	**706**	**75,687**	5.5
Total developped crop lan	**1,242,913**	**35,384**	**44,295**	**12,033**	**32,638**	**1,367,263**	**7,780**	**1,375,043**	**100.0**
Total Physical crop land	**925,043**	**33,089**	**39,418**	**7,515**	**30,876**	**1,035,941**	**13,899**	**1,049,840**	**100.0**
Fallow land	**187,527**	**4,384**	**20,665**	**3,094**	**1,841**	**217,512**	**2,733**	**220,245**	**21.0**

2015 Seasonal Agriculture Survey - Season B

Figure 6: Shareof Agriculture Land by Crops (%)

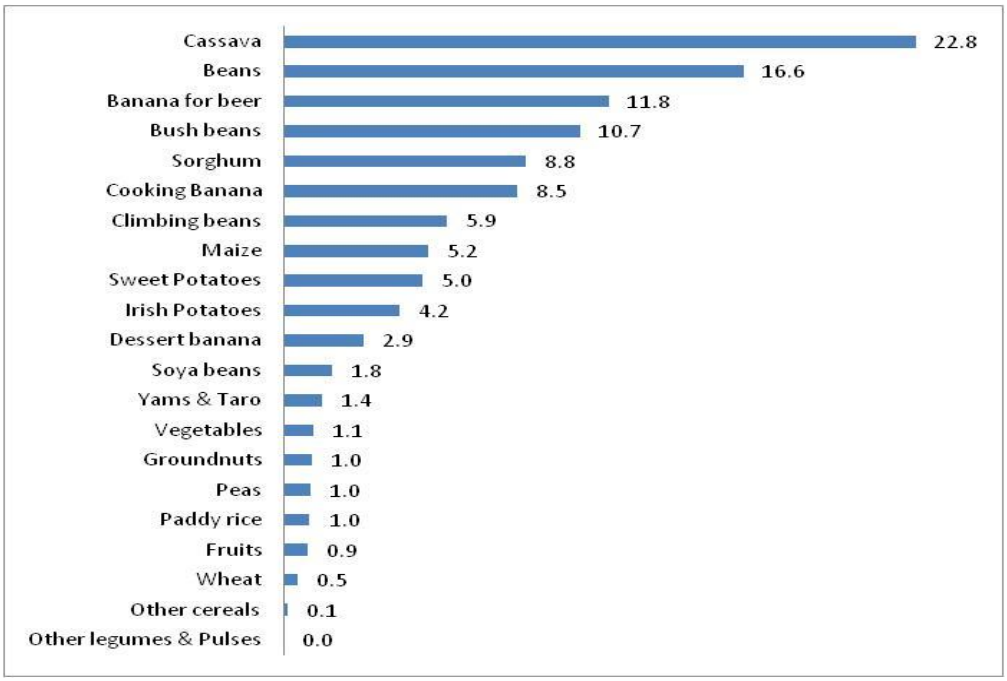
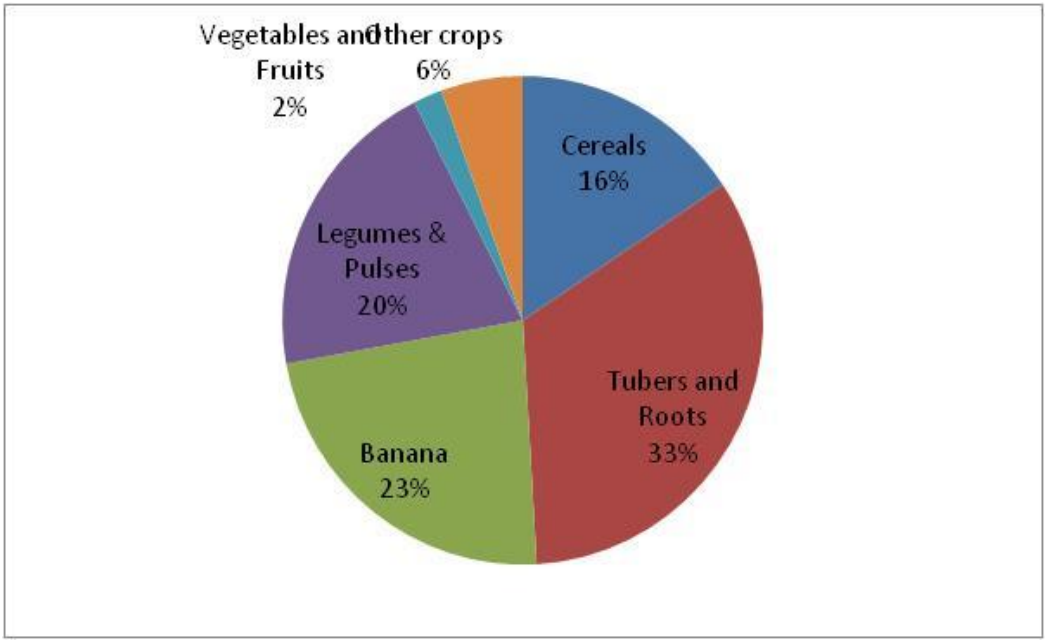


Figure 7: Share of Agriculture Land by Group of Crops (%)



The Figure 7 shows the percentage share of agricultural land cultivated by group of crops. The survey results showed that the dominant groups of agricultural crops in Rwanda in season B were: Tubers and Roots (33 %), Banana (23.6%), Legumes and Pulses (20%), Cereals (16%), while Fruits and Vegetables and other crops accounted for less than 10 % of the total share of agricultural land.

The survey results showed that the average size of tracts for Agricultural Operators in Rwanda in 2015 Season B was 0.23 hectares (see Table 60).
The Stratum 3.0 had the largest average size of tract for Agricultural Operators (2.12 Ha) followed by Stratum 1.1 (0.22 Ha), Stratum 2.1 (0.18 Ha), Stratum 1.2 (0.18 Ha), and Stratum 2.2(0.13 Ha)

Table 60. Average Size of Tract by Stratum

Strata	Average (Ha)
1.1	0.22
1.2	0.18
2.1	0.18
2.2	0.13
3.0	2.12
All Rwanda	0.23

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The average size of crop area was below 0.10 Ha with the exception of Pyrethrum (0.17 Ha). Fallow land in Segments had an average size of 0.11hectares whereby the Stratum 3.0 has the largest fallow land average size of 0.27 Hectares.

Table 61.Average Size of crop area per Agricultural Operators (Ha)

crop / Strata	1.1	1.2	2.1	2.2	3.0	Average Size
Maize	0.04	0.05	0.05	0.04	0.14	0.04
Paddy rice	0.07	.	0.06	0.07	.	0.06
Sorghum	0.09	0.11	0.09	0.08	0.39	0.09
Wheat	0.07	0.09	.	0.09	.	0.08
Other cereals	0.01	.	.	.	.	0.01
Bush beans	0.07	.	0.07	0.04	0.25	0.07
Climbing beans	0.06	0.05	0.03	0.04	0.07	0.06
Peas	0.02	0.04	0.01	0.01	0.03	0.03
Other legumes & pulses	0.02	.	.	.	.	0.02
Cassava	0.06	0.02	0.04	0.03	0.15	0.06
Irish potatoes	0.04	0.12	0.04	0.03	0.12	0.06
Sweet potatoes	0.04	0.06	0.03	0.04	0.05	0.04
Yams	0.02	0.02	0.02	0.02	0.03	0.02
Taro	0.02	.	0.02	.	0.16	0.02
Tomotoes	0.04	0.06	0.07	0.05	0.11	0.05
White cabbage	0.02	0.03	0.04	0.04	0.15	0.02
Flower cabage	0.01	.	.	.	.	0.01
Onions	0.03	0.10	0.04	0.03	0.80	0.03
Carrots	0.02	0.03	0.03	0.02	.	0.02
Eggplant	0.02	0.02	0.03	0.04	0.04	0.02
Other seasonal vegetables	0.02	0.00	.	.	.	0.01
Other annual vegetables	0.01	0.02	.	.	.	0.01
Other perennial vegetables	0.02	.	.	.	.	0.02
Cooking Banana	0.05	0.01	0.05	0.07	0.12	0.05
Dessert banana	0.03	0.02	0.03	0.03	0.05	0.03
Banana for beer	0.06	0.03	0.05	0.06	0.07	0.06
Pineapple	0.05	.	0.01	0.02	0.09	0.05
Avocado	0.02	0.02	.	.	0.03	0.02
Passion fruits	0.03	0.02	0.05	.	0.01	0.03
Other fruits	0.04	.	0.14	.	0.10	0.05
Soya beans	0.03	0.01	0.05	0.05	3.20	0.04
Ground nuts	0.05	.	0.08	0.03	0.11	0.05
sun flower	0.01	.	0.02	0.00	0.01	0.01
coffee	0.04	.	0.04	0.05	0.03	0.04
Pyrethrum	.	0.17	.	.	.	0.17
Other seasonal crops	0.03	0.06	.	.	0.12	0.03
Other annual crops	0.05	0.02	0.01	0.34	0.03	0.05
Other perennial crops	0.13	0.20	0.06	0.19	.	0.14
Pasture	2.22	0.89	2.02	0.99	8.40	3.14
Fallow land	0.11	0.10	0.11	0.11	0.27	0.11
Non agriculture land	0.12	0.10	1.08	1.05	2.34	0.15

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For LSF, the average size of crop area were as follows: Paddy Rice (204.14 Ha), Soybeans (33.47 Ha) and Tomatoes (24.56Ha).

Table 62.Average Size of crop area per Large Scale Farmers (Ha)

Crops	Average Size
Maize	3.87
Paddy rice	198.63
Sorghum	2.75
Wheat	6.60
Other cereals	.57
Bush beans	8.69
Climbing beans	2.29
Peas	3.60
Cassava	1.56
Irish potatoes	4.95
Sweet potatoes	1.11
Tomotoes	47.94
White cabbage	8.89
Flower cabage	.03
Onions	2.07
Carrots	2.41
Eggplant	1.99
Cooking Banana	.99
Dessert banana	.72
Banana for beer	1.07
Pineapple	5.01
Avocado	4.01
Passion fruits	.71
Other fruits	.99
Soya beans	33.08
Ground nuts	1.42
sun flower	1.51
coffee	7.58
Pyrethrum	2.91
Black eggplants	.09
Sweet pepper	.76

Crops	Average Size
Pepper	10.88
Amaranths	.95
Celery	.03
Small red beans	.41
Sugar beet	.22
African cabbage	.14
French beans	.04
Napia grass	.99
Sugar cane	1.33
Fodder crop	6.76
Macadamia	3.99
Olive crop	10.63
Mango	1.78
Apple	2.58
Papaya	.09
Tree tomato	.91
Orange	2.03
Lemon	.16
Guava	.23
White Mulberry	4.07
Mucuna	1.33
Desmodium	.45
Millet	.06
Jatropha	94.84
Pumpkins	.34
Palm tree	46.64
Pasture land	37.55
Fallow land	21.15
Non agricultural	3.35
Taro	.60
Other seasonal vegetables	.10
Other perennial vegetables	.60
Other seasonal crops	.08
Other annual crops	3.39
Other perennial crops	27.16

5.3.2 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 63).

Table 63. Crops Yield by Stratum (Kg/Ha)

Crops	Strata					
	1.1	1.2	2.1	2.2	3.0	All Rwanda
Maize	1,082	757	639	970	881	1,036
Paddy rice	3,380		3,963	5,152		4,476
Sorghum	850	-	1,136	525	546	847
Wheat	765	414		-		709
Other cereals	323		57	-	-	303
Cassava	1,691	-	1,474	907	752	1,664
Sweet Potatoes	5,971	3,291	7,191	5,948	5,942	6,016
Irish Potatoes	4,083	8,509	2,616	2,094	3,774	5,675
Yams & Taro	3,592	9,066	4,841	2,757	2,360	3,718
Cooking Banana	3,361	9,172	1,950	1,382	2,750	3,331
Dessert banana	2,269	-	2,408	1,728	1,441	2,259
Banana for beer	2,481	803	3,200	2,033	3,211	2,489
Beans	821	1,076	720	646	744	817
Bush beans	750		635	638	742	747
Climbing beans	940	1,076	1,004	733	1,092	943
Peas	298	281	358	-	81	296
Groundnuts	379		80	-	439	371
Soya beans	376	-	459	474	220	387
Vegetables	9,625	2,860	7,599	12,314	446	8,725
Fruits	1,215	476	-	-	34	1,070

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5.3.3 Crop Production

The contribution of individual crop production by Stratum was calculated using the product of yield and area under the crop (see Table 64).

The share of crop production by groups of crops was significantly high for Tubers and Roots (41.4%) followed by Banana (27.2%) and Cereals (7.5%). Other crop groups contributed as follows: Legumes and Pulses (6.4%) and Vegetables and Fruits (4.4%).

The share of crop production for individual crops was highest for Cassava (16.2%) followed by Sweet Potatoes (12.9%), banana for beer (12.5%) and cooking banana (12.0%).

Table 64. Production of Main Crops (MT)

	Agricultural Operators						LSF	All Rwanda	
Crops \ Strata	1.1	1.2	2.1	2.2	3.0	S/Total_1	S/Total_2	Total	Percent
Cereals	**166,593**	**3,504**	**17,943**	**41,793**	**5,806**	**235,639**	**5,799.4**	**241,439**	**7.5**
Maize	64,785	2,989	2,533	690	2,359	73,356	1,418.7	74,775	2.3
Paddy rice	5,738	-	8,164	40,787	-	54,688	4,052.0	58,740	1.8
Sorghum	90,914	-	7,243	317	3,447	101,921	227.1	102,148	3.2
Wheat	4,607	515	-	-	-	5,122	101.0	5,223	0.2
Other cereals	549	-	3	-	-	552	0.6	552	0.0
Tubers and Roots	**1,088,214**	**182,808**	**52,746**	**2,681**	**7,592**	**1,334,041**	**2,450.0**	**1,336,491**	**41.4**
Cassava	507,815	-	8,902	265	5,039	522,021	194.0	522,215	16.2
Sweet Potatoes	380,586	2,288	30,505	1,933	1,151	416,464	228.8	416,693	12.9
Irish Potatoes	138,657	179,669	5,033	88	1,157	324,603	2,027.2	326,631	10.1
Yams & Taro	61,156	851	8,305	395	245	70,952	-	70,952	2.2
Banana	**857,335**	**564**	**7,158**	**287**	**12,460**	**877,804**	**1,048.2**	**878,852**	**27.2**
Cooking Banana	374,328	436	1,640	97	9,702	386,202	837.0	387,039	12.0
Dessert banana	88,202	-	933	22	396	89,552	117.9	89,670	2.8
Banana for beer	394,805	129	4,586	168	2,362	402,050	93.3	402,143	12.5
Legumes & Pulses	**188,163**	**2,045**	**5,927**	**617**	**6,688**	**203,440**	**1,810.7**	**205,251**	**6.4**
Beans	171,938	1,689	4,567	332	6,427	184,953	1,681.8	186,634	5.8
Bush beans	98,561	-	3,097	301	6,385	108,344	1,649.8	109,994	3.4
Climbing beans	73,377	1,689	1,470	31	42	76,608	32.0	76,640	2.4
Peas	3,654	356	19	-	9	4,038	23.9	4,062	0.1
Groundnuts	4,964	-	34	-	231	5,228	1.7	5,229	0.2
Soya beans	7,607	-	1,307	285	22	9,221	103.4	9,325	0.3
Vegetables and	**114,273**	**3,086**	**20,317**	**4,583**	**117**	**142,376**	**841.1**	**143,217**	**4.4**
Vegetables	102,101	2,798	20,317	4,583	94	129,893	703.9	130,597	4.0
Fruits	12,171	288	-	-	23	12,483	137.2	12,620	0.4
Other crops	**400,878**	**3,314**	**32,446**	**849**	**59**	**437,546**	12,356.5	**449,903**	**13.9**
All Rwanda	**2,773,429**	**198,568**	**133,822**	**55,304**	**38,185**	**3,199,308**	**26,235**	**3,225,543**	**100.0**

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Figure 8: Share of production by main crops (%)

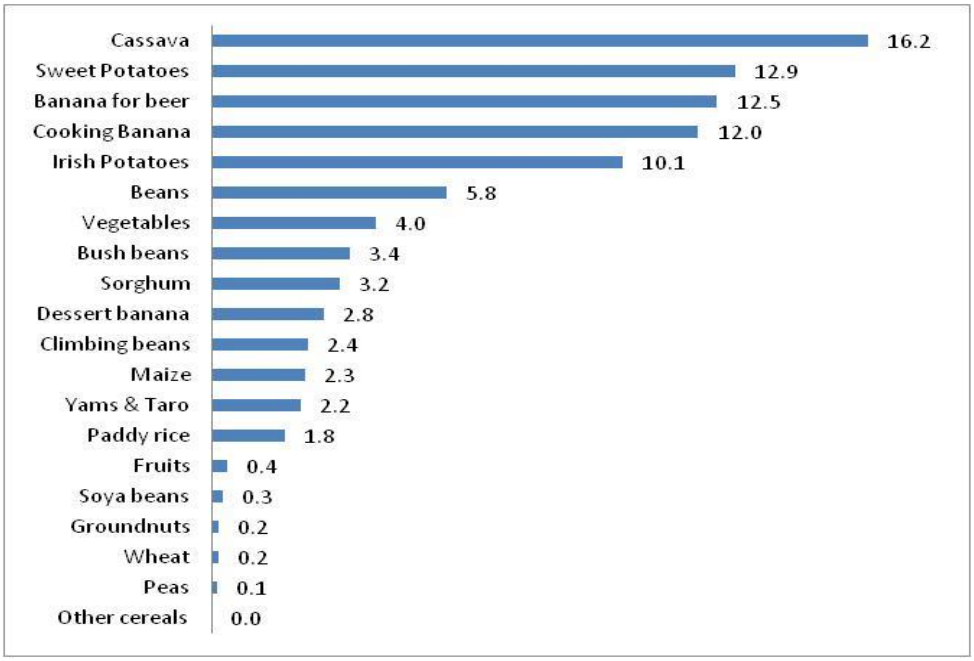
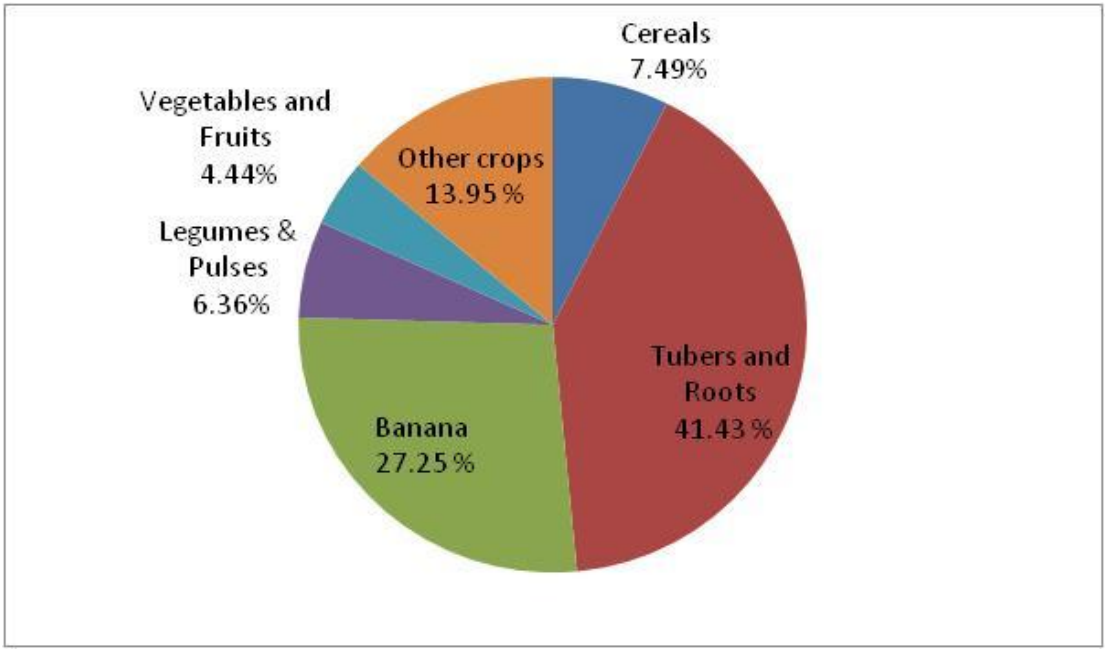


Figure 9: Share of production by group of crops (%)



5.4 Agricultural Practices

5.4.1 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 23.7 and 76.3 percent respectively (see Table 65). For LSF the share between pure stand and mixed stand was 75.4 and 24.6 percent respectively.

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.

Table 65. Share of Pure and Mixed Crop Agricultural Land (%)

	Strata	Pure Crop Land	Mixed Crop Land	Total
Agricultural Operators	**1.1**	21.4	78.6	100
	1.2	61.0	39.0	100
	2.1	47.8	52.2	100
	2.2	68.0	32.0	100
	3.0	28.8	71.2	100
	All Rwanda	23.7	76.3	100
LSF		75.4	24.6	100

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Table 66 shows the use of agricultural land for growing main crops in pure stand in the country. Stratum 1.1 used 25.7 percent of total land for pure stand in mainly Cassava cultivation followed by Banana (11.1%) and Climbing beans (10.6%). Stratum 1.2 used 66.0 percent of total land for pure stand cropping mainly for Irish Potatoes, Stratum 2.1 for Sorghum (17.6%), Stratum 2.2 used 74.3 percent of total land for pure cropping for Paddy rice and stratum 3.0 used 24.2 percent of total land for pure cropping for Sorghum.

Table 66. Distribution of Pure Crop Agricultural Land (Ha) in Segments by Type of Crop (%)

Strata \ Cro	Maize	Paddy rice	Sorghum	Cassava	Sweet potatoes	Irish potatoes	Banana	Bush beans	Climbing beans	Peas	Others	Total
1.1	3.3	0.5	7.7	25.7	9.8	6.1	11.1	5.5	10.6	1.0	18.8	100
1.2	5.2	-	0.3	0.0	2.0	66.0	-	-	3.1	1.5	21.9	100
2.1	2.8	10.0	17.6	8.7	13.4	7.8	1.8	5.2	3.6	0.1	29.0	100
2.2	0.5	74.3	4.7	1.9	4.8	0.2	0.3	1.0	0.1	0.0	12.1	100
3.0	3.6	-	24.2	11.6	0.5	0.3	3.5	11.1	-	-	45.2	100
All Rwanda	3.3	2.3	8.4	22.1	9.1	9.9	9.3	5.3	9.1	0.9	20.4	100

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5.4.2 Use of Organic Fertilizer

In segments, 43.1% of all Agricultural Operators in Rwanda reported that they used organic fertilizer. For LSF, 42.3 percent used organic fertilizer (see Table 67). Organic fertilizers were mostly used in Stratum 1.2 (48.6%) followed by Stratum 1.1 (43.2%), Stratum 2.1 (39.8%), Stratum 2.2(14.8%) and Stratum 3.0 (14.3%).

Table 67. Users of Organic Fertilizers (%)

	Strata	Used organic fertilizers
Agricultural Operators	1.1	43.2
	1.2	48.6
	2.1	39.8
	2.2	14.8
	3.0	14.3
	All Rwanda	43.1
LSF		42.3

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Most agricultural operators used organic fertilizer mainly to grow wheat, Climbing beans, Irish potatoes and peas (see table 68).

Table 68. Users of organic fertilizers by crops (%)

	Agricultural operators						LSF
Crop \ Strata	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	50.3	52.1	44.3	31.3	11.3	50.2	45.5
Paddy rice	14.3	0.0	4.3	2.3	0.0	10.9	51.5
Sorghum	42.2	0.0	29.4	11.9	9.4	42.0	34.1
Wheat	83.6	30.6	0.0	0.0	0.0	82.4	55.6
Bush Beans	47.7	0.0	39.4	44.0	11.4	47.6	45.3
Climbing beans	78.5	43.4	80.4	76.9	20.0	78.4	72.7
Peas	72.0	29.2	42.9	0.0	33.3	71.7	28.6
Cassava	39.8	0.0	26.6	31.3	16.2	39.7	35.0
Irish potatoes	72.3	61.6	83.3	45.5	12.1	72.0	68.0
Sweet potatoes	52.8	44.4	28.3	24.0	16.7	52.5	38.9
Taro	53.6	100.0	60.7	36.7	17.6	53.6	
Cooking banana	52.8	100.0	29.2	50.0	30.6	52.7	57.0
Banana for beer	46.7	100.0	40.0	25.0	17.9	46.7	47.1
Soybeans	55.2	0.0	46.9	35.6	20.0	55.0	42.9
Groundnuts	24.5	0.0	33.3	0.0	10.5	24.5	40.0
Vegetables	81.9	57.9	82.5	57.9	44.4	81.8	81.8
Fruits	52.0	66.7	53.8	33.3	29.6	52.0	61.5

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5.4.3 Use of Inorganic Fertilizers by Agricultural Operators and Large Scale Farmers

The survey results showed that 14.6 percent of Agricultural Operators used inorganic fertilizers while 51.5 percent of LSF used inorganic fertilizers during 2015 Season B (see Table 69). This shows that a larger proportion of LSF used inorganic fertilizer than Agricultural Operators during this agricultural season.

Table 69. Use of Inorganic Fertilizer (%)

	Strata	Used inorganic fertilizers
Agricultural Operators	**1.1**	14.2
	1.2	62.4
	2.1	17.9
	2.2	58.4
	3.0	3.3
	All Rwanda	14.6
LSF		51.5

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For Agricultural Operators in segments, DAP was highly used (38.2%) followed by UREA (30.8%) and NPK (29.6%) while UREA was the most highly used by LSF (35.4%) followed by NPK (31.4%) and DAP (25.1%).

Table 70. Users of Inorganic Fertilizers by Type and by Stratum (%)

	Strata	NPK	UREA	UREA (LIQUID)	DAP	OTHER Fertilizers	Total
Agricultural Operators	**1.1**	28.6	31.2	0.9	39.1	0.3	100
	1.2	73.6	9.1	3.5	13.6	0.3	100
	2.1	15.7	34.7	5.0	43.0	1.7	100
	2.2	45.7	44.6	2.0	7.2	0.4	100
	3.0	8.3	16.7	-	66.7	8.3	100
	All Rwanda	29.6	30.8	1.0	38.2	0.3	100
LSF		31.4	35.4	1.1	25.1	6.9	100

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In Stratum 2.1 and Stratum 3.0, the survey showed that DAP was highly used by 43.0 and 66.7 percent of all agricultural operators within the Stratum respectively and NPK was highly used in Stratum 1.2 and 2.2 by 73.6 and 45.7 percent of all agricultural operators within the Stratum. UREA was also ranked first in the Strata 2.2 and 2.1 (44.6% and 34.7% respectively).

Agricultural operators used inorganic fertilizers mostly on paddy rice (61.5%), Wheat (39.7%), vegetables (39.4%) and Irish potatoes (23.1%). The use of inorganic fertilizers by LSF was also important on paddy rice (100%) followed by Wheat (66.7%) and climbing beans (63.6%).

Table 71. Users of inorganic fertilizers by crops (%)

Crops \ Strata	Agricultural operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	11.0	7.4	11.4	32.8	0.0	11.0	27.3
Paddy rice	64.3	0.0	4.3	79.3	0.0	61.5	100.0
Sorghum	5.0	0.0	0.0	0.0	2.8	4.9	4.5
Wheat	40.3	13.9	0.0	0.0	0.0	39.7	66.7
Bush Beans	4.4	0.0	8.3	20.0	0.0	4.4	22.1
Climbing beans	13.2	6.0	50.0	46.2	0.0	13.4	63.6
Peas	9.2	12.5	14.3	0.0	0.0	9.2	14.3
Cassava	1.0	0.0	1.8	0.0	0.0	1.0	6.7
Irish potatoes	21.4	79.0	25.0	0.0	0.0	23.1	48.0
Sweet potatoes	0.2	0.0	0.6	0.0	0.0	0.2	5.6
Taro	1.1	0.0	3.4	2.0	0.0	1.1	
Cooking banana	0.4	0.0	4.2	0.0	0.0	0.4	2.5
Banana for beer	0.3	0.0	0.0	0.0	0.0	0.3	0.0
Soybeans	3.8	0.0	7.3	26.0	0.0	3.9	42.9
Groundnuts	1.9	0.0	0.0	0.0	0.0	1.9	5.0
Vegetables	39.0	36.8	59.6	68.4	66.7	39.4	45.5
Fruits	1.5	16.7	0.0	0.0	0.0	1.5	11.5

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5.4.4 Use of Seeds

In Rwanda, Agricultural Operators used more traditional seeds (88.4%) than improved seeds (11.6%). The same to LSF, the use of traditional seeds was more than the use of improved seeds 60.2 and 39.8 respectively.

For Agricultural Operators, Stratum 3.0 had the largest share of users of traditional seeds (98.5%) and stratum 1.2 had the largest share of users of improved seeds (14.4%).

Table 72. Agricultural Operators by Type of Seeds Used (%)

	Strata	Traditional seeds	Improved seeds
Agricultural Operators	**1.1**	88.4	11.6
	1.2	85.6	14.4
	2.1	89.9	10.1
	2.2	89.7	10.3
	3.0	98.5	1.5
	All Rwanda	88.4	11.6
LSF		60.2	39.8

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The table 73 shows that traditional seeds were used for almost all crops by Agricultural operators as well as by LSF.

Table 73. Users of Traditional Seeds by Type of Crop (%)

	Agricultural operators						LSF
Crops \ **Strata**	**1.1**	**1.2**	**2.1**	**2.2**	**3.0**	**All Rwanda**	
Maize	88.5	73.9	90.5	98.5	100.0	88.5	69.7
Sorghum	99.9	0.0	100.0	100.0	100.0	99.9	95.5
Wheat	83.6	94.4	0.0	0.0	0.0	83.8	55.6
Bush Beans	99.4	0.0	96.2	96.0	100.0	99.4	73.7
Climbing beans	99.6	98.8	100.0	100.0	100.0	99.6	36.4
Peas	99.3	100.0	85.7	0.0	100.0	99.3	85.7
Cassava	99.8	0.0	100.0	100.0	100.0	99.8	91.7
Irish potatoes	98.9	99.0	100.0	100.0	100.0	98.9	76.0
Sweet potatoes	99.8	100.0	99.4	100.0	95.8	99.7	94.4
Taro	99.6	100.0	100.0	100.0	100.0	99.6	
Cooking banana	99.4	100.0	100.0	100.0	100.0	99.4	74.7
Banana for beer	99.4	100.0	100.0	100.0	96.4	99.4	70.6
Soybeans	98.8	0.0	93.8	90.4	100.0	98.7	44.8
Groundnuts	100.0	0.0	100.0	100.0	100.0	100.0	90.0
Vegetables	75.1	26.3	59.6	52.6	66.7	74.6	31.8
Fruits	97.5	83.3	100.0	100.0	96.3	97.5	55.8

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The results showed that improved seeds were used mostly on Vegetables (29.5%), wheat (19.2) and Maize (12.2%) by Agricultural operators. The remaining crops had

a small percentage of users of improved seeds.LSF used improved seeds mostly on Vegetables (81.8%), Climbing beans(63.6) and Soybeans (62.1%).

Table 74. Users of Improved Seeds by Type of Crop (%)

Crops \ Strata	Agricultural operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	12.2	29.8	8.9	1.5	0.0	12.2	34.8
Wheat	19.4	8.3	0.0	0.0	0.0	19.2	44.4
Bush Beans	0.8	0.0	4.5	4.0	0.0	0.8	29.5
Climbing beans	0.4	1.2	0.0	0.0	0.0	0.4	63.6
Peas	0.3	0.0	0.0	0.0	0.0	0.3	14.3
Cassava	0.2	0.0	0.0	0.0	0.0	0.2	10.0
Irish potatoes	1.1	1.0	0.0	0.0	0.0	1.1	28.0
Sweet potatoes	0.0	0.0	0.6	0.0	0.0	0.0	5.6
Taro	0.0	0.0	0.0	0.0	0.0	0.0	
Cooking banana	0.5	0.0	0.0	0.0	0.0	0.5	29.1
Banana for beer	0.5	0.0	0.0	0.0	3.6	0.5	29.4
Soybeans	0.9	0.0	6.3	11.0	0.0	1.1	62.1
Vegetables	28.9	73.7	49.1	55.3	33.3	29.5	81.8
Fruits	3.0	16.7	0.0	0.0	3.7	3.0	53.8

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5.4.5 Irrigation Practice

In Rwanda only 1.5% of Agricultural Operators practiced irrigation in 2015 Season B while for LSF 28.4 practiced irrigation during their farming activities. The few Agricultural Operators that practiced irrigation were in the Stratum 2.2 (61.4%), Stratum 2.1 (10%), Stratum 3.0 (2.9%) and Stratum 1.1 (1.3%).

Table 75. Agricultural Operators and Large Scale Farmers Practicing Irrigation (%)

	Strata	Practised Irrigation
Agricultural Operators	1.1	1.3
	1.2	-
	2.1	10.0
	2.2	61.4
	3.0	2.9
	All Rwanda	1.5
LSF		28.4

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On the type of irrigation used by Agricultural Operators, the survey results showed that the majority of Agricultural Operators used Watering Can (63.7%) for irrigation followed by pumps/tube/wells/irrigation machines (see Table 76).

Use of water channels for irrigation was predominantly in Stratum 2.2 (90.4%). There was no use of Pumps/Tube wells/Irrigation machines by Agricultural Operators in strata2.1 and 2.2.

Table 76. Agricultural Operators and LSF by Type of Irrigation Practiced (%)

	Strata	Pumps/tube wells/irrigation machines	Watering can	Water channels	Others	Total
Agricultural Operators	1.1	13.2	67.9	3.8	15.1	100
	1.2	-	-	-	-	100
	2.1	5.8	67.3	5.8	21.2	100
	2.2	-	8.5	90.4	1.1	100
	3.0	37.5	62.5	-	-	100
	All Rwanda	11.8	63.7	10.0	14.5	100
LSF		18.0	18.0	59.0	4.9	100

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Most of the LSF in Rwanda practiced the water channels type of irrigation (59.0%), pumps/tube/wells/irrigation machines and Watering can (18.0%) types of irrigation.

Table 77. Practice of irrigation by crop (%)

Crops \ Strata	Agricultural operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	0.2	0.0	4.4	4.5	0.0	0.3	4.5
Paddy rice	100.0	0.0	100.0	100.0	0.0	100.0	100.0
Sorghum	0.0	0.0	0.0	4.8	0.0	0.0	0.0
Bush Beans	0.1	0.0	1.5	4.0	0.0	0.1	5.3
Cassava	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Irish potatoes	0.0	0.0	14.3	0.0	0.0	1.0	0.0
Sweet potatoes	0.1	0.0	0.9	0.0	0.0	0.0	0.0
Taro	0.2	0.0	0.0	0.0	0.0	0.5	4.0
Cooking banana	0.4	0.0	2.2	12.2	0.0	14.8	
Soybeans	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Groundnuts	0.0	0.0	1.0	1.4	0.0	0.5	21.4
Vegetables	1.0	0.0	0.0	0.0	0.0	20.9	0.0
Fruits	16.1	0.0	68.4	71.1	88.9	0.9	50.0

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5.4.6 Anti-erosive Activities

Erosion refers to the process in which the topsoil is worn away. Due to the mountainous landscape of Rwanda, most of the Agricultural Operators practice anti-erosion activities to prevent the wasting away of earth.

Anti-erosion was practised by 65.2 percent of Agricultural Operators and 53.1% of LSF in season 2015 B. Most of the anti-erosion activities were practised by Agricultural Operators in the Stratum 2.2 (84.4%), followed by Stratum 1.2 (83.7%), Stratum 2.1 (72.5%), Stratum 1.1 (64.9%) and Stratum 3.0 (10.1%)

Table 78. Anti-erosive Activities by Agricultural Operators and Large Scale Farmers (%)

	Strata	Practised Anti-erosion
Agricultural Operators	1.1	64.9
	1.2	83.7
	2.1	72.5
	2.2	84.4
	3.0	10.1
	All Rwanda	65.2
LSF		53.1

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The Survey shows that in Rwanda the most practiced erosion control measures by Agricultural Operators in all Strata were Grasses (67.3%) and Progressive Terracing (10.3%) followed by Ditches (9.2%) (See Table 79). Other erosion control measures such as planting of trees, radical terracing, waterway and mulching were also practiced by a small number of Agricultural Operators.

Table 79. Anti-erosive Activities by Agricultural Operators and LSF (%)

	Strata	Ditches	Trees	Radical Terracing	Progressive terracing	Grasses	Water drainage	Mulching	Beds	Other	Total
Agricultural Operators	**1.1**	9.3	2.9	4.9	10.5	68.3	0.4	1.0	2.7	0.0	100
	1.2	13.3	1.5	2.5	0.4	24.9	0.0	-	57.4	-	100
	2.1	1.9	0.4	0.1	0.1	25.3	43.8	0.4	27.9	-	100
	2.2	0.2	-	1.5	0.1	4.6	70.0	0.6	18.9	4.1	100
	3.0	15.6	9.4	-	-	48.2	-	23.2	2.2	1.4	100
	All Rwanda	9.2	2.8	4.8	10.3	67.3	1.2	1.0	3.4	0.1	100
LSF		18.9	7.6	8.5	4.2	28.0	13.7	15.1	3.6	0.4	100

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The anti-erosion activities were generally for all cropland. With regards to cropland for paddy rice, Irish potatoes, peas, wheat, climbing beans, and vegetables, where more than 80.0% of agricultural operators reported that their plots are protected against erosion (see table 80).

Table 80. Practice of anti-erosive activities by crops (%)

Crops \ Strata	Agricultural operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	74.8	98.9	68.4	37.3	18.9	74.8	34.8
Paddy rice	100.0	0.0	100.0	96.5	0.0	99.3	97.0
Sorghum	77.8	0.0	55.9	76.2	5.7	77.5	22.7
Wheat	88.1	97.2	0.0	0.0	0.0	88.3	88.9
Bush Beans	71.8	0.0	63.6	62.0	21.0	71.7	40.0
Climbing beans	82.6	95.2	85.7	69.2	20.0	82.7	72.7
Peas	89.1	93.8	71.4	0.0	33.3	89.1	42.9
Cassava	72.3	0.0	67.9	59.4	19.8	72.2	31.7
Irish potatoes	86.5	98.0	77.8	81.8	24.2	86.8	68.0
Sweet potatoes	79.6	77.8	81.8	76.0	8.3	79.6	22.2
Taro	73.6	50.0	79.8	79.6	64.7	73.7	
Cooking banana	76.0	50.0	54.2	12.5	39.8	75.9	59.5
Banana for beer	73.2	100.0	60.0	25.0	60.7	73.2	52.9
Soybeans	74.9	0.0	71.9	60.3	0.0	74.8	69.0
Groundnuts	69.7	0.0	75.0	100.0	0.0	69.7	25.0
Vegetables	80.7	100.0	87.7	84.2	22.2	80.9	45.5
Fruits	76.0	83.3	76.9	66.7	63.0	76.0	59.6

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5.4.7 Use of Pesticides

The survey results showed that in Rwanda 7.9 percent of Agricultural Operators used pesticides in their farming activities while 32.9% of LSF used pesticides in the farming activities (see Table 81).

Among all Agricultural Operators, those in Stratum 1.2 were the best users of pesticides (67.0%) followed by the ones in Stratum 2.2 (36.5%), Stratum 2.1 (9.8%), Stratum 1.1(7.6%) and Stratum 3.0 (2.6%).

Table 81. Agricultural Operators and LSF using Pesticide (%)

	Strata	Used Pesticides
Agricultural Operators	1.1	7.6
	1.2	67.0
	2.1	9.8
	2.2	36.5
	3.0	2.6
	All Rwanda	7.9
LSF		32.9

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Dithane was the highly used pesticide by Agricultural Operators of the Strata 1.1 and 1.2 while the Cypermetrine was the mostly used pesticides by Agricultural Operators of the Strata 2.1, 2.2 and 3.0 and Ridomil was predominantly used in Stratum 1.2. Countrywide, for Agricultural Operators, survey showed that Dithane is the most used pesticide (43.8%) followed by Cypermetrine (30.7%) while the majority of LSF used Cypermetrine pesticide (38.7%), followed by Dithane pesticide (16.1%), Ridomil pesticide (8.0%), Dimethoate pesticide (5.8%), and Dursiban (2.9%).

Table 82.Type of Pesticide used by Agricultural operators and LSF

	Strate	DITHANE	RIDOMIL	DIMETHOATE	CYPERMETRINE	DURSIBAN	TILT	OTHER PESTICIDE	Total
Agricultural Operators	11	44.6	7.0	7.3	32.5	0.5		8.1	100
	12	45.2	31.5	19.6	3.5	-		0.1	100
	21	11.9	4.5	22.4	49.3	1.5		10.4	100
	22	5.0	-	3.3	57.4	0.4		33.9	100
	30	16.7	-	25.0	41.7	-		16.7	100
	All Rwanda	43.8	8.8	8.4	30.7	0.5		7.7	100
LSF		16.1	8.0	5.8	38.7	2.9	-	28.5	100

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The survey results showed that agricultural operators used pesticides mostly on paddy rice (41.3%), vegetables (36.3%), and Irish potatoes (22.0%). The use of pesticides by LSF was considerably high on Paddy rice (90.9%) and vegetables (77.3%).

Table 83. Users of pesticides by crops (%)

Crops \ Strata	Agricultural operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	0.8	1.6	5.1	3.0	0.0	0.8	7.6
Paddy rice	42.9	0.0	8.7	51.6	0.0	41.3	90.9
Wheat	1.5	2.8	0.0	0.0	0.0	1.5	22.2
Bush Beans	0.8	0.0	0.8	0.0	0.0	0.8	9.5
Climbing beans	4.1	4.8	7.1	0.0	0.0	4.1	45.5
Peas	4.9	6.3	14.3	0.0	0.0	5.0	28.6
Cassava	0.0	0.0	0.9	0.0	0.0	0.0	5.0
Irish potatoes	20.1	86.6	0.0	0.0	0.0	22.0	40.0
Sweet potatoes	0.1	0.0	0.6	4.0	0.0	0.1	5.6
Taro	0.2	0.0	1.1	0.0	0.0	0.2	
Cooking banana	0.1	0.0	4.2	0.0	0.0	0.1	0.0
Banana for beer	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Soybeans	0.2	0.0	1.0	4.1	0.0	0.3	20.7
Groundnuts	0.0	0.0	0.0	0.0	0.0	0.0	5.0
Vegetables	35.7	57.9	59.6	60.5	77.8	36.3	77.3
Fruits	1.1	33.3	0.0	0.0	0.0	1.1	23.1

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5.5 Small Agricultural Equipment

The survey results showed that countrywide, most of the expenditure by Agricultural Operators was on the Hoe (29.3%) followed by bike (12.4%) and Sheeting (8.8%) (See Table 84). The expenditures on the other tools that were used for cultivation by Agricultural Operators were below 10 % of the total expenditure. For LSF, the expenditure was mainly on sacks and sheeting. See table 84.

Table 84.Expenditure by Type of Small Agricultural Equipment (%)

Small Agricultural Equipment	Agricultural Operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Hoe	29.4	29.2	25.9	26.8	19.4	29.3	11.8
Spring Hoe	1.4	0.4	0.4	0.8	0.5	1.3	0.0
Fork hoe	7.4	2.7	3.0	1.6	7.0	7.3	0.7
Rake	0.0	-	-	-	-	0.0	0.0
Pick/ Ipiki	1.0	0.6	0.4	0.2	0.8	1.0	0.0
Wheelbarrow	1.4	-	-	0.1	-	1.3	0.3
Shovel/igitiyo	0.9	0.2	0.6	1.3	0.4	0.9	2.2
Watering pump	0.5	0.1	13.8	-	-	0.7	0.4
Sprayer	2.3	33.8	5.7	2.8	2.5	2.5	4.7
Watering can	0.7	0.1	2.0	2.1	0.4	0.7	0.1
Scie	0.0	0.0	-	-	-	0.0	0.1
Sickle	2.6	0.7	1.8	2.4	0.5	2.6	2.6
Secataur	0.1	-	-	0.1	-	0.1	0.1
Scythe	0.2	-	0.0	0.1	0.5	0.2	0.0
Machete	4.1	3.0	3.1	2.8	3.7	4.1	2.2
Billhook	0.1	0.1	0.0	-	-	0.1	0.0
Basket	3.3	1.4	2.5	1.8	0.8	3.3	0.0
Sack	8.2	13.1	5.5	9.2	10.4	8.2	35.0
Big basket	0.1	-	0.1	-	-	0.1	0.0
Winnower	2.5	0.4	1.6	3.4	3.8	2.5	2.7
Basket(ikibo)	0.9	0.3	-	0.1	0.1	0.9	0.2
Basket(inkangara)	0.1	0.0	-	-	-	0.1	-
Scale	1.4	0.2	0.8	2.0	1.2	1.4	0.3
Jerry-can	3.0	3.1	1.7	1.5	2.7	2.9	0.1
Barrel	1.0	-	3.2	4.2	1.1	1.1	0.1
Bike	12.4	1.2	13.8	14.4	20.8	12.4	1.1
Craft bike							-
Bowl	0.6	0.2	0.2	0.2	0.7	0.6	0.1
Sheeting	8.8	1.9	8.7	16.8	19.0	8.8	33.0
Hoe sleeve	3.6	6.8	2.9	3.2	3.0	3.6	1.5
Others (Specify)	2.0	0.3	2.1	2.3	0.6	2.0	0.5
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**

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The survey results showed on the value of donations received by Agricultural Operators, Hoe (69.9%) was the largest donation followed by fork hoe and Jerry can (13.9% respectively). For LSF the largest donation was big basket (96.77%) followed by sheeting (2.58%).

Table 85. Value of Small Equipment Received from Non Agricultural Donors (%)

	11	12	21	22	30	Total	LSF
Hoe	69.8	-	-	100.0	-	69.9	-
Spring Hoe	-	-	-	-	-	-	-
Fork hoe	14.0	-	-	-	-	13.9	-
Rake	-	-	-	-	-	-	-
Pick/ Ipiki	-	-	-	-	-	-	-
Wheelbarrow	-	-	-	-	-	-	-
Shovel/igitiyo	-	-	-	-	-	-	-
Watering pump	-	-	-	-	-	-	-
Crops Sprayer	-	-	-	-	-	-	-
Watering can	-	-	-	-	-	-	0.65
Scie	-	-	-	-	-	-	-
Sickle	2.2	-	-	-	-	2.2	-
Secataur	-	-	-	-	-	-	-
Scythe	-	-	-	-	-	-	-
Machete	-	-	-	-	-	-	-
Billhook	-	-	-	-	-	-	-
Basket	-	-	-	-	-	-	-
Sack	-	-	-	-	-	-	96.77
Big basket	-	-	-	-	-	-	-
Winnower	-	-	-	-	-	-	-
Basket(ikibo)	-	-	-	-	-	-	-
Basket(inkangara)	-	-	-	-	-	-	-
Scale	-	-	-	-	-	-	-
Jerry-can	14.0	-	-	-	-	13.9	-
Barrel	-	-	-	-	-	-	-
Bike	-	-	-	-	-	-	-
Craft bike	-	-	-	-	-	-	-
Bowl	-	-	-	-	-	-	-
Sheeting	-	-	-	-	-	-	2.58
Hoe sleeve	-	-	-	-	-	-	-
Others (Specify)	-	-	-	-	-	-	-
	100.0	-	-	100.0	-	100.0	100.00

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

Clearly the majority of the crop production was consumed by the agricultural operator households (auto consumption). The rest of the crop production for some crops was sold, offered as gifts to others, used as seeds or stored. A small

percentage of the crop production for some crops was used for payment of hired labour.

With respect to LSF, a substantial percentage of the production was sold. The rest of the crop production for some crops was consumed by the household, 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 86 and 87.

Table 86. Use of Production by Agricultural Operators (%)

	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	Used as fodder	Damaged	Used in any other way	Total
Maize	8.0	.1	85.0	.3	.3	2.0	.1	3.9	.2	.0	.2	100
Paddy rice	70.9	.0	24.1	.9	.1	1.7	.1	2.2	.0	.0	.1	100
Sorghum	32.2	1.4	54.0	.4	.5	4.0	.1	7.1	.1	.1	.0	100
Wheat	32.4	.0	52.1	.0	.0	4.3	.0	11.1	.0	.0	.1	100
Other cereals	30.0	.0	50.0	.0	.0	.0	.0	20.0	.0	.0	.0	100
Bush beans	12.4	.3	73.2	.5	.2	1.9	.2	11.1	.0	.0	.1	100
Climbing beans	9.1	.3	72.6	.2	.1	3.2	.1	14.4	.0	.1	.0	100
Peas	11.1	.0	73.9	.0	.0	.5	.1	14.4	.0	.0	.0	100
Cassava	.0	.0	100.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Irish potatoes	15.5	.2	80.0	.7	.3	2.9	.0	.0	.1	.2	.1	100
Sweet potatoes	21.7	.1	62.5	.5	.0	3.1	.1	11.8	.0	.2	.0	100
Tomotoes	13.2	.0	80.3	1.0	.2	3.3	.1	.0	1.8	.1	.0	100
White cabbage	72.2	.0	18.6	.1	.0	6.9	.0	.5	.0	1.7	.0	100
Onions	58.8	.0	36.2	.5	.0	4.1	.0	.0	.3	.0	.0	100
Carrots	.0	.0	50.0	.0	.0	50.0	.0	.0	.0	.0	.0	100
Eggplant	62.0	4.0	24.7	.0	.0	2.3	.0	7.1	.0	.0	.0	100
Cooking Bananas	67.2	.0	30.1	.0	.0	2.7	.0	.0	.0	.0	.0	100
Dessert banana	45.7	.0	48.1	.0	.0	6.0	.0	.1	.0	.0	.0	100
Banana for beer	19.0	.0	77.2	.6	.1	2.2	.1	.0	.0	.3	.5	100
Pineapple	59.6	.0	38.4	.0	.0	1.2	.2	.0	.0	.0	.6	100
Avocado	70.2	.0	26.9	.0	.0	2.5	.0	.0	.0	.2	.1	100
Passion fruits	29.2	.0	63.9	.0	.0	2.5	.0	.0	.0	.0	4.3	100
Soya beans	51.2	.0	43.3	.0	.0	5.5	.0	.0	.0	.0	.0	100
Ground nuts	84.7	.0	12.0	.0	.0	2.9	.0	.0	.0	.4	.0	100
sun flower	10.5	.1	73.5	.2	.2	1.3	.3	13.8	.0	.0	.1	100
coffee	16.5	1.2	60.2	.1	.0	1.1	.0	20.8	.0	.0	.0	100
Pyrethrum	6.4	.4	82.2	.0	.0	.8	.0	10.2	.0	.0	.0	100
Black eggplants	99.4	.0	.3	.0	.0	.3	.0	.0	.0	.0	.0	100
Sweet pepper	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Pepper	73.3	.0	21.2	.0	.0	3.8	.0	1.8	.0	.0	.0	100
Amaranths	92.3	.0	2.1	.0	.0	4.2	.0	.0	.0	1.4	.0	100
Celery	43.4	1.3	50.4	.0	.0	4.5	.2	.0	.0	.2	.0	100
Spinach	98.0	.0	.0	.0	.0	2.0	.0	.0	.0	.0	.0	100
Small red beans	.0	.0	50.0	.0	.0	.0	.0	50.0	.0	.0	.0	100
Sugar beet	93.3	.0	6.8	.0	.0	.0	.0	.0	.0	.0	.0	100
Garlic	56.9	.0	7.3	.0	.0	.0	.0	.0	.0	.0	35.8	100
Leeks	42.7	.0	57.3	.0	.0	.0	.0	.0	.0	.0	.0	100

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Use of Production by Agricultural Operators (%) (Cont).

	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	Used as fodder	Damaged	Used in any other way	Total
French beans	43.2	.0	54.1	.0	.0	2.7	.0	.0	.0	.0	.0	100
Napia grass	25.0	.0	.0	.0	.0	.0	.0	.0	3.8	.0	71.3	100
Sugar cane	54.9	.0	37.5	.0	.0	6.8	.0	.0	.0	.8	.0	100
Fodder crop	4.0	.5	.0	.0	.0	1.1	1.6	1.9	90.8	.0	.1	100
Mango	38.8	.0	60.4	.0	.0	.9	.0	.0	.0	.0	.0	100
Papaya	50.0	.0	50.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Tree tomato	65.5	.0	24.2	.0	.0	.0	.0	.0	.0	.0	10.3	100
Orange	88.0	.0	10.0	.0	.0	2.0	.0	.0	.0	.0	.0	100
Lemon	70.0	.0	20.0	.0	.0	10.0	.0	.0	.0	.0	.0	100
Guava	60.0	.0	15.0	.0	.0	5.0	.0	.0	.0	20.0	.0	100
Millet	.0	.0	90.0	.0	.0	.0	.0	10.0	.0	.0	.0	100
Pumpkins	18.7	.0	74.9	.0	.0	6.3	.0	.1	.0	.0	.0	100
Cucumber	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Taro	8.9	.0	85.3	.4	.1	2.6	.0	2.3	.1	.1	.3	100
Yams	11.9	.0	80.8	.0	.0	2.8	.0	4.2	.0	.0	.3	100
Other annual vegeta	.0	.0	91.7	.0	.0	8.3	.0	.0	.0	.0	.0	100
Other seasonal crop	73.3	.0	25.0	.0	.0	1.7	.0	.0	.0	.0	.0	100
Other annual crops	42.4	.0	.3	.0	.0	.1	.0	.0	.0	.0	57.1	100

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Table 87. Use of Production by Large Scale Farmer (%)

	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	Used as fodder	Damaged	Used in any other way	All Rwanda
Maize	64.4	.0	22.7	1.3	.0	1.6	.0	5.1	4.5	.1	.3	100
Paddy rice	84.5	.0	14.1	.9	.0	.0	.0	.4	.0	.1	.0	100
Sorghum	88.6	.0	8.1	.0	.0	.0	.0	3.3	.0	.0	.0	100
Wheat	79.0	.0	15.9	.0	.0	.8	.0	4.3	.0	.0	.0	100
Bush beans	49.3	.3	37.1	1.0	.3	1.0	.0	10.7	.0	.1	.1	100
Climbing beans	58.6	.8	22.8	.0	.0	.5	.0	17.4	.0	.0	.0	100
Peas	55.8	.0	27.9	.0	.0	2.5	1.4	12.3	.0	.0	.0	100
Cassava	37.8	.0	47.6	9.1	.0	.2	.0	.0	5.3	.0	.0	100
Irish potatoes	54.0	.3	37.8	.7	.0	1.0	.0	4.9	.0	.4	.9	100
Sweet potatoes	34.2	.0	52.0	5.4	.0	1.5	.0	.0	6.9	.0	.0	100
Tomotoes	71.7	.0	28.3	.0	.0	.0	.0	.0	.0	.0	.0	100
White cabbage	55.9	.0	40.9	.0	.0	.9	.0	.0	.0	2.3	.0	100
Flower cabage	.0	.0	.0	.0	.0	.0	.0	.0	.0	100.0	.0	100
Onions	82.9	.0	17.1	.0	.0	.0	.0	.0	.0	.0	.0	100
Carrots	95.0	.0	.0	.0	.0	5.0	.0	.0	.0	.0	.0	100
Eggplant	82.1	.0	15.7	.0	.0	2.1	.0	.0	.0	.0	.0	100
Cooking Bananas	44.2	.0	53.3	.5	.0	1.4	.0	.0	.0	.7	.0	100
Dessert banana	80.9	.0	16.2	.0	.0	.2	.0	.0	.0	2.7	.0	100
Banana for beer	82.1	.0	9.7	.0	.0	2.9	.0	.0	.0	5.3	.0	100
Pineapple	87.9	.0	6.4	.0	.0	5.7	.0	.0	.0	.0	.0	100
Avocado	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Other fruits	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Soya beans	55.2	5.9	13.1	.0	.0	.0	.0	14.3	11.6	.0	.0	100
Ground nuts	29.5	.0	48.0	.9	.0	5.1	.6	15.8	.0	.0	.0	100
sun flower	.0	.0	.0	.0	.0	.0	.0	100.0	.0	.0	.0	100
coffee	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100

2015 Seasonal Agriculture Survey - Season B

Use of Production by Large Scale Farmer (%) (Cont.)

	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	Used as fodder	Damaged	Used in any other way	All Rwanda
Pyrethrum	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Black eggplants	70.0	.0	30.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Sweet pepper	77.6	.0	18.9	.0	.0	2.3	.0	1.3	.0	.0	.0	100
Pepper	98.0	.0	1.5	.0	.0	.5	.0	.0	.0	.0	.0	100
Amaranths	24.3	.0	67.5	.0	.0	8.3	.0	.0	.0	.0	.0	100
Celery	90.0	.0	5.0	.0	.0	5.0	.0	.0	.0	.0	.0	100
Spinach	.0	.0	100.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Small red beans	13.3	.0	73.3	.0	.0	.0	.0	13.3	.0	.0	.0	100
Sugar beet	53.1	.0	36.1	.0	.0	10.8	.0	.0	.0	.0	.0	100
Garlic	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Leeks	30.4	3.6	63.0	.0	.0	3.0	.0	.0	.0	.0	.0	100
French beans	78.7	.0	18.3	.0	.0	3.0	.0	.0	.0	.0	.0	100
Lettuce	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Napia grass	.0	.0	.0	.0	.0	.0	.0	.0	5.0	.0	95.0	100
Sugar cane	34.1	.0	58.6	.0	.0	7.2	.0	.0	.0	.0	.0	100
Fodder crop	10.4	.0	.0	.5	.0	1.4	.8	1.8	84.9	.0	.1	100
Macadamia	.0	.0	.0	.0	.0	70.0	.0	.0	.0	.0	30.0	100
Mango	25.9	.0	57.4	.0	.0	12.8	.2	.0	.0	.0	3.7	100
Papaya	70.0	.0	20.0	.0	.0	10.0	.0	.0	.0	.0	.0	100
Tree tomato	68.0	.0	20.7	.0	.0	2.2	.0	.0	.0	5.5	3.6	100
Orange	.0	.0	50.0	.0	.0	50.0	.0	.0	.0	.0	.0	100
Lemon	37.0	.0	26.1	.0	.0	37.0	.0	.0	.0	.0	.0	100
Guava	59.0	.0	41.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Millet	16.5	1.4	59.9	2.5	.0	2.5	5.8	11.3	.0	.0	.0	100
Pumpkins	10.5	.0	77.1	.0	.0	9.8	.0	.5	.0	1.1	1.0	100
Cucumber	99.0	.0	1.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Taro	13.9	.0	81.3	.9	.0	3.1	.0	.3	.0	.0	.5	100
Yams	33.4	.0	61.1	.0	.0	2.4	.0	3.2	.0	.0	.0	100
Other annual vegetables	25.0	.0	65.0	.0	.0	10.0	.0	.0	.0	.0	.0	100
Other perennial vegetables	.0	.0	100.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Other seasonal crops	.0	.0	100.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Other annual crops	76.7	.0	1.1	.0	.0	.0	.0	.0	.0	.0	22.2	100
Other perennial crops	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100

2015 Seasonal Agriculture Survey - Season B

Chapter 6: Results of the 2015 Season C

Details of demographic information, use of inputs, other agricultural practices, and production aspects are captured in phase II as described above.

A sample of 644 out of 9,387 Agricultural Operators was interviewed

6.1 Demographic and Social Characteristics of Agricultural Operators

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

6.1.1 Agricultural Operators by Stratum

The distribution of Agricultural Operators (in segments) was highest in Stratum 1.2 (58.2%), followed by Stratum 2.1 (30.0%).

Table 88. Agricultural Operators by Stratum

	Strata	Total	
		Number	%
Agricultural Operators	12	375	58.2
	21	193	30.0
	22	76	11.8
	All Rwanda	644	100

2015 Seasonal Agriculture Survey - Season C

The survey results showed that most of the Agricultural Operators in segments (99.5%) were individual Farmers and only about 0.5 % were cooperatives (see table 89).

Table 89. Agricultural Operators by type (%)

	Strata	Individual		Cooperative		Total	
		Number	%	Number	%	Number	%
Agricultural Operators	12	374	99.7	1	.3	375	100.0
	21	191	99.0	2	1.0	193	100.0
	22	76	100.0	0	0.0	76	100.0
	All Rwanda	641	99.5	3	.5	644	100.0

2015 Seasonal Agriculture Survey -Season C

25.5% of Agricultural Operators were members of Agricultural Cooperatives in season C, the highest proportion being in Stratum 2.2 (48.7%) followed by the Stratum 2.1(40.4%)

Table 90. Cooperative Membership

		Yes	No	Total
	Strata	Percent	Percent	Percent
Agricultural Operators	1.2	13.1	86.9	100
	2.1	40.4	59.6	100
	2.2	48.7	51.3	100
	All Rwanda	25.5	74.5	100

2015 Seasonal Agriculture Survey - Season C

6.1.2 Number of Agricultural Operators by Gender

In 2015 Season C, 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 91.

Table 91. Percentage of Agricultural Operators by Gender and Stratum

	Agricultural Operators		
Strata	Male	Female	Total
1.2	66.8	33.2	100
2.1	67.0	33.0	100
2.2	72.4	27.6	100
All Rwanda	67.6	32.4	100

2015 Seasonal Agriculture Survey - Season C

6.1.3 Age Distribution of Agricultural Operators

The majority (27.3%) of Agricultural Operators in Rwanda were in the age group of between 25 and 34 (see Table 92). This is followed by 25.7 percent of Agricultural Operators in age group of 55 and above. The age group distribution of Agricultural Operators by Stratum varied more in the age groupof between 45 and 54 with Stratum 2.2 (22.4%) being the highest and Stratum 1.2 (15.0%) being lowest. The least variation was in the age group of between 14and 24 with the Stratum 1.2 being the highest (5.9%) and Stratum 2.2 (3.9%) being the lowest.

Table 92. Age Distribution of Agricultural Operators

	Agricultural Operators				
Strata	14-24	25-34	35-44	45-54	55 and Above
1.2	5.9	31.8	24.3	15.0	23.0
2.1	4.2	21.5	27.7	17.3	29.3
2.2	3.9	19.7	23.7	22.4	30.3
All Rwanda	5.1	27.3	25.3	16.5	25.7

2015 Seasonal Agriculture Survey - Season C

The majority (31.2%) of male Agricultural Operators in Rwanda in season C were in the age group of between 25 and 34 (see Table 93). This is followed by 28.2 percent of Agricultural Operators in age group of between 35and 44.

Table 93. Age Distribution of Male Agricultural Operators

	Agricultural Operators				
Strata	14-24	25-34	35-44	45-54	55 and Above
1.2	5.6	37.2	28.4	11.2	17.6
2.1	3.1	25.0	28.9	18.0	25.0
2.2	5.5	18.2	25.5	23.6	27.3
All Rwanda	4.8	31.2	28.2	14.8	21.0

2015 Seasonal Agriculture Survey - Season C

The distribution of female Agricultural Operators in Rwanda in season C was high in the age groupof 55 and above (35.6%) followed by 20.2 percent of female Agricultural Operators in age group ofbetween 45 and 54, 19.2 percent of female Agricultural Operators in age groupof between 25-34 and 35 and 44 , 5.8 percent in age group of between 14 and 24 (see Table 94).

Table 94. Age Distribution of Female Agricultural Operators

	Agricultural Operators				
Strata	14-24	25-34	35-44	45-54	55 and Above
1.2	6.5	21.0	16.1	22.6	33.9
2.1	6.3	14.3	25.4	15.9	38.1
2.2	0.0	23.8	19.0	19.0	38.1
All Rwanda	5.8	19.2	19.2	20.2	35.6

2015 Seasonal Agriculture Survey - Season C

6.1.4 Education Level of Agricultural Operators

The Survey results of the 2015 Season C showed that in Rwanda, 60.8% of Agricultural Operators had attended primary level education, 27.1% had no education, 10.0 % attended secondary level education and only 2.0 % had attended tertiary level education. For those Agricultural Operators that had attented primary level education (60.8%) their distribution by Stratum was reasonably uniform with Stratum 2.2 having a higher percentage of 72.4(see Table 95).

Table 95. Education Level of Agricultural Operators by Stratum (%)

	Agricultural Operators				
Strata	Primary	Secondary	Tertiary	No education	Total
1.2	56.4	13.6	2.4	27.5	100
2.1	64.9	4.7	2.1	28.3	100
2.2	72.4	5.3	0.0	22.4	100
All Rwanda	60.8	10.0	2.0	27.1	100

2015 Seasonal Agriculture Survey - Season C

In Rwanda, 67.4% of male Agricultural Operators had attended primary education, 17.8% of Agricultural operators did not attend school, 12.2 % attended secondary education and 2.5 attended tertiary level of education (see Table 96).

Table 96. Education level of Male Agricultural Operators (%)

	Agricultural Operators				
Strata	Primary	Secondary	Tertiary	No education	Total
1.2	65.2	16.8	3.2	14.8	100
2.1	67.2	5.5	2.3	25.0	100
2.2	78.2	7.3	0.0	14.5	100
All Rwanda	67.4	12.2	2.5	17.8	100

2015 Seasonal Agriculture Survey - Season C

As Table 97 shows, Stratum 2.1 had the highest percentage of female Agricultural Operators with primary education (60.3%) and the lowest percentage of female agriculture operators with no education level (34.9%).

Table 97. Education Level of Female Agricultural Operators (%)

	Agricultural Operators				
Strata	Primary	Secondary	Tertiary	No education	Total
1.2	38.7	7.3	.8	53.2	100
2.1	60.3	3.2	1.6	34.9	100
2.2	57.1	0.0	0.0	42.9	100
All Rwanda	47.1	5.3	1.0	46.6	100

2015 Seasonal Agriculture Survey - Season C

6.1.5 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 non-resident of a segment if his/her agricultural activities are undertaken in the segment but lives outside the segment.

Results of the survey showed that in Rwanda the majority of Agricultural Operators (89.9%) were non-resident while 10.1% were residents. (See Table 98)
Stratum 1.2 had the lowest percentage of non-resident operators (70.7%) and the biggest percentage of resident operators (29.3%), while the rest of the Strata had above 90.0% of non-residents

Table 98. Agricultural Operators by Residency (%)

	Agricultural Operators		
Strata	Resident	Non resident	Total
1.2	29.3	70.7	100
2.1	1.7	98.3	100
2.2	.8	99.2	100
All Rwanda	10.1	89.9	100

2015 Seasonal Agriculture Survey - Season C

6.2 Date of Sowing

The starting dates of sowing by Agricultural Operators in Segments for each main crop is summarized in Tables 99. For the majority of Agricultural Operators, sowing for 2015 Season C crops was mainly done in May, June and July 2015 with exceptions on spinach and which was sown before May 2015.

Table 99. Agricultural Operators Indicating the Sowing Date in Segments by Crop

Crop name	Before 30/04/2015	01-31/05/2015	01- 30/06/2015	After June 2015	Total
Bush beans	0.0	7.9	37.3	54.7	100.0
Climbing beans	25.7	41.1	20.5	12.7	100.0
Peas	0.0	6.0	66.0	28.1	100.0
Irish potatoes	5.7	21.7	40.8	31.7	100.0
Sweet potatoes	10.2	28.3	30.3	31.2	100.0
Tomotoes	12.1	27.7	39.8	20.5	100.0
White cabbage	4.8	21.3	43.7	30.2	100.0
Flower cabage	50.0	50.0	0.0	0.0	100.0
Onions	25.1	16.7	33.5	24.7	100.0
Carrots	0.0	26.1	38.6	35.3	100.0
Eggplant	33.5	37.3	15.1	14.1	100.0
Soya beans	1.1	6.8	43.9	48.2	100.0
Amaranths	18.8	20.8	22.7	37.7	100.0
Spinach	100.0	0.0	0.0	0.0	100.0
Sugar beet	0.0	0.0	0.0	100.0	100.0
Garlic	0.0	50.0	0.0	50.0	100.0
Leeks	0.0	33.3	0.0	66.7	100.0
French beans	0.0	10.0	50.0	40.0	100.0

Seasonal Agriculture Survey - Season C

6.3 Farm Characteristics (Area, Yield and Production)

From the detailed tables on area under crops, yield and crop production see Tables 100, 103 and 104, the following are some of the highlights on the estimated production, area under crops and yield for the 2015 Season C.

6.3.1 Crop Areas

In Rwanda, in terms of land area under crops the main individual crops grown in Season C were Irish potatoes (34.5%), Sweet potatoes (20.5%), vegetables (19.7%) and Beans (17.19%).

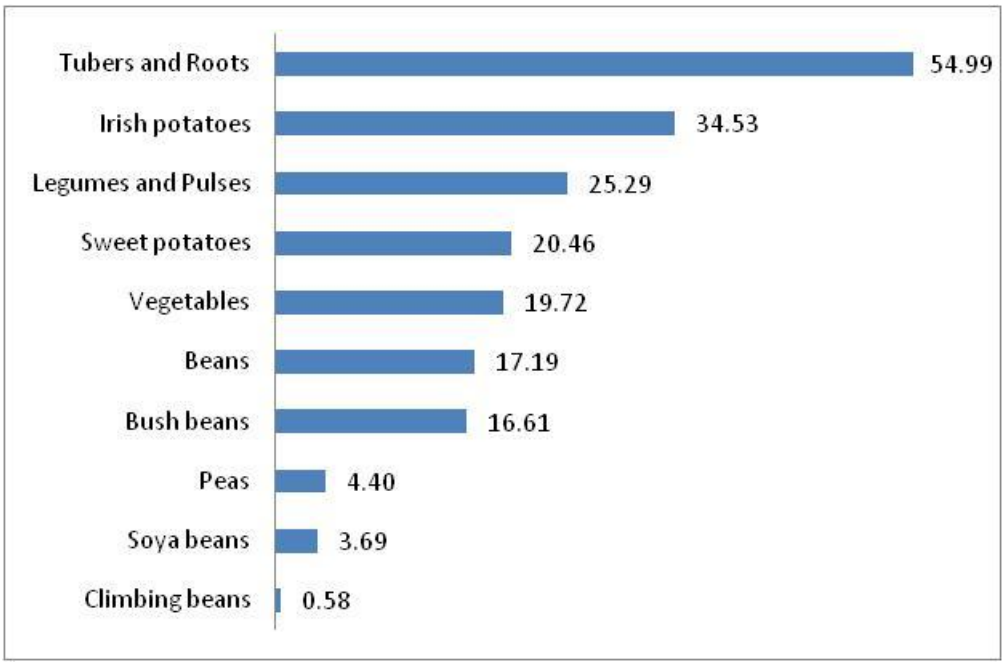
Table 100. Area (Ha) Cultivated by Crop and Group of Crops by Stratum (Hectares)

Crops	12	21	22	Total	Percent
Tubers and Roots	6,078	5,363	685	12,127	55.0
Sweet potatoes	129	3,704	680	4,513	20.5
Irish potatoes	5,949	1,659	6	7,614	34.5
Legumes and Pulses	121	4,881	575	5,577	25.3
Beans	107	3,273	411	3,791	17.2
Bush beans	6	3,247	409	3,662	16.6
Climbing beans	100	27	2	129	0.6
Peas	14	955	2	971	4.4
Soya beans	-	653	162	814	3.7
Vegetables	454	3,428	467	4,349	19.7
Developed	6,653	13,672	1,727	22,053	100
Phyisical	6,653	13,672	1,727	22,053	100

2015 Seasonal Agriculture Survey - Season C

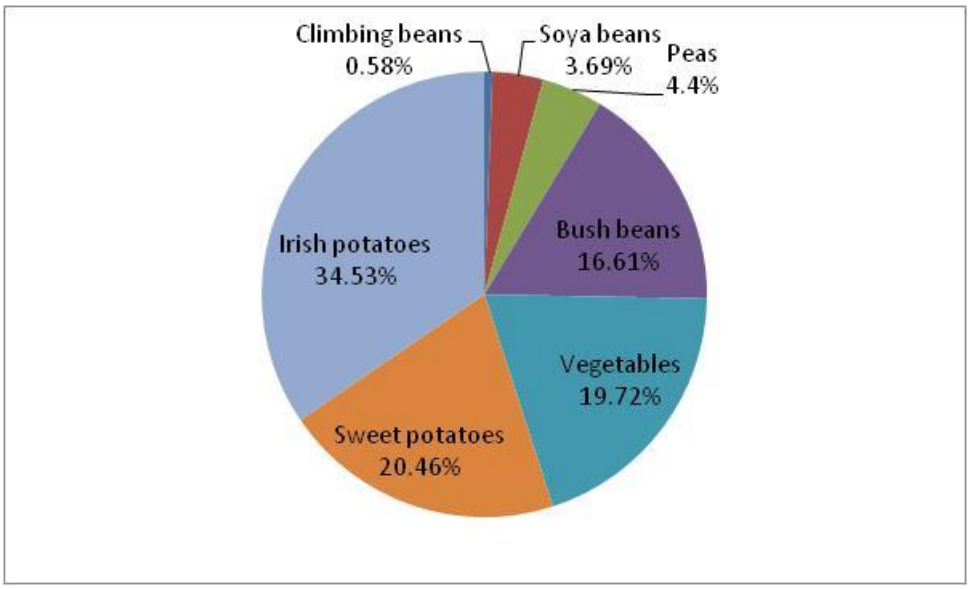
The total developed land means simply the cropland with regards to perennial crops cultivation standards and being sometimes mixed with seasonal crops while the physical land means the real size in terms of cultivated plot area. Total developed crop land remains the same with total physical crop land since there are no perennial crops in Season C.

Figure 10: Shareof Agriculture Land by Crops and groups of crops



The survey results showed that the dominant individual crops in Rwanda were: Irish potatoes (34.53%), Sweet potatoes (20.46%) and vegetables (19.72%).Survey results showed that the dominant groups of agricultural crops in Rwanda were: Tubers and roots (54.99%), Legumes and Pulses (25.29%).(see figure 10 and 11).

Figure 11: Shares of Agriculture Land by individual Crops



The survey results (see Table 101) showed that the average size of tracts for Agricultural Operators in Rwanda in 2015 Season C was 0.15 hectares.

Stratum 1.2 had the largest average size of tract for Agricultural Operators (0.16Ha) followed by Stratum 2.1 (0.15 Ha) and Stratum 2.2 (0.13 Ha).

The survey results confirmed that plot sizes for the Agricultural Operators in Rwanda are very small.

Table 101. Average Size of Tracts by Stratum

Strata	Average (Ha)
1.2	.16
2.1	.15
2.2	.13
All Rwanda	.15

2015 Seasonal Agriculture Survey - Season C

The average size of crops area was below 0.10Ha for all crops during 2015 Season C.

Table 102. Average Size of crop area per Agricultural Operators (Ha)

Crops / Stra	12	21	22	All Rwanda
Bush beans	.01	.04	.08	.04
Climbing beans	.04	.01	.02	.03
Peas	.01	.05	.01	.05
Irish potatoes	.09	.07	.01	.08
Sweet potatoes	.03	.03	.04	.03
Tomotoes	.02	.04	.04	.04
White cabbage	.02	.03	.03	.03
Flower cabage	.04			.04
Onions	.07	.03	.01	.04
Carrots	.12	.02	.03	.04
Eggplant	.01	.04	.04	.04
Soya beans		.03	.03	.03
Ground nuts		.01		.01
Black eggplants		.03	.01	.02
Sweet pepper		.02	.03	.03
Amaranths	.00	.01	.02	.01
Celery		.01	.00	.01
Spinach	.01			.01
Sugar beet		.02	.02	.02
Garlic	.02			.02
Leeks	.03		.00	.02
French beans		.04	.02	.04
Cucumber		.02		.02
Pasture	.89	2.37	1.27	1.70
Fallow	.13	.10	.09	.11
Non Agriculture	.10	.85	.86	.31
Other seasonal			.01	.01

2015 Seasonal Agriculture Survey - Season C

6.3.2 Crop Yields

Crop yield also known as “Agricultural output” refers to the measure of yield of a crop per unit area of land cultivation.

The results showed that the yield of Vegetables and Irish potatoes was higher than the rest of other crops in 2015 Season C (See table 103).

Table 103. Crops Yield by Stratum (Kg/Ha)

Crops	12	21	22	Total
Sweet potatoes	1,113	2,464	3,462	2,576
Irish potatoes	9,966	12,845	-	10,586
Beans	330	626	435	597
Bush beans	13	632	437	609
Climbing beans	350			272
Peas	-	443	-	436
Soya beans		536	863	601
Vegetables	8,700	11,701	11,113	11,324

2015 Seasonal Agriculture Survey - Season C

6.3.3 Crop Production

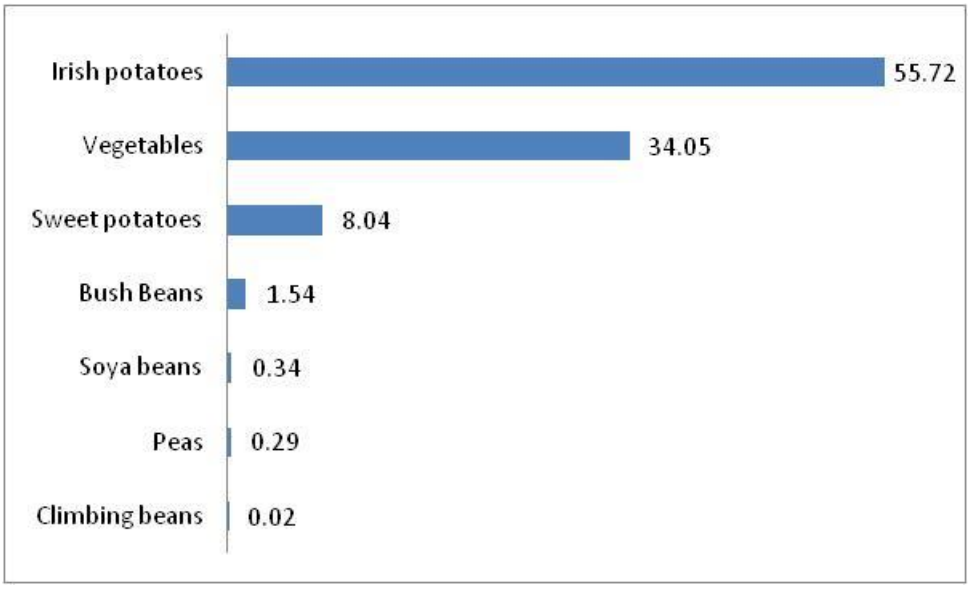
The contribution of individual crop production by Stratum (see Table 104) was calculated using the product of yield and area under the crop. The results showed that the share of crop production was significantly high for Irish Potatoes (55.7%) followed by Vegetables (34.0%), Sweet Potatoes (8.0%) and Beans (2.2%).

Table 104. Production of Main Crops (MT)

Crops	12	21	22	Total	Percent
Tubers and Roots	59,431	30,441	2,354	92,226	63.8
Sweet potatoes	144	9,127	2,354	11,625	8.0
Irish potatoes	59,287	21,314	-	80,601	55.7
Legumes and Pulses	35	2,823	318	3,177	2.2
Beans	35	2,050	179	2,264	1.6
Bush Beans	0	2,050	179	2,229	1.5
Climbing beans	35			35	0.0
Peas	-	423	-	423	0.3
Soya beans	-	350	140	489	0.3
Vegetables	3,953	40,111	5,187	49,251	34.0

2015 Seasonal Agriculture Survey - Season C

Figure 12: Share of production by main crops (%)



6.4 Agricultural Practices

6.4.1 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 85.0 and 15.0 percent respectively (see Table 105).

In general, Agricultural Operators used most of their agricultural land to cultivate crops in pure stand.

Table 105. Share of Pure and Mixed Crop Agricultural Land (%)

	Strata	Pure Crop Land	Mixed Crop Land	Total
Agricultural Operators	1.2	95.1	4.9	100
	2.1	79.7	20.3	100
	2.2	87.3	12.7	100
	All Rwanda	85.0	15.0	100

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The results showed that Stratum 1.2 used 90.8 percent of total land for pure stand cropping mainly for Irish Potatoes, Stratum 2.1 and 2.2 for Beans 30.0%, 43.0% respectively.

Table 106. Pure Crop Agricultural Land (Ha) in Segments by Type of Crop (%)

Strata	Irish Potatoes	Beans	Peas	Soya beans	Vegetables	Total
1.2	90.8	1.7	1.5	0.0	0.0	5.9
2.1	13.0	30.0	20.8	7.8	3.6	24.8
2.2	.2	43.0	24.1	.1	9.5	23.1
All Rwanda	38.3	21.5	14.6	4.6	2.8	18.3

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6.4.2 Use of Organic Fertilizer

In segments, 65.2% of all Agricultural Operators in Rwanda reported that they used organic fertilizer (see Table 107). Organic fertilizers were mostly used in Stratum 1.2 (69.1%) followed by Stratum 2.1 (65.3%) and Stratum 2.2 (45.3%).

Table 107. Users of Organic Fertilizers (%)

	Strata	Used organic fertilizers
Agricultural Operators	**1.2**	69.1
	2.1	65.3
	2.2	45.3
	All Rwanda	65.2

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Generally 62.5% of agricultural operators used organic fertilizers during their farming activities, where organic fertilizer has been largely used to grow beans, peas, vegetables and Irish potatoes by Agricultural operators (see table 108).

Table 108. Users of organic fertilizers by crop (%)

Crops	12	21	22	Total
Bush Beans	100.0	56.7	18.2	52.7
Climbing beans	35.3	100.0	0.0	38.9
Peas	100.0	69.2	0.0	71.4
Irish potatoes	74.0	89.5	0.0	74.9
Sweet potatoes	50.0	41.9	32.5	40.4
Soybeans	0.0	0.0	26.7	12.5
Vegetables	38.5	92.5	83.3	74.6
Total	68.1	60.5	43.3	62.5

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6.4.3 Use of Inorganic Fertilizers by Agricultural Operators

The survey results showed that 46.0 percent of Agricultural Operators used inorganic fertilizers during 2015 Season C (see Table 109).

Table 109. Use of Inorganic Fertilizer

	Strata	Used inorganic fertilizers
Agricultural Operators	1.2	59.5
	2.1	29.5
	2.2	21.3
	All Rwanda	46.0

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The survey results showed that NPK was highly used (60.5%) followed by UREA (22.2%) and DAP (14.2%). In Stratum 2.1 and Stratum 2.2, the survey showed that the UREA was highly used by 51.1 and 50.0 percent of all agricultural operators within the Stratum respectively and NPK was highly used in Stratum 1.2 by 76.6 percent of all agricultural operators within Stratum.

Table 110. Users of Inorganic Fertilizers by Type and by Stratum (%)

	Agricultural Operators						
	Strata	NPK	UREA	UREA (LIQUID)	DAP	OTHER Fertilizers	Total
Agricultural Operators	12	76.6	9.1	1.9	11.7	.8	100
	21	23.4	51.1	3.2	22.3	0.0	100
	22	32.1	50.0	7.1	10.7	0.0	100
	All Rwanda	60.5	22.2	2.6	14.2	.5	100

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Agricultural operators used inorganic fertilizers mostly on Irish potatoes (65.6%) and Vegetables (54.6%).

Table 111.Users of Inorganic fertilizers by Crop (%)

Crops	12	21	22	Total
Bush Beans	0.0	23.3	0.0	18.9
Climbing beans	11.8	0.0	0.0	11.1
Peas	0.0	38.5	0.0	35.7
Irish potatoes	65.7	63.2	0.0	65.6
Sweet potatoes	0.0	0.0	0.0	0.0
Soybeans	0.0	5.9	13.3	9.4
Vegetables	28.2	64.2	70.8	54.6

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6.4.4 Use of Seeds

In Rwanda, Agricultural Operators used more traditional seeds (87.6%) than improved seeds (12.4%). For Agricultural Operators, Stratum 1.2 had the largest share of users of traditional (90.2%) and stratum 2.2 had the largest share of users improved seeds (18.8%).

Table 112.Agricultural Operators by Type of Seeds Used (%)

	Strata	Traditional seeds	Improved seeds	
		Percent	Percent	Total
Agricultural Operators	**1.2**	90.2	9.8	100.0
	2.1	85.2	14.8	100.0
	2.2	81.2	18.8	100.0
	All Rwanda	87.6	12.4	100.0

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As indicated below, Traditional seeds were used by agricultural operators to grow almost all crops during 2015 season C.

Table 113. Users of Traditional Seeds by Type of Crop (%)

	12	21	22	Total
Bush Beans	100.0	100.0	100.0	100.0
Climbing beans	100.0	100.0	0.0	100.0
Peas	100.0	100.0	0.0	100.0
Irish potatoes	98.5	94.7	0.0	98.3
Sweet potatoes	100.0	100.0	100.0	100.0
Soybeans	0.0	94.1	100.0	96.9
Vegetables	17.9	64.2	66.7	50.8

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Improved seeds were used on Vegetables (59.2%), Soybeans (3.1%) and Irish potatoes (2.0 %) by all Agricultural operators who grew them during 2015 Season C (see table 114).

Table 114. Users of Improved Seeds by Type of Crop (%)

Crops	12	21	22	Total
Bush Beans	0.0	0.0	0.0	0.0
Climbing beans	0.0	0.0	0.0	0.0
Peas	0.0	0.0	0.0	0.0
Irish potatoes	1.8	5.3	0.0	2.0
Sweet potatoes	0.0	0.0	0.0	0.0
Soybeans	0.0	5.9	0.0	3.1
Vegetables	82.1	43.3	66.7	59.2

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6.4.5 Irrigation Practice

The survey results showed that about 20.5% of agricultural operators in segments practised irrigation (see Table 115). The irrigation is more practised in Stratum 2.1 and 2.2where the high percentage of operators in those Strata practised irrigation (54.4% and 33.3% respectively).

Table 115. Agricultural Operators Practicing Irrigation

	Strata	Practised Irrigation	Did not practise irrigation	Total
Agricultural Operators	12	.5	99.5	100.0
	21	54.4	45.6	100.0
	22	33.3	66.7	100.0
	All Rwanda	20.5	79.5	100.0

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On the type of irrigation used by Agricultural Operators, the survey results showed that the majority of Agricultural Operators used Watering Can (33.5%) for irrigation followed by Water Channels (see Table 116). Use of water can for irrigation was predominantly in Stratum 2.2 (67.7%). There was little use of Pumps/Tube wells/Irrigation machines by Agricultural Operators in Rwanda (1.8%).

Table 116.Agricultural Operators by Type of Irrigation Practised (%)

	Strata	Pumps/tube wells/irrigation machines	Watering can	Water channels	Others	Total
Agricultural Operators	1.2	0.0	50.0	0.0	50.0	100
	2.1	2.2	25.4	13.4	59.0	100
	2.2	0.0	67.7	25.8	6.5	100
	All Rwanda	1.8	33.5	15.6	49.1	100

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The survey results showed that agricultural operators practiced irrigation mainly on peas, vegetables and Bush beans during the 2015 season C (see table 117).

Table 117.Practice of irrigation by Crops (%)

	12	21	22	Total
Bush Beans	0.0	43.3	9.1	36.5
Climbing beans	0.0	100.0	0.0	5.6
Peas	0.0	100.0	0.0	92.9
Irish potatoes	0.0	36.8	0.0	2.0
Sweet potatoes	0.0	27.9	12.5	19.9
Soybeans	0.0	17.6	6.7	12.5
Vegetables	5.1	83.6	83.3	60.0

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6.4.6 Anti-erosive Activities

Erosion refers to the process in which the topsoil is worn away. Due to the mountainous landscape of Rwanda, most of the Agricultural Operators practice anti-erosion activities to prevent the wasting away of the earth. The survey results (see Table 118 and Figure 36) show the distribution of Agricultural Operators practicing anti-erosion activities.

Anti-erosion was practised by 69.8 percent of Agricultural Operators. Most of the anti-erosion activities were practised by Agricultural Operators in the Stratum 2.2 (81.1%), followed by Stratum 1.2 (65.6%), Stratum 2.1(64.8%) (See Table 118).

Table 118. Anti-erosive Activities by Agricultural Operators (%)

	Strata	Practised Anti-erosion
Agricultural Operators	1.2	65.6
	2.1	64.8
	2.2	81.1
	All Rwanda	69.8

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The Survey shows that in Rwanda the most practised erosion control measures by Agricultural Operators in all Strata were beds (43.4%), water drainage (31.0%) and grasses (17.0%) (SeeTable119).

Other erosion control measures such as planting of trees, radical terracing, and progressive terracing, radical terracing and mulching were also practised by a small number of Agricultural Operators.

Table119. Distribution of Type Anti-erosive Activities by Agricultural Operators (%)

	Strata	Ditches	Trees	Bench terraces	Progressive terraces	Cover plants/grasses	Water drainage	Mulching	Beds	Others	Total
Agricultural Operators	1.2	4.4	6.4	4.7	4.2	27.0	0.0	0.0	53.3	0.0	100.0
	2.1	.5	.4	.1	1.4	20.1	27.6	1.5	48.4	.0	100.0
	2.2	.2	.1	3.3	.3	3.0	64.9	1.6	26.6	0.0	100.0
	All Rwanda	1.5	1.9	2.3	1.8	17.0	31.0	1.1	43.4	.0	100.0

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The anti-erosion activities were generally for all cropland. With regards to cropland for Peas, Climbing beans and Irish potatoes, more than 90.0% of agricultural operators reported that their plots are protected against erosion.

Table 120. Practice of anti-erosion by crop (%)

	12	21	22	Total
Bush Beans	100.0	71.7	100.0	77.0
Climbing beans	94.1	100.0	0.0	94.4
Peas	100.0	100.0	0.0	100.0
Irish potatoes	92.7	94.7	0.0	92.8
Sweet potatoes	70.0	87.2	95.0	87.0
Soybeans	0.0	41.2	33.3	37.5
Vegetables	92.3	92.5	75.0	89.2

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6.4.7 Use of Pesticides

The survey results showed that in Rwanda 53.3 percent of Agricultural Operators used pesticides in their farming activities (See Table 121).

For Agricultural Operators, Stratum 1.2 was high in the use of pesticides (61.1%) followed by the Stratum 2.1 (45.6%), Stratum 2.2 (34.7%).

Table 121. Agricultural Operators using Pesticide (%)

	Strata	Used Pesticides
Agricultural Operators	**1.2**	61.1
	2.1	45.6
	2.2	34.7
	All Rwanda	53.3

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Countrywide, Dithane was the most highly used pesticide by Agricultural Operators followed by Cypermetrine pesticide. In the Strata 1.2 Dithane was the most used while Cypermetrine was the mostly used pesticides by Agricultural Operators in Strata 2.1 and 2.2(See table 122).

Table 122. Type of pesticide used by agricultural operators (%)

Strata	DITHANE	RIDOMIL	DIMETHOATE	CYPERMETRINE	DURSIBAN	TILT	OTHER PESTICIDE	Total
12	50.0	11.2	16.3	22.4	0.0	0.0	0.0	100.0
21	17.2	3.3	4.9	55.7	.8	1.6	16.4	100.0
22	22.9	0.0	14.3	60.0	0.0	0.0	2.9	100.0
Total	41.3	8.8	13.8	31.9	.2	.4	3.7	100.0

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Pesticides were most used by agricultural operators on peas, vegetables and Irish potatoes (See table 123).

Table 123. Users of pesticides by crops (%)

Crops	12	21	22	Total
Bush Beans	0.0	38.3	45.5	37.8
Climbing beans	29.4	0.0	0.0	27.8
Peas	0.0	100.0	0.0	92.9
Irish potatoes	63.9	31.6	0.0	62.1
Sweet potatoes	0.0	4.7	2.5	3.4
Soybeans	0.0	35.3	13.3	25.0
Vegetables	53.8	71.6	83.3	68.5

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6.5 Small Agricultural Equipment

The survey results showed that countrywide, most of the expenditure by Agricultural Operators was on the Hoe (36.0%) followed by Crops sprayer (16.1%).

The expenditures on the other tools that were used for cultivation by Agricultural Operators were below 10 % of the total expenditure (See Table 124).

Table 124. Expenditure by Type of Small Agricultural Equipment

Small Agricultural Equipment	Agricultural Operators			
	1.2	2.1	2.2	All Rwanda
Hoe	32.9	43.8	30.4	36.0
Spring Hoe	.6	1.0	.6	.7
Fork hoe	3.0	1.5	.7	2.1
Rake	0.0	0.0	.6	.1
Pick/ Ipiki	.3	0.0	0.0	.2
Wheelbarrow	0.0	5.5	0.0	1.8
Shovel/igitiyo	.1	.6	.4	.3
Watering pump	1.3	0.0	0.0	.6
Crops Sprayer	23.1	5.4	16.6	16.1
Watering can	0.0	6.4	17.1	5.3
Scie	0.0	.0	0.0	.0
Sickle	.5	1.6	1.8	1.1
Scythe	0.0	0.0	.2	.0
Machete	2.5	3.8	3.3	3.1
Billhook	.0	0.0	0.0	.0
Basket	2.3	3.6	6.9	3.6
Sack	13.1	7.6	4.2	9.7
Big basket	.1	0.0	0.0	.0
Winnower	.8	.6	1.8	.9
Basket(ikibo)	1.0	1.1	0.0	.9
Scale	1.9	0.0	0.0	.9
Jerry-can	4.1	1.6	.8	2.7
Barrel	.4	0.0	0.0	.2
Bike	0.0	7.6	0.0	2.5
Bowl	.1	.5	.1	.2
Sheeting	6.3	2.5	11.5	6.1
Hoe sleeve	5.1	4.3	3.0	4.5
Others (Specify)	.3	.9	0.0	.4
Total	100.0	100.0	100.0	100.0

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The survey results showed the value of donations received by Agricultural Operators: Hoe (84.7%) was the largest donation followed by Bike (11.9%).

Table 125. Small Equipment Received from Non Agricultural Donors (%)

Small Agricultural Equipment received	12	21	22	Total
Hoe	0.0			0.0
Spring Hoe	0.0			0.0
Fork hoe	0.0			0.0
Rake	0.0			0.0
Pick/ Ipiki	0.0			0.0
Wheelbarrow	0.0			0.0
Shovel/igitiyo	0.0			0.0
Watering pump	0.0			0.0
Crops Sprayer	0.0			0.0
Watering can	84.7			84.7
Scie	3.4			3.4
Sickle	0.0			0.0
Secataur	0.0			0.0
Scythe	0.0			0.0
Machete	0.0			0.0
Billhook	0.0			0.0
Basket	0.0			0.0
Sack	0.0			0.0
Big basket	0.0			0.0
Winnower	0.0			0.0
Basket(ikibo)	0.0			0.0
Basket(inkangara)	0.0			0.0
Scale	0.0			0.0
Jerry-can	0.0			0.0
Barrel	0.0			0.0
Bike	11.9			11.9
Craft bike	0.0			0.0
Bowl	0.0			0.0
Sheeting	0.0			0.0
Hoe sleeve	0.0			0.0
Others (Specify)	0.0			0.0
Total	100.0			100.0

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6.6 Use of Crop Production by Agricultural Operators

Clearly, the majority of the crop production was consumed and sold by the agricultural operator households. The rest of the crop production for some crops was offered as gifts to others or used as seeds.

The survey results on the use of crop production by agricultural operators are given in Table 126.

Table 126. Use of Production by Agricultural Operators (%)

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	Used as fodder	Damaged	Used in any other way	Total
Bush beans	8.404	0.000	77.067	.833	0.000	1.897	0.000	11.798	0.000	0.000	0.000	100.00
Climbing beans	1.667	0.000	84.439	0.000	0.000	3.778	0.000	10.117	0.000	0.000	0.000	100.00
Peas	71.941	0.000	26.671	0.000	0.000	.707	0.000	.681	0.000	0.000	0.000	100.00
Irish potatoes	27.515	0.000	50.347	.258	.061	3.845	.550	17.290	0.000	.135	0.000	100.00
Sweet potatoes	15.325	0.000	76.526	1.311	1.027	4.736	.068	0.000	.860	.145	0.000	100.00
Tomotoes	71.442	0.000	18.953	0.000	2.000	4.670	0.000	.178	0.000	2.756	0.000	100.00
White cabbage	45.176	.017	49.386	0.000	0.000	5.116	0.000	0.000	0.000	.305	0.000	100.00
Flower cabage	80.000	0.000	15.000	0.000	0.000	5.000	0.000	0.000	0.000	0.000	0.000	100.00
Onions	74.558	0.000	12.150	.556	0.000	3.014	6.944	2.778	0.000	0.000	0.000	100.00
Carrots	74.022	0.000	22.052	1.538	0.000	2.388	0.000	0.000	0.000	0.000	0.000	100.00
Eggplant	62.937	0.000	27.600	0.000	.068	7.679	.340	.187	0.000	.104	1.086	100.00
Soya beans	16.250	0.000	49.073	0.000	0.000	3.578	3.125	27.973	0.000	0.000	0.000	100.00
Amaranths	35.385	0.000	53.700	0.000	.938	7.165	0.000	0.000	0.000	2.813	0.000	100.00
Spinach	75.000	0.000	20.000	0.000	0.000	5.000	0.000	0.000	0.000	0.000	0.000	100.00
Sugar beet	90.000	0.000	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.00
Garlic	50.000	0.000	0.000	0.000	0.000	0.000	0.000	50.000	0.000	0.000	0.000	100.00
Leeks	56.667	0.000	43.333	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.00
French beans	65.781	0.000	28.428	0.000	0.000	1.791	0.000	0.000	0.000	4.000	0.000	100.00

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General conclusion

The 2015 Seasonal Agriculture Survey has shown that Rwanda has experienced growth in agriculture recently due to reforms introduced in the sector. Survey results indicated that there are still considerable opportunities to boost production and contribute more to food security, poverty reduction and overall development.