The Republic of Rwanda

NATIONAL INSTITUTE OF STATISTICS OF RWANDA

SEASONAL AGRICULTURAL SURVEY

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SEASONAL AGRICULTURAL SURVEY

December 2016

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FOREWORD

The Government of Rwanda conducted the 2016 Seasonal Agricultural Survey (SAS) from November 2015 to October 2016 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 2016 SAS covered three agricultural Seasons (A, B and C) for the year 2016 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 2016 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 2016 SAS indicated that the main crops grown in 2016 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 Ton
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 2016 SAS, NISR used as the 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 25,346 and 23,286 agricultural operators in Season A and Season B respectively. From these numbers of agricultural operators, sub-samples were selected during the second phases of Seasons A and B.

Furthermore, the total number of enumerated large-scale farmers was 774 in 2016 Season A and 622 in Season B. Season C considered 152 segments counting 8,987 agricultural operators from which 963 agricultural operators were selected for survey interviews.

[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.

Fieldwork

The fieldwork consisted of screening land areas on maps by classifying every plot inside each segment as either agricultural (cultivated land, pastures, and fallow land) or non-agricultural land (water, forests, roads, rocky and bare soils and buildings) and completing screening forms and farm questionnaires. The fieldwork was conducted as follows:

- In Season A, the fieldwork commenced on 5 November 2015 and concluded on 27th January 2016;
- In Season B, the fieldwork started on 08th March and ended on 30thJune 2016;
- In Season C, the fieldwork started on 13th September and ended on 2nd October 2016.

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 2016 SAS

Crop land

In 2016 Season A, the main crops were banana (23.2% of the total cultivated area), cassava (20.8% of the total cultivated area), beans (19.8% of the total cultivated area), and maize (12.3% of the total cultivated area). Other crops took 23.9% of the total cultivated area.

In 2016 Season B, the main crops were banana (23.6% of the total cultivated area), cassava (21.1% of the total cultivated area), beans (17.8% of the total cultivated area), sorghum (9.9% of the total cultivated area) and maize (5.1% of the total cultivated area). Other crops took 22.5% of the total cultivated area.

Season C was quite different because the main crops were Irish potatoes (28.7%of the total cultivated area), sweet potatoes (26.9% of the total cultivated area), vegetables (21.8%of the total cultivated area) and beans (15.3% of the total cultivated area). Other crops took 7.3% of the total cultivated area.

The average sizes of farm land were 0.25, 0.26 and 0.17 hectares in Seasons A, B and C for each agricultural operator. However, fallow land represented 15.5% in Season A and 18.5% 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 yielded the following information:

- ***The use of traditional seeds***: between 81% and 90% of agricultural operators used traditional seeds during all Seasons,
- ***The use of improved seeds***: between 10% and 19% of agricultural operators used improved seeds during all agricultural Seasons
- ***The use of organic fertilizers***: between 50% and 70% of agricultural operators used organic fertilizers during all Seasons,
- ***The use of inorganic fertilizers***: between 18% and 22% of agricultural operators used inorganic fertilizers in Season A and B whereas in Season C, 46% of agricultural operators used inorganic fertilizers.

For large-scale farmers (LSF), the survey provided the following information:

- ***The use of traditional seeds***: between 50% and 70% of LSF,
- ***The use of improved seeds:*** *between 30% and 50% of* LSF
- ***The use of organic fertilizers***: between 65% and 76% of LSF,
- ***The use of inorganic fertilizers***: between 51% and 62% of LSF.

Use of pesticides:

The survey illustrated that the use of pesticides varies with agricultural Seasons.

- In Seasons A and B, they have been 10.6% and 11.6% of all agricultural operators respectively used pesticides.
- In Season C, 50.7% of all agricultural operators used pesticides.

Among the large-scale farmers, the percentage of those who used pesticides was 45.6% and 42.7% during Seasons 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: 38.8% in pure stand[4] and 61.2% in mixed stand[5],
- In Season B: 41.0% in pure stand and 59.0% in mixed stand,
- In Season C: 76.6% in pure stand and 23.4% in mixed stand.

For the LSF the share between pure stand and mixed stand in Season A was 83.7 and 16.3 percent respectively while in Season B, the percentage share was 75.4 and 24.6 percent respectively.

Irrigation practices

In Seasons A and B, between 2.4% and 4.1% of all agriculture operators practised irrigation but in Season C, their percentage was 29.2%.
The share of large-scale farmers who practised irrigation was between 17% and 35% during Seasons A and B.

Anti-erosion activities

In Seasons A and B, 73.2% and 72.1% of all agricultural operators practised anti-erosion activities but in Season C, their percentage was 78.4%.
The share of large-scale farmers who practised anti-erosion activities was 55.4% and 64.4% in Seasons A and B, respectively.

Production

Season A

In Season A, tubers and toots (37.3%) gained the highest share of crop production by groups of crops in Rwanda followed by banana (27.6%) and cereals (11.0%). The contributions of

[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 more than one crop.

the group of vegetables and fruits and the group of legumes and pulses were, 4.7% and 7.6%.

Season B

In Season B, the group of tubers and roots had again the highest share of crop production (42.7%) followed by banana (29.5%) and cereals (8.5%). Other crop groups contributed as follows: legumes and pulses (6.7%) and vegetables and fruits (4.5%).

Season C

In Season C, the highest share of crop production was for vegetables (43.4%) followed by Irish potatoes (40.6%), sweet potatoes (13.0%) and beans (2.1%). Other individual crops contributed less than 1.0%.

Chapter 1: Introduction

1.1 Need for Agricultural Statistics

During the recent decades, agriculture has had a lot of transformations. It contributed more than 30% of the GDP and employed over 70% of the population. Over the course of EDPRS I, agriculture contributed significantly to poverty reduction.
In recognition of its potential in economic development, food security and poverty reduction, the government has set a very ambitious agricultural 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 the agricultural sector, the NISR in collaboration with the MINAGRI, introduced a new program of agricultural surveys that uses multiple frame sampling techniques, based on probability sampling and estimation methods combining an area frame and a list frame since the 2013 agricultural 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 Agricultural 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 the agricultural sector.

1.3 Time frame

The 2016 SAS fieldwork commenced on 5 November 2015 and continued up to 27th January 2016 for Season A; from 8th March to 30thJune 2016 for Season B and Season C started from 13th September to 2nd October 2016. The fieldwork 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 LSF was prepared to be used for enumeration. At the same time, the sampling units of an area frame were constructed by professionals in the 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 is used to denote land-use.

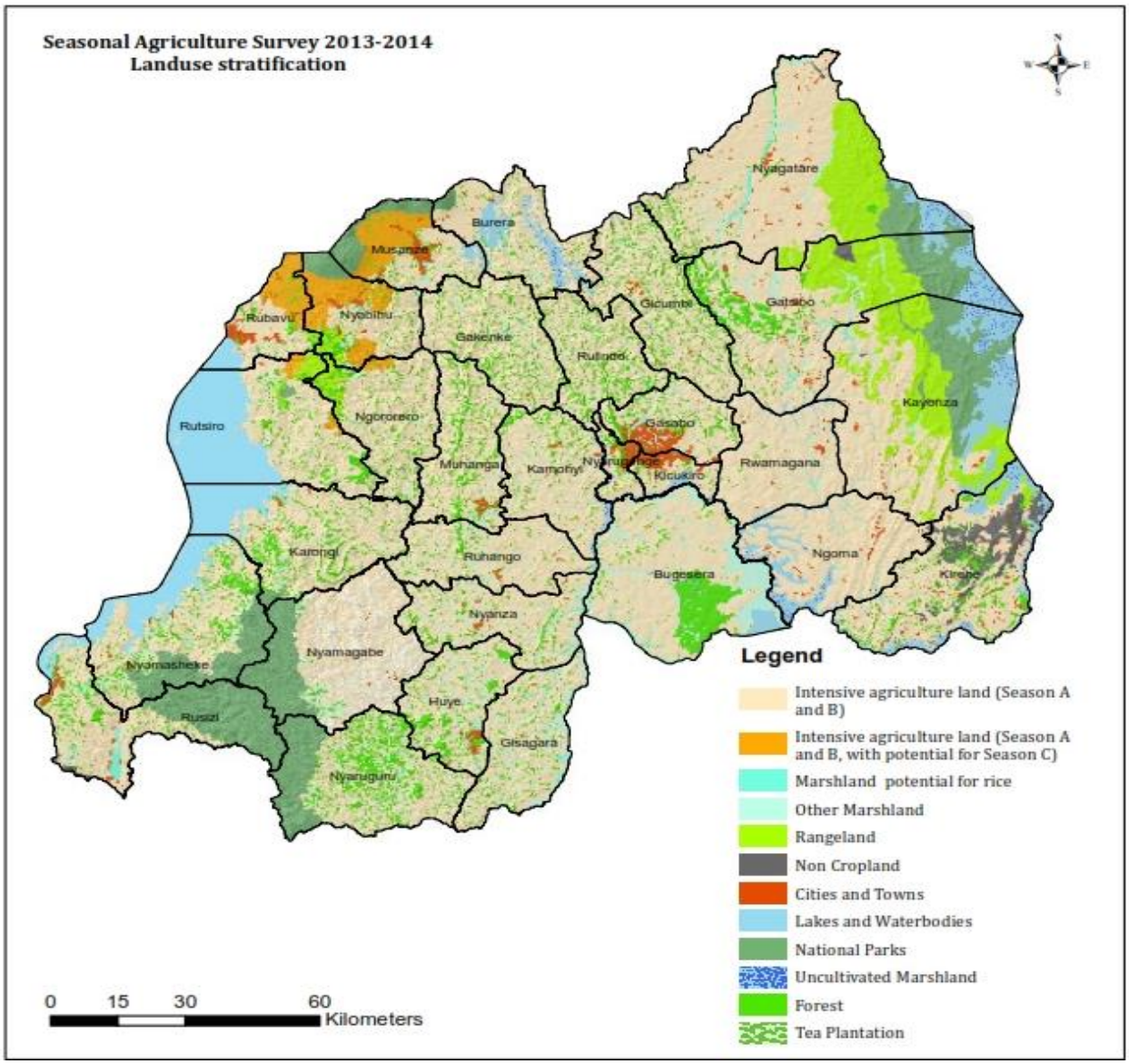
During the construction of the area sampling frame, the entire land area of Rwanda was subdivided into 12 non-overlapping land-use strata defined by the proportion of cultivated land or other land-use characteristics, as shown in Table 1 and Figure 1.

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

Stratum	Description	Total (Hectares)	Percent
1.1	Intensive agricultural land (Seasons A and B)	**1,479,081.4**	**81.9**
1.2	Intensive agricultural land (Seasons 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 plantations	**28,763.1**	**1.6**
Total agriculture land		**1,806,102.9**	**100.0**

2016 Seasonal Agricultural Survey

Figure 1: Land Use Stratification



2016 Seasonal Agricultural Survey in 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	Sratum '1.1	District	Sratum1.2	District	Sratum'2.1	District	Sratum 2.2	District	Sratum 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	-	Nyanza	4.9%	Nyagatare	7.4%	Kirehe	2.1%
7	Gicumbi	4.2%	Bugesera	-	Nyaruguru	4.4%	Gatsibo	6.7%	Nyabihu	2.1%
8	Rwamagana	4.1%	Kayonza	-	Kamonyi	4.2%	Kayonza	5.9%	Rubavu	0.7%
9	Karongi	4.0%	Ngoma	-	Nyamagabe	3.6%	Rwamagana	5.0%	Gisagara	-
10	Nyamagabe	3.8%	Gatsibo	-	Kayonza	3.1%	Ngoma	4.5%	Rusizi	-
11	Gakenke	3.8%	Kirehe	-	Huye	3.1%	Nyamasheke	4.5%	Nyanza	-
12	Kamonyi	3.6%	Gicumbi	-	Rwamagana	3.1%	Muhanga	2.6%	Huye	-
13	Nyanza	3.6%	Rwamagana	-	Gasabo	3.0%	Ruhango	2.2%	Bugesera	-
14	Ruhango	3.5%	Karongi	-	Gakenke	2.7%	Gasabo	1.7%	Rwamagana	-
15	Muhanga	3.4%	Nyamagabe	-	Rulindo	2.0%	Kirehe	0.9%	Ngoma	-
16	Gisagara	3.3%	Gakenke	-	Gicumbi	1.7%	Gakenke	0.4%	Nyamasheke	-
17	Ngororero	3.3%	Kamonyi	-	Ngororero	1.4%	Kamonyi	0.3%	Muhanga	-
18	Rutsiro	3.2%	Nyanza	-	Rusizi	1.2%	Ngororero	0.3%	Ruhango	-
19	Nyamasheke	3.2%	Ruhango	-	Muhanga	1.2%	Nyamagabe	0.2%	Gasabo	-
20	Nyaruguru	3.2%	Muhanga	-	Karongi	1.2%	Karongi	0.1%	Gakenke	-
21	Burera	3.0%	Gisagara	-	Burera	1.1%	Rulindo	0.1%	Kamonyi	-
22	Rulindo	2.8%	Nyamasheke	-	Nyamasheke	1.0%	Nyabihu	-	Nyamagabe	-
23	Rusizi	2.8%	Nyaruguru	-	Nyabihu	0.9%	Musanze	-	Karongi	-
24	Huye	2.7%	Burera	-	Musanze	0.8%	Rubavu	-	Rulindo	-
25	Gasabo	1.8%	Rulindo	-	Rutsiro	0.8%	Rutsiro	-	Musanze	-
26	Nyabihu	1.3%	Rusizi	-	Kirehe	0.5%	Nyaruguru	-	Nyaruguru	-
27	Musanze	1.2%	Huye	-	Kicukiro	0.2%	Gicumbi	-	Gicumbi	-
28	Rubavu	1.1%	Gasabo	-	Nyarugenge	0.2%	Burera	-	Burera	-
29	Kicukiro	0.6%	Kicukiro	-	Ngoma	0.1%	Kicukiro	-	Kicukiro	-
30	Nyarugenge	0.5%	Nyarugenge	-	Rubavu	0.1%	Nyarugenge	-	Nyarugenge	-

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2.3.2 List Frame Construction

The list of LSF (sometimes called Big Farmers) included those farmers with the largest areas for crops or those with the largest numbers of livestock because the sampling unit is the farmer.

2.3.3. Distribution of Strata

Definitions of various strata

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

- ***Stratum 1.2***: Intensive cropland for Seasons A, B and C on hillsides. The difference from Stratum1.1 is that Stratum 1.2 has potential for agricultural production for Season C.

- ***Stratum 2.1***: Is located in marshlands and is cultivated during Seasons A, B and C. The crops involved comprise all crops with the exception of perennial crops.

- ***Stratum 2.2***: Is also in marshlands and has potential for growing 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 survey, because 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 2016

The country was demarcated into 12 strata. Only the first five strata (defined above) were subject to agricultural land sampling. In the 2016 Seasonal Agricultural Survey, the sample selection was a two-stage sampling design as follows:

a) In each stratum, primary sampling units (PSUs) were selected using probability proportional to size (PPS) sampling where area was the size 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 were assigned to each PSU. Then, if a PSU had 225 hectares, it was divided into (22) sampling units of 10-hectares each. If this PSU was selected, one of its 22 sampling units would be selected as the segments for data collection. However, the SSUs from Stratum 3.0 were 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 the selected PSUs in each of the five strata.

Table 3. Selected Segments by Strata for SAS 2016

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
		540

2016 Seasonal Agricultural 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 were eligible for Seasons A and B, whereas Season C considered only 152 Segments from Strata 1.2, 2.1 and 2.2.

3.1.3 Sampling of Secondary Sampling Units

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

3.1.4 Selection of Respondents in Phase I

Phase I serves at collecting data on area under different types of crops in the screening process, whereas the Phase II is mainly devoted to the collection of data on demographic, social characteristics of interviewees, together with yields of the different crops produced.

i. Large-scale farmers

Enumerated large-scale farmers were 558 in both 2015 Season A and B. The LSF were engaged in either crop farming activities only, livestock farming activities only, or both crop and livestock farming activities.

ii. Agricultural Operators

Agricultural operators are the small scale farmers within the sample segments. Every selected segment was firstly screened using the appropriate materials such as the segment maps, GIS devices and the screening form. Using these devices, the enumerators accounted for every plot inside the sample segments. 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 a total of 25,495 and 24,911

[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.

agricultural operators were enumerated respectively in Seasons A and B. Season C considered only 152 segments, involving 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 were undertaking crop farming activities only and 50% of the large-scale farmers were undertaking both crop and livestock farming and were selected for interview. A sample of 199 and 194 large-scale farmers were interviewed in Seasons A and B, respectively, using a farm questionnaire.

ii. Agricultural Operators

From the agricultural operators enumerated in the sample segments during Phase I, a sample of the agricultural operators was 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) sampling at the national level was used.

3.1.6 Estimation Methodology

i. Definition of the Notations and Parameters

Weight: $W_i = \frac{N_i}{N}$

Where N is the total number of segments in the population and N_i denotes the number of segments with i-th stratum;

- for the stratum i,

- The average of the variable of interest Y, is $\bar{Y}i = \frac{1}{N_i}\sum_{j=1}^{N_i} Y_{ij}$ in the stratum i;

  Where Y_{ij} denotes the value of the Y-variable for the j-th segment in the i-th stratum;

- The mean square in stratum i of Y is defined by $S_i^2 = \frac{1}{N_i - 1}\sum_{j=1}^{N_i}(Y_{ij} - \bar{Y}i)^2$

The sample size from the Stratum is equal to n_i in stratum i,

- $f_i = \frac{n_i}{N_i}$ is the i-th sampling rate; $\bar{y}_i = \frac{1}{n_i}\sum_{j}^{n_i} y_{ij}$ is the sample mean of sample observations in i-th stratum, where Y_{ij} denotes the value of Y-variable for the j-th sample stratum in the i-th stratum.

The sample variance for the i-th stratum is denoted by $s_i^2 = \frac{1}{n_i - 1}\sum_{j=1}^{n_i}(y_{ij} - \bar{y}_i)^2$ is the sample variance of the stratum i.

ii. Estimation of Population Mean

- The overall mean of the population is $\bar{Y}$ and is written as follows:

  $\bar{Y} = \sum_{i}^{k} W_i \bar{Y}_i$, where k is the number of 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 Population Total

For stratum i, the total Y is denoted $Y = \sum_{i=1}^{k} N_i \bar{Y}_i$, an unbiased estimator of the total Y to the universe is: $\hat{T} = \sum_{i=1}^{k} N_i \bar{y}_i$

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

The estimators $\hat{T}(Y)$ and $\bar{y}_{st}$ are unbiased estimators of the total and the mean.

Variance of the Mean Estimator and the Total Estimator (Abbreviated as Var)

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

Estimation of Variances of Estimators

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

Estimator of variances of the estimators of the mean and the total are used to calculate the standard errors, 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.

A segment of about 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 2016 SAS used 118 enumerators grouped in 35 field teams and 28 team leaders. All fieldwork staff in 2016 possesses a degree in Agronomy Science and was 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. Fieldwork 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 checked if they had all required materials for their fieldwork. 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 fieldwork.

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 related to the plots inside the appropriate 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. A 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 noted that all completed farm questionnaires were subjected to two or 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 completed

satisfactorily by enumerators. 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 the NISR office by 20 staff trained in using the CSPro software. To ensure appropriate matching of data in the completed 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 or LSF before starting data entry. Thereafter, data were entered in computers, edited and summarized in tables using SPSS and Excel.

Chapter 4: Results of the 2016 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 195 out of 774 LSF and 5,089 out of 25,346agricultural 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	3,251	63.9
	1.2	518	10.2
	2.1	577	11.3
	2.2	483	9.5
	3.0	260	5.1
	All Rwanda	5,089	100
LSF		195	100

2016 Seasonal Agricultural Survey

The distribution of agricultural operators (in segments) was highest in Stratum 1.1 (63.9%), followed by Stratum 2.1 (10.2%). In 2016 Season A phase II, 195 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	3,241	100	10	0.3	3,251	100
	1.2	517	100	1	0.2	518	100
	2.1	569	98.6	8	1.4	577	100
	2.2	481	99.6	2	0.4	483	100
	3.0	257	99	3	1.2	260	100
	All Rwanda	5,065	99.5	24	0.5	5,089	100
LSF						195	100

2016 Seasonal Agricultural 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% were cooperatives.

Table 6. Cooperative membership

		Yes	No	Total
	Strata	Percent	Percent	Percent
Agricultural Operators	1.1	13.7	86.3	100
	1.2	12.5	87.5	100
	2.1	35.7	64.3	100
	2.2	71.4	28.6	100
	3.0	13.8	86.2	100
	All Rwanda	21.6	78.4	100
LSF		72.3	27.7	100

2016 Seasonal Agricultural Survey - Season A

For the cooperative membership of agricultural operators, Stratum 2.2 had the highest proportion (71.4%) followed by the Stratum 2.1 (35.7%). For LSF, 72.3 percent were members of agricultural cooperatives.

4.1.2 Number of agricultural operators by gender

In 2016 Season A, the distribution of agricultural operators in Rwanda by gender was 70.0% 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	69.5	30.5	100
1.2	63.2	36.8	100
2.1	72.1	27.9	100
2.2	69.0	31.0	100
3.0	86.8	13.2	100
All Rwanda	70.0	30.0	100

2016 Seasonal Agricultural 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 25-34 (25.8%) followed by agricultural operators in age-group of 55 years and above (25.6%). The age group distribution of agricultural operators by Stratum varied more in the age group of between 45 and 54 with Stratum 3.0 (25.3%) being highest, Stratum 1.2 (15.7%) 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	5.6	23.3	25.4	19.8	26.0
1.2	5.0	25.9	26.7	15.7	26.7
2.1	3.0	20.4	25.7	22.7	28.3
2.2	4.6	23.1	28.1	23.1	21.2
3.0	5.1	23.3	24.9	25.3	21.4
All Rwanda	5.1	23.2	25.8	20.3	25.6

2016 Seasonal Agricultural Survey - Season A

The majority (27.7%) of male agricultural operators in Rwanda were in the age group of between 35 and 44 (see Table 9). This is followed by 26.1 percent of Agricultural Operators in agegroup of between 25 and 34.

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	5.8	26.1	27.2	18.3	22.5
1.2	5.8	30.0	30.6	14.7	19.0
2.1	3.2	22.9	27.3	21.0	25.6
2.2	5.4	26.8	29.2	19.9	18.7
3.0	4.5	24.2	26.5	26.0	18.8
All Rwanda	5.4	26.1	27.7	18.9	22.0

2016 Seasonal Agricultural Survey - Season A

The distribution of female agricultural operators in Rwanda was high in the age group of 55 and above (34.2%) followed by 23.5 percent of female agricultural operators in agegroup of between 45 and 54, 21.3 percent of female agricultural operators in age group of between 35and 44, 16.7 percent in age groupof between 25 and 34 and 4.4 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	4.9	17.0	21.1	23.1	33.8
1.2	3.7	18.9	20.0	17.4	40.0
2.1	2.5	13.8	21.4	27.0	35.2
2.2	2.7	14.8	25.5	30.2	26.8
3.0	8.8	17.6	14.7	20.6	38.2
All Rwanda	4.4	16.7	21.3	23.5	34.2

2016 Seasonal Agricultural Survey - Season A

4.1.4 Education level of agricultural operators

The survey results of the 2016 SAS Season A illustrated that 66.6% of agricultural operators had attended primary level education, 25.9% had no education, 6.5% attended secondary level education and only 1.0% 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	66.2	6.0	0.8	27.1	100
1.2	59.8	8.7	2.5	29.0	100
2.1	66.8	7.4	1.2	24.6	100
2.2	74.6	6.9	0.8	17.7	100
3.0	71.2	5.8	0.0	23.0	100
All Rwanda	66.6	6.5	1.0	25.9	100

2016 Seasonal Agricultural Survey - Season A

Among agricultural operators who had attended primary level education (71.4%) 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	72.0	6.4	1.0	20.7	100
1.2	64.5	12.5	3.7	19.3	100
2.1	70.0	8.3	1.5	20.2	100
2.2	75.0	6.9	0.6	17.5	100
3.0	72.6	6.7	0.0	20.6	100
All Rwanda	71.4	7.3	1.2	20.2	100

2016 Seasonal Agricultural Survey - Season A

In Rwanda, 71.4% of male agricultural operators attended primary level education, 20.2% had no education and 7.3% 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	52.9	4.9	0.3	41.8	100
1.2	51.6	2.1	0.5	45.8	100
2.1	58.5	5.0	0.6	35.8	100
2.2	73.8	6.7	1.3	18.1	100
3.0	61.8	0.0	0.0	38.2	100
All Rwanda	55.6	4.7	0.5	39.3	100

2016 Seasonal Agricultural Survey - Season A

2016 SAS illustrated that 55.6% of female agricultural operators attended primary education. Stratum 2.2 had the highest female agricultural operators with primary education level (73.8%). The lowest percentage of female agricultural operators had tertiary education (0.5%).

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 2016 SAS showed that in Rwanda the majority of agricultural operators (74.8%) were nonresident while 25.2 % were residents. (See Table 14)

Table 14. Agricultural operators by residency (%)

	Agricultural Operators		
Strata	**Resident**	**Non resident**	**Total**
1.1	27.7	72.3	100
1.2	26.9	73.1	100
2.1	8.7	91.3	100
2.2	4.9	95.1	100
3.0	99.9	0.1	100
All Rwanda	25.2	74.8	100

2016 Seasonal Agricultural Survey - Season A

In general, the Stratum 3.0 had the biggest percentage of resident's operators (99.9%), while in the rest of the Strata, resident agricultural operators are less than 25.3% of all agricultural operators.

4.2 Date of Sowing

For Agricultural operators, sowing for some crops started before September 2015. 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 2015	01-15 September 2015	16-30 September 2015	After September 2015	Others	Total
Maize	8.8	24.1	24.0	43.1	0.0	100
Paddy rice	79.9	10.6	4.5	5.1	0.0	100
Sorghum	18.2	39.8	27.4	14.6	0.0	100
Wheat	16.8	20.0	12.6	50.5	0.0	100
Bush beans	1.5	18.3	24.5	55.8	0.0	100
Climbing beans	9.5	37.5	22.3	30.7	0.0	100
Peas	10.6	29.1	25.5	34.8	0.0	100
Cassava	3.6	10.7	10.0	18.8	56.8	100
Irish potatoes	39.9	15.6	16.1	28.1	0.2	100
Sweet potatoes	28.4	12.4	10.4	48.7	0.1	100
Yams	38.5	7.7	15.4	38.5	0.0	100
Taro	36.4	16.0	10.0	35.6	2.0	100
Cooking Banana	1.1	0.8	0.5	1.1	96.5	100
Dessert Banana	0.0	1.4	0.5	0.7	97.4	100
Banana for beer	0.4	0.6	0.4	0.9	97.6	100
Soya beans	2.0	13.0	22.1	62.9	0.0	100
Ground nuts	4.7	22.9	27.3	44.8	0.3	100

2016 Seasonal Agricultural Survey - Season A

For the majority of crops, sowing of crops by agricultural operators started in September 2015. 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 2015.

When comparing 2016 Season A with 2015 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, and 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 2015	01-15 September 2015	16-30 September 2015	After September 2015	Others	Total
Maize	2.5	20.7	27.2	49.5	0.0	100
Paddy rice	96.6	1.7	0.0	1.7	0.0	100
Sorghum	14.8	49.2	11.5	24.6	0.0	100
Wheat	0.0	6.7	80.0	13.3	0.0	100
Bush beans	1.1	22.8	32.3	43.9	0.0	100
Climbing beans	0.0	27.8	27.8	44.4	0.0	100
Peas	0.0	11.1	11.1	77.8	0.0	100
Cassava	11.5	5.1	6.4	12.8	64.1	100
Irish potatoes	15.1	21.9	27.4	35.6	0.0	100
Sweet potatoes	41.7	0.0	0.0	58.3	0.0	100
Yams	0.0	0.0	0.0	0.0	0.0	0
Taro	0.0	0.0	0.0	0.0	0.0	0
Cooking bananas	2.4	2.4	0.0	2.4	92.7	100
Dessert banana	0.0	0.0	0.0	0.0	100.0	100
Banana for beer	0.0	0.0	0.0	0.0	100.0	100
Soya beans	5.6	27.8	22.2	44.4	0.0	100
Ground nuts	0.0	37.5	37.5	25.0	0.0	100

2016 Seasonal Agricultural Survey - Season A

The majority of LSF (96.6%) indicated that they sowed paddy rice before September 2015 (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 2015.

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 2016 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 (23.2%), cassava (20.8%), beans (19.8%), and maize (12.3%) (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	**161,882**	**12,638**	**20,425**	**4,294**	**12,048**	**211,287**	**19,519**	**230,806**	**16.6**
Maize	132,874	8,566	18,532	2,620	3,813	166,405	4,410	170,815	12.3
Sorghum	23,463	2,392	1,223	392	8,147	35,616	311	35,928	2.6
Paddy rice	391	8	647	1,279		2,325	14,717	17,042	1.2
Wheat	3,400	1,664		0		5,064	73	5,137	0.4
Other cereals	1,756	8	23	1	89	1,877	8	1,885	0.1
Tubers and	**393,744**	**12,647**	**11,929**	**779**	**5,150**	**424,249**	**570**	**424,819**	**30.6**
Cassava	277,591	50	5,527	221	4,442	287,832	217	288,049	20.8
Sweet Potatoes	60,228	977	3,387	269	71	64,933	112	65,044	4.7
Irish Potatoes	40,572	11,604	912	99	624	53,810	241	54,051	3.9
Yams & Taro	15,353	16	2,102	191	12	17,674	0	17,674	1.3
Banana	**314,705**	**141**	**3,242**	**181**	**3,316**	**321,584**	**424**	**322,009**	**23.2**
Cooking Banana	110,239	29	1,125	71	2,666	114,131	321	114,452	8.2
Dessert banana	34,696	27	527	37	304	35,591	56	35,647	2.6
Banana for beer	169,770	85	1,590	73	346	171,863	47	171,910	12.4
Legumes & Pulses	**294,325**	**7,540**	**9,404**	**833**	**8,557**	**320,661**	**2,656**	**323,316**	**23.3**
Beans	**250,088**	**6,059**	**7,547**	**689**	**8,070**	**272,453**	**2,115**	**274,568**	**19.8**
Bush beans	164,037	32	6,869	655	8,005	179,598	2,058	181,656	13.1
Climbing beans	86,051	6,027	679	33	65	92,856	56	92,912	6.7
Peas	14,284	1,481	71	3	155	15,994	18	16,012	1.2
Groundnuts	11,276		157	24	260	11,716	206	11,922	0.9
Soya beans	18,678		1,629	118	73	20,498	317	20,815	1.5
Vegetables and Fruits	**19,387**	**1,069**	**2,563**	**369**	**133**	**23,521**	**589**	**24,109**	**1.7**
Vegetables	11,991	750	2,453	332	127	15,653	159	15,811	1.1
Fruits	7,396	318	109	37	6	7,868	430	8,298	0.6
Other crops	**52,960**	**3,161**	**3,820**	**353**	**1,357**	**61,650**	**1,150**	**62,801**	**4.5**
Total developpe	**1,237,004**	**37,195**	**51,382**	**6,810**	**30,561**	**1,362,952**	**24,908**	**1,387,860**	**100.0**
Total Physical c	**1,100,362**	**37,145**	**49,960**	**6,714**	**28,966**	**1,223,147**	**24,652**	**1,247,799**	**100.0**
Fallow land	**167,635**	**2,929**	**13,059**	**2,065**	**4,283**	**189,971**	**1,378**	**191,349**	**15.3**

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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

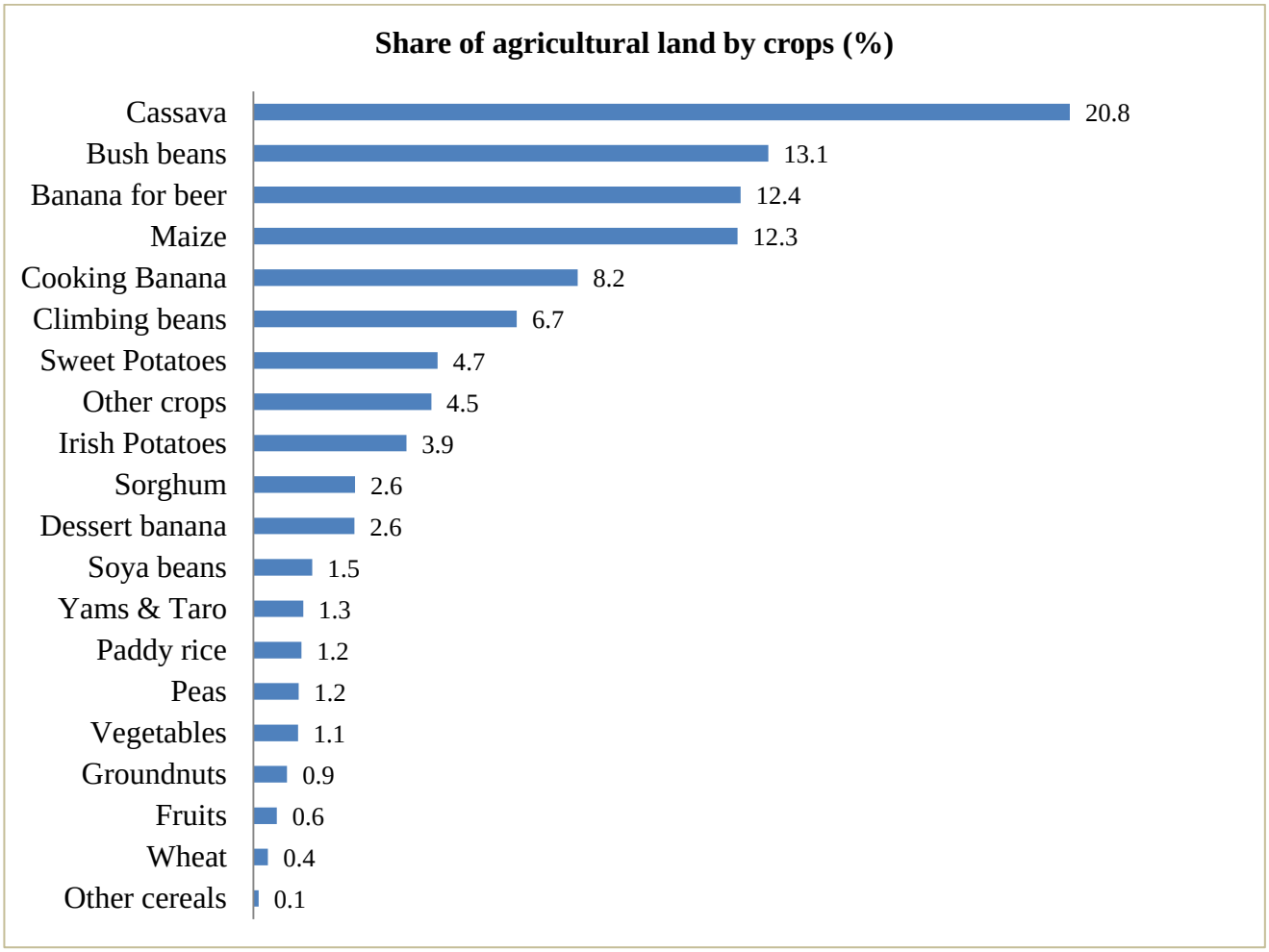
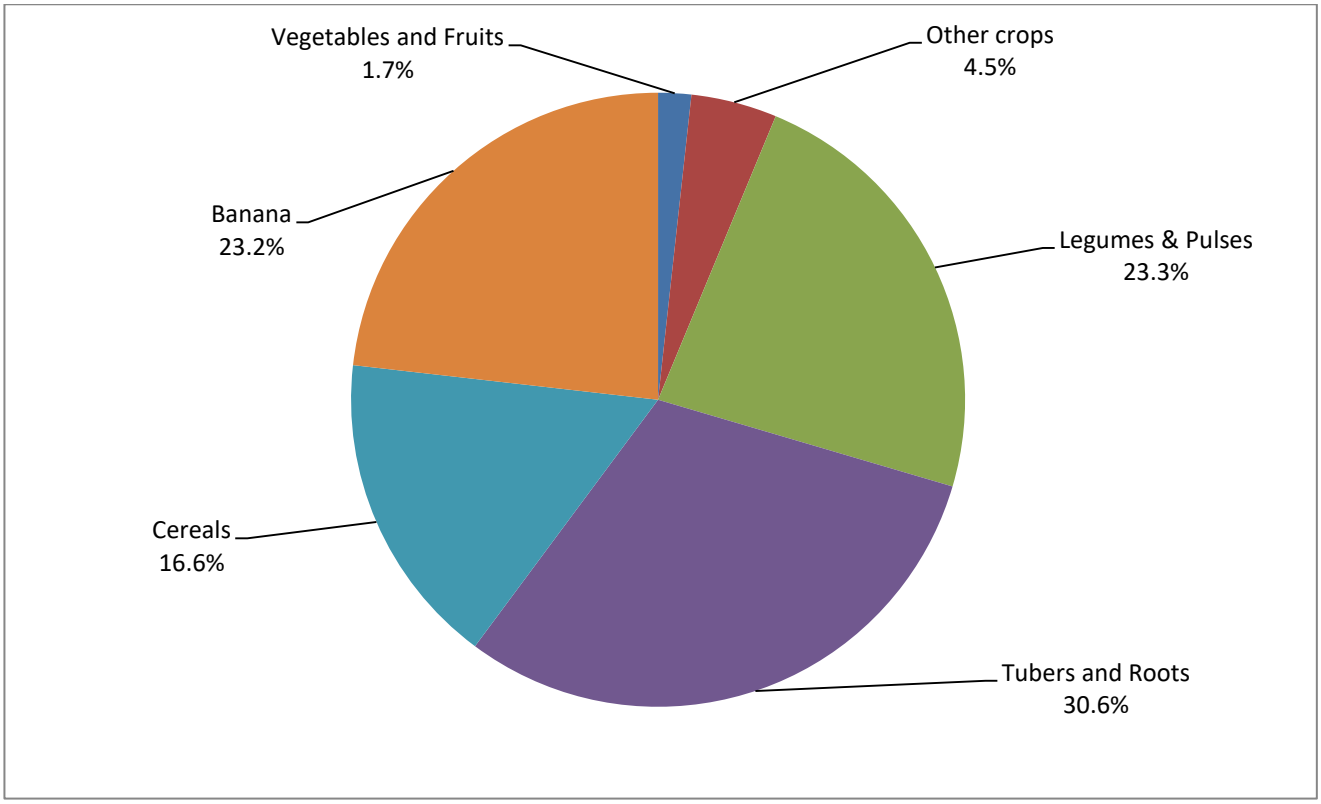


Figure 3 : Share of Agriculture Land by Group of Crops (%)



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%), legumes and pulses (23%), banana (23%), cereals (17%), 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 0.25 hectares.

Table 18. Average size of tract by Stratum

Strata	Average (Ha)
1.1	0.25
1.2	0.19
2.1	0.17
2.2	0.12
3.0	2.56
All Rwanda	0.25

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The Stratum 3.0 had the largest average size of tract for agricultural operators (2.56 Ha) followed by Stratum 1.1 (0.25 Ha.), Stratum 1.2 (0.19 Ha), Stratum 2.1(0.17 Ha), and Stratum 2.2 (0.12 Ha).

The average size of crop area was below 0.10 Ha with the exception of pyrethrum (0.18 Ha), sorghum (0.14 Ha), banana for beer (0.12 Ha) and cassava (0.11 ha). Fallow land in segments had an average size of 0.08 hectares whereby the Stratum 3.0 has the largest fallow land average size of 0.80hectares.

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	0.04	0.06	0.07	0.09	0.14	0.05
Paddy rice	0.03	0.03	0.02	0.03	-	0.02
Sorghum	0.12	0.07	0.14	0.28	0.41	0.14
Wheat	0.06	0.08	-	0.01	-	0.07
Other cereals	0.03	0.01	0.02	-	0.08	0.03
Bush beans	0.07	0.01	0.07	0.05	0.35	0.07
Climbing beans	0.06	0.05	0.04	0.04	0.07	0.06
Peas	0.02	0.04	0.02	0.01	0.09	0.03
Cassava	0.11	0.04	0.07	0.06	0.39	0.11
Irish potatoes	0.03	0.09	0.01	0.03	0.06	0.03
Sweet potatoes	0.04	0.06	0.03	0.03	0.05	0.04
Yams	0.02	-	0.01	0.00	0.02	0.02
Taro	0.02	0.01	0.02	0.02	0.02	0.02
Tomotoes	0.04	0.03	0.11	0.08	0.06	0.05
White cabbage	0.01	0.04	0.02	0.03	0.09	0.02
Flower cabage	-	0.03	-	-	-	0.03
Onions	0.03	0.05	0.08	0.05	0.04	0.03
Carrots	0.02	0.09	0.04	0.03	-	0.03
Eggplant	0.02	0.01	0.02	0.03	0.07	0.02
Other seasonal vegetables	0.02	0.01	0.01	0.01	-	0.02
Other annual vegetables	-	0.01	-	-	0.31	0.11
Other perennial vegetables	0.01	-	-	-	-	0.01
Cooking Banana	0.10	0.02	0.12	0.22	0.28	0.10
Dessert banana	0.07	0.05	0.07	0.09	0.24	0.07
Banana for beer	0.12	0.05	0.09	0.08	0.15	0.12
Pineapple	0.08	-	0.06	0.01	0.10	0.08
Avocado	0.03	0.02	-	-	-	0.03
Passion fruits	0.03	0.05	0.14	0.03	-	0.03
Other fruits	-	0.02	-	0.07	-	0.05
Soya beans	0.03	-	0.04	0.03	0.05	0.03
Ground nuts	0.04	-	0.03	0.03	0.08	0.04
sun flower	0.01	-	0.01	0.00	0.03	0.01
coffee	0.06	-	0.02	0.03	0.03	0.06
Pyrethrum	-	0.18	-	-	-	0.18
Other seasonal crops	0.05	-	-	-	-	0.05
Other annual crops	0.05	0.04	-	0.26	-	0.05
Pasture	2.31	1.06	2.44	1.51	9.10	3.38
Fallow	0.08	0.08	0.06	0.07	0.80	0.08
Non Agriculture	0.12	0.10	0.83	0.91	2.60	0.15

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Table 20. Average size of crop area per large-scale farmers (Ha)

Crops	Average Size
Maize	14.75
Paddy rice	77.87
Sorghum	2.32
Wheat	6.07
Bush beans	7.59
Climbing beans	1.57
Peas	1.05
Cassava	2.26
Irish potatoes	2.80
Sweet potatoes	2.28
Tomotoes	2.72
White cabbage	1.04
Flower cabage	0.10
Onions	0.22
Carrots	0.33
Eggplant	0.56
Cooking Banana	1.57
Dessert banana	0.90
Banana for beer	1.79
Pineapple	4.04
Avocado	5.55
Passion fruits	1.31
Other fruits	0.46
Soya beans	6.90
Ground nuts	3.68
sun flower	0.32
other oil seeds	1.04
coffee	8.10
Pyrethrum	2.93
Black eggplants	0.06
Sweet pepper	0.11
Pepper	0.83
Amaranths	0.97
Celery	1.04
Small red beans	0.19
Sugar beet	0.54
French beans	11.26
Napia grass	0.34
Sugar cane	2.02
Fodder crop	6.39
Macadamia	4.51
Olive crop	10.94
Mango	3.16
Apple	2.07
Papaya	0.29
Tree tomato	0.78
Orange	3.38
Lemon	0.14
Guava	0.62
White Mulberry	5.98
Mucuna	0.10
Desmodium	0.29
Millet	0.11
Stevia	2.61
Jatropha	31.98
Cucumber	0.37
Palm tree	48.87
Tea	1.87
Pasture	36.79
Fallow	9.25
Non Agriculture	3.29
Taro	0.12
Other seasonal vege	0.50
Other seasonal crop	0.20
Other annual crops	1.59
Other perennial crop	42.85

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For LSF, the average size of crop area was as follows: paddy rice (77.87 Ha), maize (14.75 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	1,750	819	1,843	1,897	2,584	1,758
Paddy rice	149	-	1,717	599	-	2,901
Sorghum	1,171	1,184	1,430	1,673	1,729	1,323
Wheat	437	1,674	-	-	-	850
Other cereals	593	-	580	1,344	470	584
Cassava	1,415	-	1,030	-	1,562	1,409
Sweet Potatoes	7,637	4,534	10,328	8,287	16,420	7,745
Irish Potatoes	5,146	13,223	2,676	4,722	3,705	6,840
Yams & Taro	4,575	-	5,271	2,126	42,893	4,653
Cooking Banana	3,351	-	1,326	-	2,722	3,313
Dessert banana	2,556	-	10,958	4,299	7,770	2,730
Banana for beer	3,068	-	3,251	4,033	8,425	3,080
Bush beans	865	-	548	1,061	539	835
Climbing beans	1,067	753	1,101	1,483	-	1,046
Peas	754	502	770	-	692	729
Groundnuts	519	-	397	531	464	508
Soya beans	556	-	925	490	544	593
Vegetables	7,406	5,759	14,250	14,960	16,897	8,703
Fruits	4,458	3,157	-	-	-	4,150

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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.

Table 22. 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	**262,649**	**12,628**	**37,037**	**6,396**	**23,979**	**342,689**	**60,059.2**	**402,748**	**11.0**
Maize	232,583	7,012	34,164	4,972	9,852	288,582	11,747.7	300,330	8.2
Paddy rice	58	-	1,111	766	-	1,936	47,494.9	49,430	1.4
Sorghum	27,483	2,831	1,749	656	14,085	46,803	718.9	47,522	1.3
Wheat	1,484	2,786	-	-	-	4,270	95.2	4,365	0.1
Other cereals	1,041	-	13	2	42	1,098	2.4	1,100	0.0
Tubers and Roots	**1,131,640**	**157,870**	**54,197**	**3,098**	**10,950**	**1,357,754**	**3,902.8**	**1,361,656**	**37.3**
Cassava	392,683	-	5,692	-	6,940	405,315	645.6	405,961	11.1
Sweet Potatoes	459,945	4,432	34,985	2,226	1,170	502,757	1,002.9	503,760	13.8
Irish Potatoes	208,780	153,438	2,442	466	2,311	367,437	2,254.3	369,691	10.1
Yams & Taro	70,232	-	11,078	406	529	82,244	-	82,244	2.3
Banana	**979,009**	**-**	**12,436**	**454**	**12,533**	**1,004,431**	**1,502.4**	**1,005,934**	**27.6**
Cooking Banana	369,415	-	1,493	-	7,258	378,165	1,030.8	379,196	10.4
Dessert banana	88,671	-	5,775	159	2,363	96,968	335.9	97,304	2.7
Banana for beer	520,924	-	5,168	295	2,911	529,298	135.7	529,434	14.5
Legumes & Pulses	**260,715**	**5,281**	**6,138**	**815**	**4,579**	**277,528**	**1,489.0**	**279,017**	**7.6**
Beans	233,712	4,538	4,514	744	4,312	247,820	1,124.6	248,945	6.8
Bush beans	141,880	-	3,767	695	4,312	150,654	1,061.2	151,715	4.2
Climbing beans	91,832	4,538	747	49	-	97,166	63.3	97,230	2.7
Peas	10,764	744	54	-	107	11,669	3.7	11,673	0.3
Groundnuts	5,855	-	62	13	120	6,050	3.4	6,054	0.2
Soya beans	10,385	-	1,507	58	40	11,988	357.2	12,346	0.3
Vegetables and Fruits	**121,782**	**5,326**	**34,960**	**4,961**	**2,139**	**169,168**	**2,878.9**	**172,047**	**4.7**
Vegetables	88,806	4,321	34,960	4,961	2,139	135,186	2,422.3	137,608	3.8
Fruits	32,976	1,006	-	-	-	33,982	456.6	34,438	0.9
Other crops	**393,063**	**827**	**23,766**	**1,466**	**-**	**419,121**	10,276.6	**429,398**	11.8
All Rwanda	**3,148,858**	**181,932**	**168,532**	**17,188**	**54,180**	**3,570,691**	**80,109**	**3,650,799**	**100**

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The share of crop production by groups of crops in Rwanda was significantly high for tubers and roots (37.3%) followed by banana (27.6%). Other crop groups contributed as follows: cereals (11.0%), legumes and pulses (7.6%), and vegetables and fruits (4.7%). The share of crop production for individual crop was highest for banana for beer (14.5%), followed by sweet potatoes (13.8%), cassava (11.1%), cooking banana (10.4%) and Irish potatoes (10.1%).

Figure4: Share of production by main crops (%)

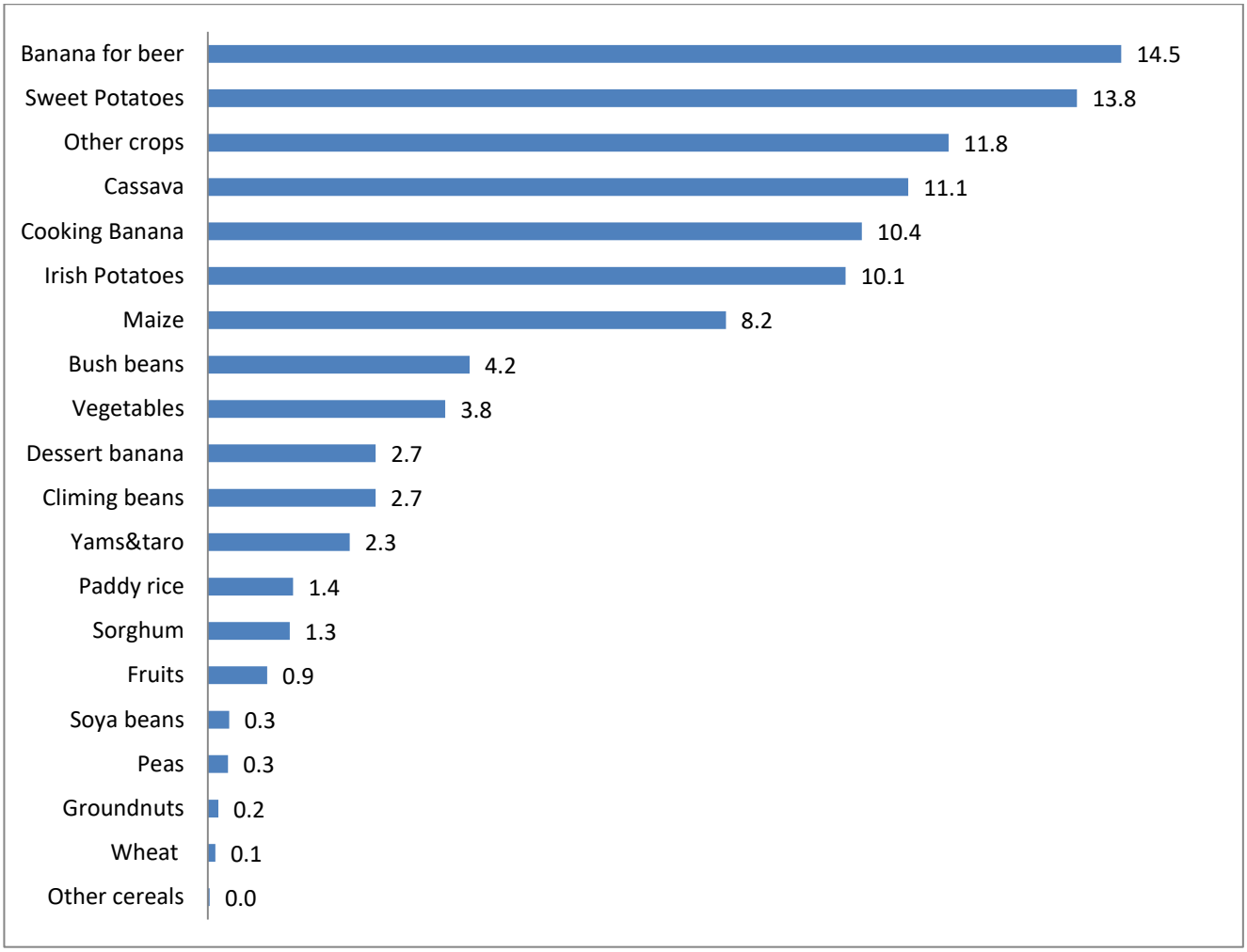
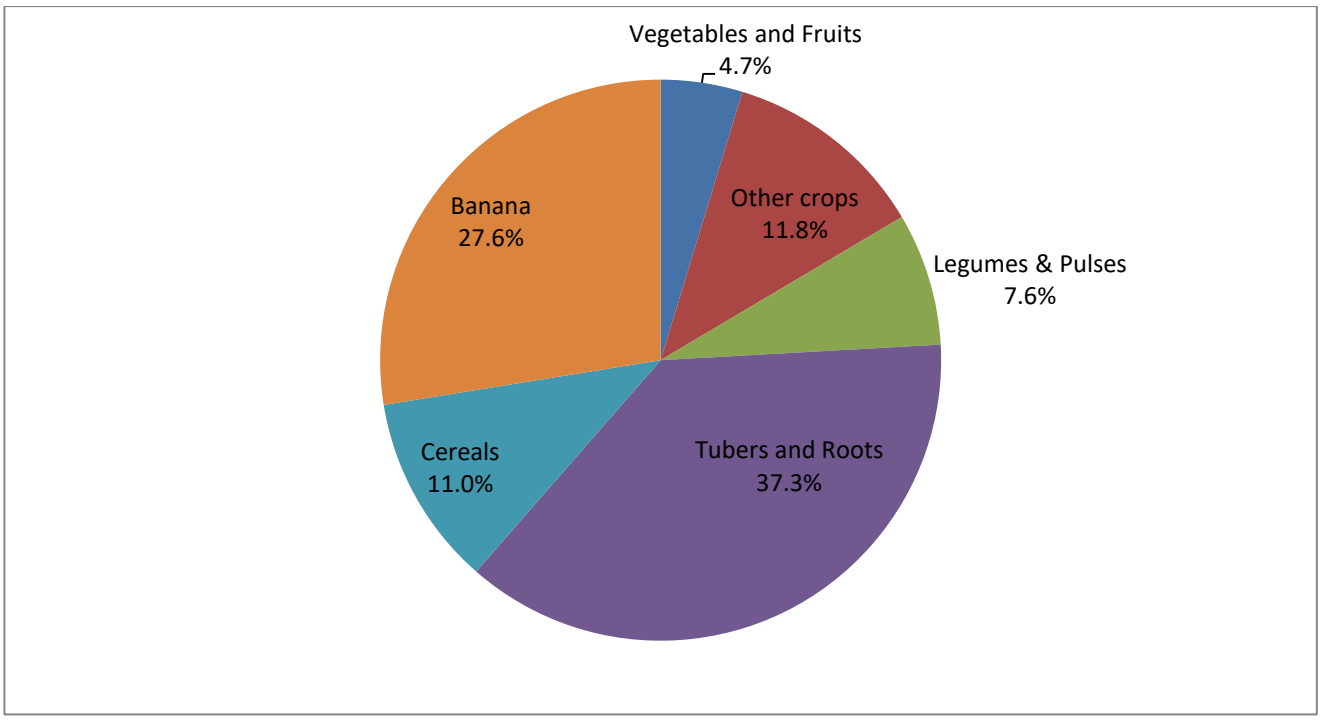


Figure 5 : Share of production by group of crops (%)



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 38.8% and 61.2% respectively (see Table 23). For LSF, the share between pure stand and mixed stand was 83.7% and 16.3% respectively.

Table 23. Share of pure and mixed Crop agricultural land (%)

	Strata	Pure Crop Land	Mixed Crop Land	Total
Agricultural Operators	**1.1**	37.7	62.3	100
	1.2	46.7	53.3	100
	2.1	54.8	45.2	100
	2.2	72.5	27.5	100
	3.0	36.6	63.4	100
	All Rwanda	38.8	61.2	100
LSF		83.7	16.3	100

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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	10.4	0.1	1.3	30.9	8.9	1.9	23.0	3.6	7.6	1.4	11.1	100
1.2	20.0	0.0	4.1	0.2	4.3	29.2	0.2	0.0	11.9	3.8	26.4	100
2.1	43.4	2.3	0.9	11.8	9.5	0.4	4.3	4.6	1.1	0.1	21.6	100
2.2	45.6	25.9	1.1	2.6	4.3	0.8	1.6	4.9	0.1	0.0	13.1	100
3.0	17.0	-	16.0	16.7	0.5	0.4	9.3	26.8	0.0	0.3	13.0	100
All Rwanda	12.9	0.4	1.7	28.3	8.5	2.7	20.7	4.0	7.1	1.4	12.2	100

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Table 24 shows the use of agricultural land for growing main crops in pure stand in the country. Stratum 1.1 used 30.9 percent of total land for pure stand in mainly cassava cultivation followed by banana (23.0%) and maize (10.4%). Stratum 1.2 used 29.2 percent of total land for pure stand cropping mainly for Irish potatoes. Stratum 2.1 used 43.4 percent of total land for pure stand cropping mainly for Maize and Stratum 2.2 used 45.6 percent of total land for pure cropping for maize followed by paddy rice (25.9%).

4.4.2 Use of organic fertilizer

In segments, 60.1% of all agricultural operators in Rwanda reported that they used organic fertilizer (see Table 25). The organic fertilizers were mostly used in Stratum 1.2 (64.7%) followed by Stratum 1.1 (61.1%), Stratum 2.1 (56.8%), Stratum 2.2 (32.5%) and Stratum 3.0 (12.7%).

Table 25. Users of Organic Fertilizers (%)

	Strata	Used organic fertilizers
Agricultural Operators	**1.1**	61.1
	1.2	64.7
	2.1	56.8
	2.2	32.5
	3.0	12.7
	All Rwanda	60.1
LSF		75.9

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For Large-scale farmers, 75.9% 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	63.0	70.6	61.8	68.8	12.2	60.6	71.4
Paddy rice	18.8	0.0	3.0	14.1	0.0	12.4	48.5
Sorghum	27.9	24.3	19.4	0.0	8.2	20.0	34.2
Wheat	69.6	18.2	0.0	0.0	0.0	33.3	75.0
Bush Beans	54.4	0.0	44.3	49.3	9.6	49.4	67.4
Climbing beans	80.7	58.0	68.4	50.0	100.0	74.7	62.5
Peas	71.6	66.3	22.2	0.0	15.4	67.2	30.0
Cassava	50.6	0.0	40.4	50.0	7.2	48.3	50.0
Irish potatoes	69.8	78.6	72.4	58.3	14.3	69.3	60.5
Sweet potatoes	58.2	29.2	52.1	36.1	0.0	55.7	28.6
Cooking banana	58.6	100.0	65.2	0.0	23.1	56.0	74.3
Banana for beer	58.5	0.0	51.9	42.9	27.3	57.7	100.0
Soybeans	53.3	0.0	47.4	46.4	0.0	51.0	65.0
Groundnuts	30.0	0.0	30.0	16.7	10.0	28.1	35.7
Taro	75.0	0.0	77.0	55.3	33.3	74.0	0.0
Vegetables	89.7	58.3	76.3	89.5	62.5	84.4	87.0
Fruits	68.4	100.0	60.0	33.3	0.0	67.4	54.5

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4.4.3 Use of inorganic fertilizer by agricultural operators and large-scale farmers

The survey results showed that 22.0 percent of agricultural operators used inorganic fertilizers while 61.5 percent of LSF used inorganic fertilizers during 2016 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	19.4
	1.2	47.9
	2.1	39.9
	2.2	66.3
	3.0	2.3
	All Rwanda	22.0
LSF		61.5

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For agricultural operators in segments, DAP was the most used (36.3%) followed by UREA (35.5%) and NPK (26.9%) while UREA was the most highly used by LSF (39.8%) followed by DAP (31.9%) and NPK (22.9%).

Table 28. Users of inorganic fertilizers by type and by Stratum (%)

	Strata	NPK	UREA	UREA(LIQUID)	DAP	OTHER Fertilizers	Total
Agricultural Operators	1.1	23.1	35.3	0.9	40.5	0.2	100.0
	1.2	87.1	4.1	1.6	7.1	-	100.0
	2.1	16.8	48.8	0.2	32.6	1.7	100.0
	2.2	45.3	43.9	3.6	6.9	0.3	100.0
	3.0	9.1	63.6	-	27.3	-	100.0
	All Rwanda	26.9	35.5	1.0	36.3	0.3	100.0
LSF		22.9	39.8	0.9	31.9	4.2	100.0

2016 Seasonal Agricultural Survey - Season A

In Strata 1.1 and 2.1, the survey showed that DAP was used by 40.5 and 32.6 percent of all agricultural operators, respectively and NPK was mostly used in Stratum 1.2 (87.1% of all agricultural operators). UREA was also ranked first in the Stratum 3.0 (63.6%).

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

	Agricultural operators						LSF
Crops \ Strata	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	22.0	2.8	40.9	28.9	0.0	21.2	52.1
Paddy rice	68.8	0.0	62.1	86.6	0.0	81.8	97.0
Sorghum	1.1	2.7	0.0	7.7	0.0	1.1	0.0
Wheat	21.7	3.6	0.0	0.0	0.0	9.0	100.0
Bush Beans	4.6	0.0	7.5	4.3	0.6	4.5	16.3
Climbing beans	13.6	1.2	10.5	25.0	0.0	10.5	43.8
Peas	9.8	2.3	0.0	0.0	7.7	7.8	30.0
Cassava	0.4	0.0	0.0	0.0	0.0	0.3	0.0
Irish potatoes	15.3	71.4	9.2	8.3	1.6	28.7	39.5
Sweet potatoes	0.8	0.0	0.8	2.8	0.0	0.8	0.0
Cooking banana	0.1	0.0	0.0	0.0	0.0	0.1	4.1
Banana for beer	0.0	0.0	0.0	0.0	0.0	0.0	25.0
Soybeans	2.6	0.0	10.5	3.6	0.0	3.6	45.0
Groundnuts	0.5	0.0	0.0	0.0	5.0	0.8	0.0
Taro	1.3	0.0	3.5	5.3	0.0	1.9	0.0
Vegetables	33.6	37.5	46.1	55.3	62.5	39.2	43.5
Fruits	0.9	0.0	0.0	0.0	0.0	0.8	22.7

2016 Seasonal Agricultural Survey - Season A

Agricultural operators used inorganic fertilizers mostly on paddy rice (81.8%), vegetables (39.2%), Irish potatoes (28.7%) and maize (21.2 %), while LSF mostly used inorganic fertilizers on wheat (100%), paddy rice (97.0%) and maize (52.1%).

4.4.4 Use of Seeds

In 2016, agricultural operators used traditional seeds more than improved ones (81.8 % and 18.2% respectively). For LSF, on country level, traditional seeds are used at (49.6 %).

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

	Strata	Traditional seeds	Improved seeds
Agricultural Operators	**1.1**	84.0	16.0
	1.2	91.1	8.9
	2.1	69.4	30.6
	2.2	64.5	35.5
	3.0	97.4	2.6
	All Rwanda	81.8	18.2
LSF		49.6	50.4

2016 Seasonal Agricultural Survey - Season A

The use of traditional seeds and improved seeds by Stratum is given in Table 31 and in Table 32.

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	80.0	94.1	58.2	59.4	100.0	79.2	44.5
Paddy rice	100.0	0.0	68.2	61.7	0.0	64.3	45.5
Sorghum	99.4	100.0	100.0	100.0	100.0	99.7	100.0
Wheat	100.0	92.7	0.0	0.0	0.0	94.9	25.0
Bush Beans	99.2	100.0	97.7	97.1	100.0	99.1	81.4
Climbing beans	99.7	97.2	100.0	100.0	100.0	99.1	56.3
Peas	100.0	100.0	100.0	0.0	100.0	100.0	90.0
Cassava	99.5	0.0	98.9	100.0	98.6	99.5	97.2
Irish potatoes	99.5	99.1	100.0	100.0	98.4	99.3	78.9
Sweet potatoes	99.8	95.8	100.0	97.2	100.0	99.6	100.0
Cooking banana	99.9	100.0	100.0	0.0	98.5	99.8	77.0
Banana for beer	99.4	100.0	92.6	100.0	100.0	99.2	37.5
Soybeans	98.6	0.0	96.5	96.4	100.0	98.2	60.0
Groundnuts	99.5	0.0	100.0	100.0	100.0	99.6	100.0
Taro	99.6	0.0	100.0	100.0	100.0	99.7	0.0
Vegetables	77.6	54.2	73.7	60.5	25.0	72.5	30.4
Fruits	97.3	100.0	100.0	100.0	100.0	97.5	54.5

2016 Seasonal Agricultural 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	22.9	7.3	43.6	41.4	.6	23.2	58.0
Paddy rice	0.0	0.0	39.4	41.9	0.0	39.7	69.7
Sorghum	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wheat	0.0	7.3	0.0	0.0	0.0	5.1	75.0
Bush Beans	.9	0.0	2.9	4.3	0.0	1.1	22.1
Climbing beans	.4	1.2	0.0	0.0	0.0	.6	37.5
Peas	0.0	0.0	0.0	0.0	0.0	0.0	10.0
Cassava	.2	0.0	0.0	0.0	0.0	.2	5.6
Irish potatoes	0.0	.3	0.0	0.0	0.0	.1	23.7
Sweet potatoes	0.0	0.0	0.0	2.8	0.0	.1	0.0
Cooking banana	.1	0.0	0.0	0.0	0.0	.1	24.3
Banana for beer	.2	0.0	7.4	0.0	0.0	.5	62.5
Soybeans	1.1	0.0	3.5	3.6	0.0	1.6	40.0
Groundnuts	.0	0.0	0.0	0.0	0.0	.0	0.0
Taro	.0	0.0	0.0	0.0	0.0	.0	0.0
Vegetables	25.9	45.8	39.5	52.6	75.0	33.6	95.7
Fruits	2.1	16.7	0.0	0.0	0.0	2.2	63.6

2016 Seasonal Agricultural Survey - Season A

Agricultural operators used improved seeds mostly to grow vegetables (33.6%) and maize (23.2%). Among LSF, the highest use of improved seeds has been to grow vegetables (95.7%) followed by wheat and paddy rice as their percentages are (75.0% and 69.7% respectively).

4.4.5 Irrigation practices

In Rwanda, only 2.4% of agricultural operators practised irrigation in 2016. The few agricultural operators that practised irrigation were in the Stratum 2.2 (57.1%), Stratum 2.1 (13.9%), Stratum 3.0 (1.2%) and Stratum 1.1 (0.9%). 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 practising Irrigation (%)

	Strata	Practised Irrigation
Agricultural Operators	1.1	0.9
	1.2	-
	2.1	13.9
	2.2	57.1
	3.0	1.2
	All Rwanda	2.4
LSF		16.9

2016 Seasonal Agricultural Survey - Season A

The 2016 SAS results showed that about 2.4% of agricultural operators and 16.9 % of LSF practised 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 (52.6%), followed by those that used watering can (35.2%) (SeeTable34).

Table 34. Agricultural operators and LSF by type of irrigation practised (%)

	Strata	Pumps/tube wells/irrigation machines	Watering can	Water channels	Others	Total
Agricultural Operators	11	6.2	55.4	26.2	12.3	100.0
	21	1.5	30.3	58.3	9.8	100.0
	22	0.5	7.9	89.8	1.8	100.0
	30	38.5	61.5	0.0	0.0	100.0
	Total	3.6	35.2	52.6	8.6	100.0
LSF		19.0	21.9	50.5	8.6	100.0

2016 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 (61.5%, 55.4% and 30.3% respectively).

Agricultural operators from Strata 2.2 and 2.1 mostly used water channels as the irrigation practice (89.8% and 58.3% 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	.1	0.0	2.4	10.9	.6	.9	5.0
Paddy rice	93.8	0.0	92.4	87.9	0.0	88.9	78.8
Sorghum	0.0	0.0	0.0	7.7	0.0	.3	0.0
Wheat	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bush Beans	0.0	0.0	3.4	14.5	.6	.9	1.2
Climbing beans	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Peas	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cassava	.1	0.0	2.2	0.0	0.0	.2	0.0
Irish potatoes	.1	0.0	1.3	25.0	0.0	.4	0.0
Sweet potatoes	.1	0.0	2.5	5.6	0.0	.5	0.0
Cooking banana	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Banana for beer	.1	0.0	0.0	0.0	0.0	.1	0.0
Soybeans	0.0	0.0	0.0	10.7	0.0	.7	10.0
Groundnuts	0.0	0.0	0.0	16.7	0.0	.4	0.0
Taro	.6	0.0	4.4	2.6	0.0	1.4	0.0
Vegetables	12.5	0.0	35.5	60.5	62.5	22.2	47.8
Fruits	.6	0.0	10.0	0.0	0.0	.8	11.4

2016 Seasonal Agricultural Survey - Season A

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 practise anti-erosive activities to prevent the wasting away of the topsoil. The survey results show the distribution of agricultural operators and LSF practising 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	72.9
	1.2	84.4
	2.1	72.6
	2.2	86.5
	3.0	12.6
	All Rwanda	73.2
LSF		55.4

2016 Seasonal Agricultural Survey - Season A

Anti-erosion was practised by 73.2% of agricultural operators and 55.4% of LSF. Most of the anti-erosion activities were practised by agricultural operators in the Stratum 2.2 (86.5%), followed by Stratum 1.2 (84.4%), Stratum 2.1 (72.6%), Stratum 1.1 (72.9%) and Stratum 3.0 (12.6%).

Table 37. Anti-erosive activities by agricultural operators and LSF (%)

	Strata	Ditches	Trees	Bench terraces	Progressive terraces	Cover plants/ grasses	Water drainage	Mulching	Beds	Others	Total
Agricultural Operators	**1.1**	2.9	2.7	4.7	21.1	65.4	0.5	0.7	2.0	0.1	100
	1.2	0.4	0.2	3.5	4.6	31.0	0.0	-	60.3	0.0	100
	2.1	0.2	1.0	0.1	4.5	26.9	32.0	1.1	33.0	1.2	100
	2.2	0.9	0.1	3.4	0.3	9.1	66.3	0.9	18.9	0.0	100
	3.0	29.0	2.1	-	1.3	49.1	-	9.2	9.2	-	100
	All Rwanda	2.5	2.2	4.1	17.3	56.8	6.1	0.7	10.0	0.2	100
LSF		11.9	6.4	9.0	7.9	27.6	24.8	8.6	3.2	0.6	100

2016 Seasonal Agricultural Survey - Season A

The Survey shows that, in Rwanda the most practised erosion control measures by agricultural operators in all Strata were Grasses (56.8%) and progressive terracing (17.3%) followed by beds (10.0%) (See Table 37).

Other erosion control measures such as planting of trees, radical terracing, waterway and mulching were also practised 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	70.2	84.1	62.1	61.7	9.4	66.2	54.6
Paddy rice	100.0	0.0	78.8	98.4	0.0	95.2	93.9
Sorghum	55.9	48.6	45.2	15.4	8.2	38.6	13.2
Wheat	69.6	69.1	0.0	0.0	0.0	69.2	100.0
Bush Beans	68.1	50.0	49.4	58.0	10.2	61.0	37.2
Climbing beans	80.4	81.6	68.4	50.0	0.0	80.3	62.5
Peas	87.5	80.2	44.4	0.0	0.0	81.7	30.0
Cassava	72.0	0.0	64.0	58.3	10.1	69.1	25.0
Irish potatoes	76.6	88.7	61.8	91.7	4.8	75.3	47.4
Sweet potatoes	75.1	54.2	72.3	75.0	0.0	73.8	42.9
Cooking banana	66.7	100.0	47.8	0.0	15.4	62.1	50.0
Banana for beer	73.5	100.0	51.9	57.1	9.1	72.0	62.5
Soybeans	72.8	0.0	49.1	78.6	0.0	68.6	45.0
Groundnuts	65.3	0.0	30.0	50.0	0.0	58.2	14.3
Taro	73.3	0.0	72.6	84.2	66.7	73.8	0.0
Vegetables	78.0	87.5	56.6	65.8	50.0	72.5	78.3
Fruits	78.5	66.7	50.0	100.0	0.0	76.6	63.6

2016 Seasonal Agricultural Survey - Season A

The anti- erosive activities were generally undertaken on cropland. With regards to cropland for maize, sorghum, bush beans, cassava, Irish potatoes, sweet potatoes, taro and vegetables.

4.4.7 Use of pesticides

The survey results showed that in Rwanda 10.6% of agricultural operators used pesticides in their farming activities against 45.6% of LSF. (See Table 39).

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

	Strata	Used Pesticides
Agricultural Operators	1.1	7.8
	1.2	51.5
	2.1	21.3
	2.2	53.8
	3.0	3.1
	Rwanda	10.6
LSF		45.6

2016 Seasonal Agricultural Survey - Season A

The use of pesticides is less than 55% of agricultural operators in all strata. Stratum 2.2 (53.8%) and Stratum 1.2 (51.5%) were having the highest agricultural operators who used pesticides followed by Strata 2.1, 1.1 and 3.0 (21.3%, 7.8% and 3.1% respectively).

The Table 40 shows that, countrywide, for agricultural operators, Cypermetrine is the most used pesticide (36.0% of all agricultural operators) followed by Dithane (31.6%). For the LSF, most of them used Cypermetrine (38.3%), followed by Dithane (13.2%), Ridomil (8.6%) Dimethoate (4.3%).

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

	Strate	DITHANE	RIDOMIL	DIMETHOATE	CYPERMETRINE	DURSIBAN	PILKARE	OTHER PESTICIDE	Total
Agricultural Operators	11	31.7	7.2	11.1	40.2	0.7		9.1	100
	12	46.1	27.7	15.8	10.3	-		0.1	100
	21	16.1	0.9	7.1	53.6	-		22.3	100
	22	2.8	0.6	6.4	61.7	-		28.5	100
	30	36.0	4.0	4.0	28.0	-		28.0	100
	All Rwanda	31.6	10.9	11.5	36.0	0.4		9.7	100
LSF		13.2	8.6	4.3	38.3		0.6	35.0	100

2016 Seasonal Agricultural Survey - Season A

The survey results showed that agricultural operators used pesticides mostly on paddy rice (67.1%), vegetables (39.7%), and Irish potatoes (25.4%).

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 paddy rice (78.8%), vegetables (73.9%) and Irish potatoes (36.8%).

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	3.9	0.3	13.4	10.2	0.0	4.7	16.8
Paddy rice	6.3	0.0	48.5	74.1	0.0	67.1	78.8
Sorghum	0.0	0.0	3.2	0.0	0.0	0.3	0.0
Wheat	0.0	1.8	0.0	0.0	0.0	1.3	0.0
Bush Beans	0.7	0.0	4.0	2.9	0.0	1.0	11.6
Climbing beans	3.7	1.6	0.0	0.0	0.0	3.1	25.0
Peas	4.2	0.0	0.0	0.0	0.0	3.0	0.0
Cassava	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Irish potatoes	8.7	75.5	5.3	0.0	1.6	25.4	36.8
Sweet potatoes	0.1	0.0	0.0	0.0	0.0	0.1	0.0
Cooking banana	0.1	0.0	0.0	0.0	0.0	0.1	1.4
Banana for beer	0.1	0.0	0.0	0.0	0.0	0.1	0.0
Soybeans	0.0	0.0	0.0	0.0	0.0	0.0	10.0
Groundnuts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Taro	0.4	0.0	0.0	5.3	0.0	0.6	0.0
Vegetables	31.9	58.3	44.7	55.3	87.5	39.7	73.9
Fruits	0.3	33.3	10.0	0.0	0.0	1.1	27.3

2016 Seasonal Agricultural Survey - Season A

4.5 Small agricultural equipment

Expenditure on small agricultural equipment by agricultural operators was mainly on the hoe (31.2%) followed by sheet and Sacks for agricultural operators (13.1% and 13.0% respectively) while LSF spent mainly on sacks, sheeting and hoe (41.9%, 34.4% and 11.0% 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.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	37.6	23.1	28.4	23.7	20.2	31.2	11.0
Spring Hoe	2.3	2.6	1.1	0.4	0.8	1.7	0.1
Fork hoe	9.7	2.2	1.7	1.2	8.5	6.3	0.2
Rake	0.1	-	-	-	-	0.0	0.0
Pick/ Ipiki	0.9	0.1	0.9	0.2	1.1	0.8	0.0
Wheelbarrow	0.3	-	1.8	-	2.2	0.7	0.2
Shovel/igitiyo	1.0	0.3	0.9	0.7	1.1	0.9	0.1
Watering pump	-	-	1.0	2.6	4.3	0.9	0.0
Crops Sprayer	1.9	32.9	3.3	9.2	1.4	5.7	3.1
Watering can	0.5	0.3	2.4	1.9	0.6	1.1	0.1
Scie	0.0	-	-	0.1	-	0.0	0.0
Sickle	2.0	0.7	1.6	2.3	0.6	1.8	1.3
Secataur	0.0	-	0.0	-	-	0.0	0.0
Scythe	0.2	-	0.1	0.0	0.2	0.1	0.0
Machete	4.0	1.8	2.5	3.3	4.0	3.5	1.7
Billhook	0.2	0.5	0.1	0.1	0.1	0.2	0.0
Basket	3.2	1.9	12.0	2.1	0.4	4.3	0.1
Sack	9.3	18.0	10.6	19.8	23.2	13.0	41.9
Big basket	0.0	0.0	0.2	0.3	-	0.1	-
Winnower	2.6	0.7	1.9	2.9	4.7	2.6	0.7
Basket(ikibo)	0.6	0.3	0.2	0.1	-	0.4	-
Basket(inkangara)	0.0	0.1	-	-	-	0.0	-
Scale	0.9	2.2	-	0.4	-	0.7	0.1
Jerry-can	1.5	1.4	0.5	1.1	0.4	1.2	0.1
Barrel	0.1	-	0.9	-	0.5	0.3	0.1
Bike	5.9	-	3.0	2.9	4.5	4.3	1.8
Craft bike	0.1	-	-	-	-	0.0	-
Bowl	0.4	0.0	0.6	0.9	0.3	0.5	0.0
Sheeting	9.4	5.5	19.5	20.0	16.7	13.1	34.4
Hoe sleeve	4.0	4.7	3.1	2.3	3.0	3.5	1.3
Thresher machine	0.1	0.1	0.1	-	0.0	0.1	0.3
Others (Specify)	1.2	0.4	1.7	1.3	1.0	1.2	1.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

2016 Seasonal Agricultural Survey - Season A

The survey results on the value of donations received by agricultural operators, hoes (48.1%) were the largest donation followed by watering can (22.2%).

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	45.3	96.5	-	1.8	-	48.1	-
Spring Hoe	0.0	0.1	2.8	2.8	-	0.0	-
Fork hoe	-	-	-	-	-	-	-
Rake	0.0	-	-	4.6	-	0.0	-
Pick/ Ipiki	0.0	-	-	-	-	0.0	-
Wheelbarrow	0.0	-	-	-	-	0.0	-
Shovel/igitiyo	0.1	0.4	7.4	-	-	0.1	-
Watering pump	-	-	-	-	-	-	-
Crops Sprayer	-	-	-	-	-	-	-
Watering can	23.8	0.5	10.2	-	-	22.2	-
Scie	0.0	-	-	-	-	0.0	-
Sickle	0.0	-	-	-	-	0.0	-
Secataur	15.8	-	-	-	-	14.8	-
Scythe	-	-	-	-	-	-	-
Machete	-	-	-	-	-	-	-
Billhook	-	-	-	-	-	-	-
Basket	0.1	-	-	-	-	0.1	-
Sack	5.7	-	1.9	17.4	-	5.4	-
Big basket	-	-	-	-	-	-	-
Winnower	-	-	-	-	-	-	-
Basket(ikibo)	-	-	-	-	-	-	-
Basket(inkangara)	-	-	21.3	-	-	0.1	-
Scale	-	1.2	-	22.0	-	0.1	-
Jerry-can	0.1	-	-	-	-	0.1	-
Barrel	-	1.3	-	23.9	100.0	0.2	-
Bike	-	-	-	-	-	-	-
Craft bike	0.1	-	-	-	-	0.1	-
Bowl	-	-	-	-	-	-	-
Sheeting	0.2	-	27.8	27.5	-	0.4	100.0
Hoe sleeve	0.6	-	28.7	-	-	0.7	-
Thresher machine	8.0	-	-	-	-	7.5	-
Others (Specify)	-	-	-	-	-	-	-
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

2016 Seasonal Agricultural Survey - Season A

For LSF, sheeting was the largest donation.

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	15.9	76.1	.3	.6	2.9	.1	3.6	.1	.4	.0	.1	100
Paddy rice	71.7	23.2	1.2	.1	1.5	.0	2.0	.0	.3	.1	.0	100
Sorghum	51.1	39.4	.5	1.6	1.9	.1	4.8	.0	.6	.0	.0	100
Wheat	18.8	62.5	.0	.0	.5	.0	18.2	.0	.0	.0	.0	100
Bush beans	14.1	70.5	.4	.8	1.4	.3	11.6	.0	.9	.0	.0	100
Climbing beans	7.9	76.9	.1	.1	2.5	.3	11.8	.0	.3	.0	.0	100
Peas	10.0	77.4	.0	.0	1.3	.0	11.2	.0	.1	.0	.0	100
Cassava	22.0	74.2	.9	.2	2.5	.0	.0	.0	.1	.1	.0	100
Irish potatoes	16.8	72.5	.3	.1	1.8	.2	8.2	.0	.0	.1	.0	100
Sweet potatoes	12.2	83.6	1.0	.1	2.4	.0	.0	.6	.0	.1	.0	100
Tomotoes	74.8	21.6	.1	.0	2.5	.0	.2	.0	.0	.7	.0	100
White cabbage	46.0	46.6	.0	.0	6.4	.0	.0	.0	.0	.0	1.1	100
Onions	69.7	26.5	.0	2.0	1.3	.0	.6	.0	.0	.0	.0	100
Carrots	66.1	32.0	.0	.0	1.9	.0	.0	.0	.0	.0	.0	100
Eggplant	46.3	49.3	.0	.0	4.2	.0	.0	.0	.0	.1	.0	100
Cooking Bananas	15.4	82.5	.2	.1	1.4	.0	.0	.0	.1	.0	.2	100
Dessert banana	57.1	41.6	.1	.2	.9	.0	.0	.0	.0	.0	.1	100
Banana for beer	58.3	39.4	.1	.0	1.2	.0	.0	.0	.0	.0	.9	100
Pineapple	29.5	62.7	.0	.0	7.6	.0	.0	.0	.0	.0	.1	100
Avocado	67.0	32.0	.0	.0	1.0	.0	.0	.0	.0	.0	.0	100
Passion fruits	53.1	40.6	.0	.0	3.8	.0	2.5	.0	.0	.0	.0	100
Soya beans	12.1	70.8	.1	.1	.9	.1	15.2	.2	.6	.0	.0	100
Ground nuts	17.2	62.1	.4	.6	1.3	.2	17.6	.0	.5	.0	.0	100
sun flower	.9	90.2	.0	.0	1.5	.1	7.3	.0	.0	.0	.0	100
coffee	100.0	.0	.0	.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	42.5	57.5	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Sweet pepper	68.7	30.5	.0	.0	.7	.0	.1	.0	.0	.0	.0	100
Pepper	81.4	8.6	.0	.0	3.6	.0	6.4	.0	.0	.0	.0	100
Amaranths	41.8	51.1	.0	.0	7.1	.0	.0	.0	.0	.0	.0	100
Celery	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Garlic	57.3	8.8	.0	.0	.0	.0	32.3	.0	1.7	.0	.0	100
Leeks	82.5	13.3	.0	.0	4.2	.0	.0	.0	.0	.0	.0	100
Millet	21.6	67.9	.0	.0	2.9	.0	7.6	.0	.0	.0	.0	100
Cucumber	96.4	3.6	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Taro	12.1	81.1	.5	.0	1.8	.0	4.5	.0	.0	.0	.0	100
Yams	24.1	69.1	.0	.0	3.3	.0	3.5	.0	.0	.0	.0	100
Other seasonal veget	.0	50.0	.0	.0	50.0	.0	.0	.0	.0	.0	.0	100
Other annual vegetab	.0	80.0	.0	.0	20.0	.0	.0	.0	.0	.0	.0	100
Other seasonal crops	97.8	.0	.0	.0	1.5	.0	.0	.0	.0	.7	.0	100
Other annual crops	74.2	5.8	.0	.0	7.5	.0	.0	.0	.0	.0	12.5	100

2016 Seasonal Agricultural Survey - Season A

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	59.4	28.6	0.7	0.0	0.6	0.0	5.6	3.1	1.1	0.9	0.1	100.0
Paddy rice	84.5	14.1	.2	.0	.0	.0	.9	.0	.0	.1	.0	100
Sorghum	85.8	6.7	.1	.0	.0	.0	7.3	.0	.0	.1	.0	100
Wheat	94.0	5.0	.0	.0	.0	.0	1.0	.0	.0	.0	.0	100
Bush beans	50.1	36.5	1.2	.0	.4	.0	10.2	.0	1.2	.0	.0	100
Climbing beans	54.9	31.0	.0	.0	2.1	.0	11.9	.0	.0	.0	.2	100
Peas	37.3	39.5	.0	.0	1.0	2.5	19.8	.0	.0	.0	.0	100
Other legumes & pulses	.0	.0	.0	.0	.0	.0	.0	100.0	.0	.0	.0	100
Cassava	37.3	50.9	.0	.0	.0	.0	.0	11.6	.0	.0	.2	100
Irish potatoes	39.0	53.9	.0	.0	.1	.2	6.7	.0	.0	.1	.0	100
Sweet potatoes	.0	87.1	.0	.0	5.7	.0	.0	7.1	.0	.0	.0	100
Tomotoes	61.3	36.2	.0	.0	.0	1.7	.0	.0	.0	.8	.0	100
White cabbage	32.3	64.4	.0	.0	1.0	.0	.0	.0	.0	.0	.0	98
Flower cabage	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Onions	82.7	17.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Carrots	25.0	75.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Eggplant	69.8	30.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Cooking Bananas	49.3	47.0	.2	.0	3.5	.0	.0	.0	.0	.0	.0	100
Dessert banana	75.9	24.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Banana for beer	85.7	14.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Pineapple	72.3	27.6	.0	.0	.1	.0	.0	.0	.0	.0	.0	100
Avocado	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Passion fruits	98.0	2.0	.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	46.2	31.4	.0	.0	.0	.0	5.4	11.1	5.6	.1	.3	100
Ground nuts	46.2	38.2	.0	.0	1.1	.0	13.9	.0	.0	.0	.0	99
coffee	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Sweet pepper	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Pepper	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Amaranths	11.1	88.9	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Celery	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Millet	95.0	5.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Other seasonal crops	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Other annual crops	75.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	25.0	100
Other perennial crops	66.7	.0	.0	.0	.0	.0	.0	.0	.0	.0	33.3	100

2016 Seasonal Agricultural Survey - Season A

Chapter 5: Results of the 2016 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 186 out of 558LSF and 5,568 out of 23,286agricultural 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(69.5%), followed by Stratum 2.1 (12.7%) and Stratum 1.2 (9.9%). In 2016 Season B Phase II, 186large-scale farmers were listed and enumerated in Rwanda.

Table 46: Agricultural operators and LSF by Stratum

	Strata	Total	
		Number	%
Agricultural Operators	1.1	3,869	69.5
	1.2	500	9.0
	2.1	705	12.7
	2.2	223	4.0
	3.0	271	4.9
	All Rwanda	5,568	100
LSF		186	100

2016 Seasonal Agricultural Survey - Season B

The survey results showed that most of the agricultural operators in segments (99.4%) were individual farmers and only 0.6 % of them were cooperatives.

Table 47. Agricultural operators by type (%)

	Strata	Individual		Cooperative		Total	
		Number	%	Number	%	Number	%
Agricultural Operators	1.1	3,850	69.6	19	52.8	3,869	69
	1.2	499	9.0	1	2.8	500	9
	2.1	696	12.6	9	25.0	705	13
	2.2	216	3.9	7	19.4	223	4
	3.0	271	4.9	0	0.0	271	5
	All Rwanda	5,532	100.0	36	100.0	5,568	100
LSF						186	100

2016 Seasonal Agricultural Survey - Season B

According to the 2016 SAS results, countrywide 15.1% of agricultural operators reported to be members of agricultural cooperatives, where 38.1% of agricultural operators in Stratum 2.2 are part of agricultural cooperatives, compared with 24.8% of Stratum 2.1.

Among LSF, 66.7% of them are members of agricultural cooperatives.

Table 48. Cooperative membership

		Yes	No	Total
	Strata	Percent	Percent	Percent
Agricultural Operators	1.1	11.9	88.1	100
	1.2	17.2	82.8	100
	2.1	24.8	75.2	100
	2.2	38.1	61.9	100
	3.0	13.7	86.3	100
	All Rwanda	15.1	84.9	100
LSF		66.7	33.3	100

2016 Seasonal Agricultural Survey - Season B

5.1.2 Number of agricultural operators by gender

In 2016 Season B, the percentage distribution of agricultural operators in Rwanda by gender was 69.1% male and 30.9% 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	69.2	30.8	100
1.2	66.7	33.3	100
2.1	66.2	33.8	100
2.2	71.3	28.7	100
3.0	77.1	22.9	100
All Rwanda	69.1	30.9	100

2016 Seasonal Agricultural Survey - Season B

5.1.3 Distribution of agricultural operators by Age

The majority (26.1%) of agricultural operators in Rwanda were in the age groups of 55 and above followed by the group of between 35 and 44 (24.5%). The age group distribution of agricultural operators by Stratum varied more in the age group of between 25-34 with Stratum 1.2 (32.5%) being the highest and Strata 2.2 (17.6%) being lowest. The least variation was in the age group of 35-44 with the Stratum 2.2 being the highest (26.9%) and Stratum 3.0 (24.0%) 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	5.0	23.7	24.0	20.6	26.7
1.2	5.0	32.5	26.1	13.0	23.4
2.1	4.7	18.8	25.6	22.6	28.3
2.2	6.5	17.6	26.9	30.1	19.0
3.0	7.7	23.2	24.0	21.8	23.2
All Rwanda	5.2	23.6	24.5	20.6	26.1

2016 Seasonal Agricultural Survey - Season B

The majority (27.0%) of male agricultural operators in Rwanda were in the age group of between 25 and 34, followed by 26.7 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	5.0	27.4	26.5	19.5	21.7
1.2	6.3	36.3	28.2	11.4	17.7
2.1	4.6	21.9	26.9	22.8	23.9
2.2	6.5	18.8	30.5	29.9	14.3
3.0	7.7	25.4	23.0	21.1	23.0
All Rwanda	5.3	27.0	26.7	19.7	21.4

2016 Seasonal Agricultural Survey - Season B

The distribution of female agricultural operators in Rwanda was high in the age group of 55 and above (36.8%) followed by 22.6 percent of female agricultural operators in age groupof between 45 and 54, 19.7 percent of female agricultural operators in age group of between 35 and 44, 16.0 percent in age groupof between 25 and 34 and 4.9 percent in age group of between 14 and 24 (see Table 52).

Table 52. Age distribution of female agricultural operators

	Agricultural Operators				
Strata	14-24	25-34	35-44	45-54	55 and Above
1.1	5.0	15.4	18.5	23.0	38.1
1.2	2.4	24.7	21.7	16.3	34.9
2.1	5.1	12.8	23.0	22.1	37.0
2.2	6.5	14.5	17.7	30.6	30.6
3.0	8.1	16.1	27.4	24.2	24.2
All Rwanda	4.9	16.0	19.7	22.6	36.8

2016 Seasonal Agricultural Survey - Season B

5.1.4 Education Level of Agricultural Operators

The survey results of the 2016 Season B showed that in Rwanda, 66.0% of agricultural operators had attended primary level education, 26.0% had no education, 6.6% attended secondary level education and only 1.4% had attended tertiary level education. Among agricultural operators who had attended primary level education (66.0%) their distribution across Strata was reasonably uniform with Stratum 2.2 and Stratum 2.1 having higher percentages of 67.6 and 66.4 respectively.(see Table 53).

Table 53. Distribution of agricultural operators by education level (%)

	Agricultural Operators				
Strata	Primary	Secondary	Tertiary	No education	Total
1.1	66.3	6.2	1.2	26.4	100
1.2	64.1	10.0	3.0	22.8	100
2.1	66.4	6.0	1.4	26.1	100
2.2	67.6	7.9	0.5	24.1	100
3.0	63.5	6.6	1.5	28.4	100
All Rwanda	66.0	6.6	1.4	26.0	100

2016 Seasonal Agricultural Survey - Season B

In Rwanda, 71.5% of male agricultural operators attended primary level education, 19.9% had no education and 7.0% 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	72.0	6.7	1.4	19.9	100
1.2	71.2	10.5	3.9	14.4	100
2.1	71.1	6.1	1.5	21.3	100
2.2	70.8	7.8	0.6	20.8	100
3.0	66.0	7.7	1.9	24.4	100
All Rwanda	71.5	7.0	1.6	19.9	100

2016 Seasonal Agricultural Survey - Season B

2016 SAS illustrated that 53.8% of female agricultural operators attended primary education. Stratum 2.2 had the highest female agricultural operators with primary education level (59.7%). The lowest percentage of female agricultural operators had tertiary education (0.8%).

Table 55. Education level of female agricultural operators (%)

	Agricultural Operators				
Strata	Primary	Seconda	Tertiary	No educatic	Total
1.1	53.3	5.1	0.7	40.9	100
1.2	50.0	9.0	1.2	39.8	100
2.1	57.0	6.0	1.3	35.7	100
2.2	59.7	8.1	0.0	32.3	100
3.0	54.8	3.2	0.0	41.9	100
All Rwanda	53.8	5.6	0.8	39.8	100

2016 Seasonal Agricultural 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 2016 SAS showed that in Rwanda the majority of agricultural operators (74.2%) were nonresident while 25.8% were residents. In general, the Stratum 3.0 had the biggest percentage of resident's operators (99.9%), while in the rest of the Strata, resident agricultural operators are less than 30.0% of all agricultural operators. (See Table 56)

Table 56. Agricultural operators by residency (%)

	Agricultural Operators		
Strata	**Resident**	**Non resident**	**Total**
1.1	27.9	72.1	100
1.2	27.4	72.6	100
2.1	1.9	98.1	100
2.2	3.2	96.8	100
3.0	99.9	0.1	100
All Rwanda	25.8	74.2	100

2016 Seasonal Agricultural Survey - Season B

4.2 Date of sowing

For agricultural operators, sowing for some crops started before February 2016. 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 February 2016. For paddy rice and sorghum, the majority of agricultural operators indicated January as the sowing date while for yams and taro; the date indicated by the majority of agricultural operators was before January 2016.

Sowing dates for crops such as dessert banana, cooking banana, and 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 December 2015	01-31 January 2016	01- 28 February 2016	After February 2016	Others	Total
Maize	1.9	11.1	46.0	41.0	0.0	100
Paddy rice	11.9	55.9	25.9	6.3	0.0	100
Sorghum	7.7	72.3	18.3	1.6	0.0	100
Wheat	4.4	5.5	6.6	83.5	0.0	100
Bush beans	0.8	4.1	47.1	48.1	0.0	100
Climbing beans	0.9	4.4	46.8	47.9	0.0	100
Peas	2.0	12.7	42.5	42.8	0.0	100
Cassava	1.2	3.2	2.9	3.5	89.2	100
Irish potatoes	12.7	17.1	29.1	41.1	0.0	100
Sweet potatoes	18.5	25.5	25.1	30.9	0.0	100
Yams	86.3	9.8	2.0	0.0	2.0	100
Taro	69.5	11.2	8.8	8.4	2.1	100
Cooking Banana	0.3	0.1	0.4	0.2	99.1	100
Dessert Banana	0.0	0.2	0.7	0.2	98.9	100
Banana for beer	0.4	0.2	0.3	0.3	98.8	100
Soya beans	0.8	11.7	57.3	30.3	0.0	100
Ground nuts	0.3	6.8	53.7	39.2	0.0	100

2016 Seasonal Agricultural Survey - Season B

For LSF, the majority of main crops were sown after February 2016, with the exception of sorghum and paddy rice sown in January and February 2016, respectively.

Table 58. Large-scale farmers indicating sowing date for crops (%)

Crop name	Before December 2015	01-31 January 2016	01- 28 February 2016	After February 2016	Others	Total
Maize	0.0	9.5	27.7	62.8	0.0	100
Paddy rice	26.0	53.4	20.5	0.0	0.0	100
Sorghum	11.2	40.4	33.7	14.6	0.0	100
Wheat	0.0	0.0	0.0	100.0	0.0	100
Bush beans	3.3	2.8	22.2	71.7	0.0	100
Climbing beans	0.0	0.0	75.0	25.0	0.0	100
Peas	0.0	0.0	0.0	100.0	0.0	100
Cassava	1.1	2.2	2.2	1.1	93.4	100
Irish potatoes	0.0	2.2	30.4	67.4	0.0	100
Sweet potatoes	16.0	24.0	12.0	48.0	0.0	100
Taro	100.0	0.0	0.0	0.0	0.0	100
Cooking Banana	2.4	0.0	0.0	0.0	97.6	100
Dessert Banana	0.0	2.6	0.0	0.0	97.4	100
Banana for beer	0.0	0.0	0.0	0.0	100.0	100
Soya beans	0.0	5.6	13.9	80.6	0.0	100
Ground nuts	0.0	0.0	23.1	76.9	0.0	100

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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 2016 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 (29.5%), cassava (17.3%), irish potatoes (10.2%), beans (6.1%), sorghum (3.8%) and maize (2.4 %) (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.

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	**177,635**	**6,355**	**10,605**	**2,822**	**9,211**	**206,628**	**14,082**	**220,710**	**16.8**
Maize	54,654	5,231	2,613	675	2,892	66,065	778	66,843	5.1
Sorghum	115,576	-	6,945	543	6,319	129,383	502	129,884	9.9
Paddy rice	1,062	-	995	1,604	-	3,661	12,728	16,389	1.2
Wheat	5,296	1,124	-	-	-	6,420	74	6,494	0.5
Other Cereals	1,047	-	52	0	0	1,099	-	1,099	0.1
Tubers and Roots	**380,975**	**20,590**	**12,526**	**623**	**7,688**	**422,403**	**546**	**422,949**	32.1
Cassava	265,506	71	4,806	241	6,964	277,588	217	277,804	**21.1**
Sweet potatoes	63,903	875	5,221	299	93	70,391	140	70,530	5.4
Irish potatoes	30,274	19,616	1,552	25	533	52,000	185	52,185	4.0
Yams & Taro	21,292	29	947	59	98	22,425	4	22,429	1.7
Bananas	**302,664**	**148**	**3,285**	**182**	**4,046**	**310,325**	**431**	**310,756**	23.6
Cooking Banana	110,099	47	1,079	65	3,437	114,727	312	115,038	**8.7**
Dessert banana	35,015	-	710	50	170	35,945	70	36,015	2.7
Banana for beer	157,550	101	1,497	67	440	159,654	49	159,703	12.1
Legumes and Pulses	**249,662**	**3,428**	**11,604**	**868**	**12,341**	**277,904**	**3,925**	**281,829**	21.4
Beans	***209,957***	***2,519***	***8,953***	***586***	***9,164***	***231,180***	***2,876***	***234,057***	**17.8**
Bush beans	139,700	10	6,925	536	9,148	156,318	2,825	159,143	***12.1***
Climbing beans	70,258	2,510	2,028	50	16	74,862	51	74,913	5.7
Peas	7,665	909	80	7	184	8,846	54	8,900	0.7
Ground nuts	13,459	-	272	12	369	14,113	30	14,142	1.1
Soya beans	18,581	-	2,298	263	2,623	23,765	965	24,730	1.9
Other legumes & pulses	-	-	-	-	-	-	-	-	0.0
Vegetables and Fruits	**17,506**	**883**	**1,500**	**92**	**69**	**20,049**	**843**	**20,892**	1.6
Vegetables	9,607	800	1,393	91	64	11,954	497	12,451	**0.9**
Fruits	7,898	83	107	2	5	8,095	345	8,440	0.6
Other crops	**56,172**	**1,472**	**668**	**34**	**253**	**58,599**	**1,210**	**59,810**	4.5
Developed	**1,184,614**	**32,876**	**40,188**	**4,622**	**33,608**	**1,295,909**	**21,036**	**1,316,946**	**100.0**
Physical	**1,066,406**	**32,820**	**38,442**	**4,535**	**30,883**	**1,173,086**	**20,786**	**1,193,872**	**100.0**
Fallow	**185,946**	**6,624**	**17,551**	**2,441**	**5,338**	**217,901**	**2,937**	**220,838**	**18.5**

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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.

Figure 6: Shareof agriculture land by crops (%)

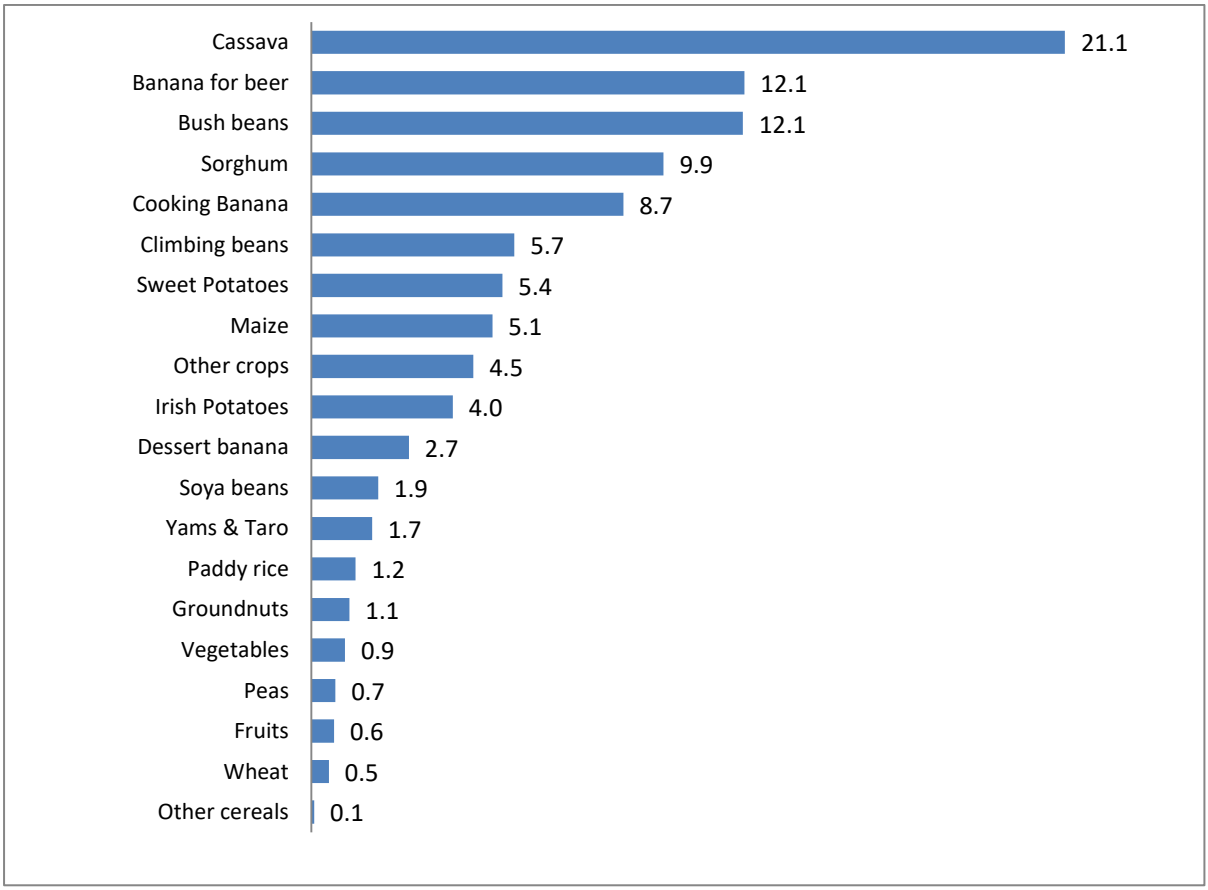
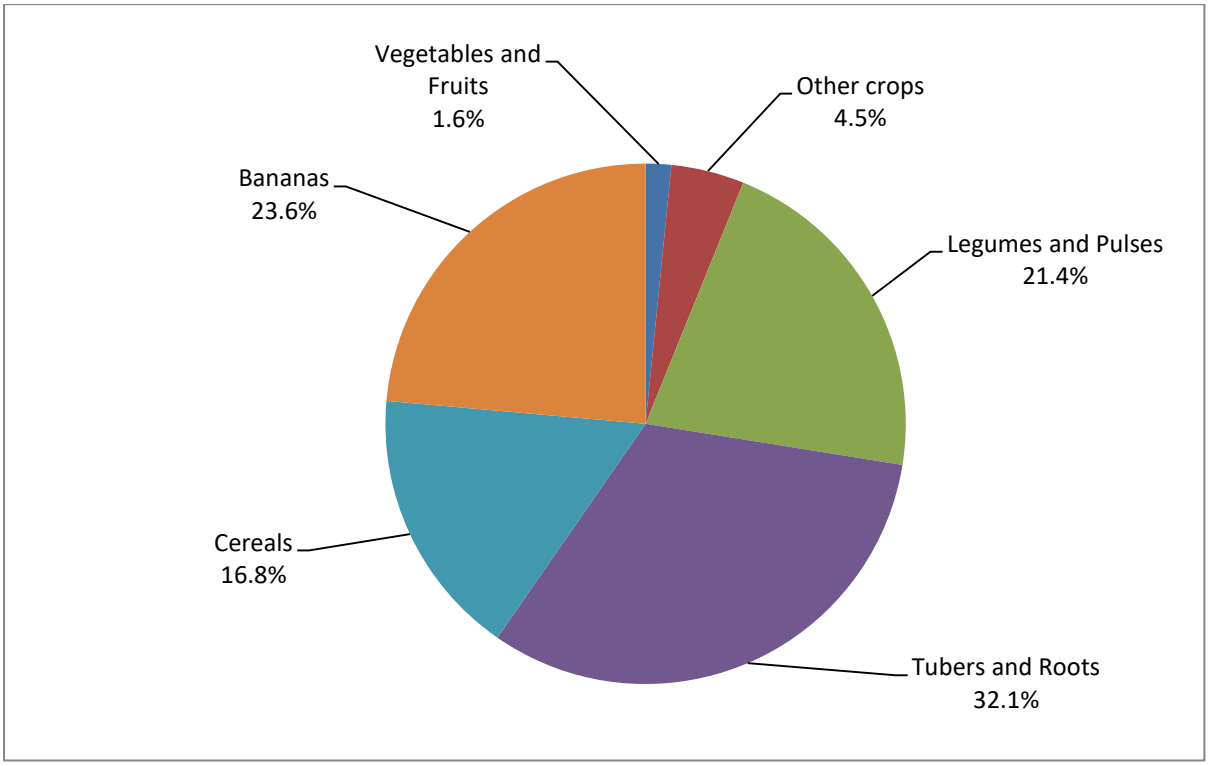


Figure 7: Share of agriculture land by Group of crops (%)



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 (32.1%), banana (23.6%), legumes and pulses (21.4%), cereals (16.8%), while vegetables and fruits 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 2016 Season B was 0.26 hectares (see Table 60).
The Stratum 3.0 had the largest average size of tract for agricultural operators (2.65 Ha) followed by Stratum 2.2 (0.27 Ha), Stratum 1.1 (0.25 Ha), Stratum 1.2 (0.19 Ha) and Stratum 2.1(0.18 Ha).

Table 60. Average size of tract by stratum

Strata	Average (Ha)
1.1	0.25
1.2	0.19
2.1	0.18
2.2	0.27
3.0	2.65
All Rwanda	0.26

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The average size of crop area was below 0.10 Ha with the exception of cassava (0.10 Ha). Fallow land in segments had an average size of 0.10 hectares whereby the Stratum 3.0 has the largest fallow land average size of 1.02 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	0.03	0.06	0.04	0.11	0.12	0.04
Paddy rice	0.04	-	0.09	0.13	-	0.07
Sorghum	0.08	-	0.08	0.07	0.48	0.09
Wheat	0.08	0.10	-	-	-	0.08
Other cereals	0.05	-	-	-	-	0.05
Bush beans	0.07	0.02	0.10	0.08	0.32	0.07
Climbing beans	0.05	0.05	0.03	0.04	0.15	0.05
Peas	0.02	0.06	0.02	0.03	0.13	0.03
Cassava	0.10	0.05	0.06	0.06	0.46	0.10
Irish potatoes	0.05	0.14	0.11	0.05	0.09	0.07
Sweet potatoes	0.03	0.05	0.03	0.04	0.07	0.03
Yams	0.02	-	0.01	-	0.02	0.02
Taro	0.02	0.01	0.01	0.01	0.07	0.02
Tomotoes	0.04	0.04	0.05	0.02	0.16	0.04
White cabbage	0.02	0.03	0.02	0.04	0.02	0.02
Flower cabage	0.02	0.03	-	0.01	-	0.03
Onions	0.02	0.06	0.03	0.00	-	0.03
Carrots	0.02	0.06	0.02	0.01	-	0.02
Eggplant	0.02	0.04	0.02	0.03	0.01	0.02
Other seasonal vegetables	0.03	0.01	-	-	-	0.03
Other annual vegetables	0.01	-	-	-	-	0.01
Cooking Banana	0.09	0.04	0.11	0.12	0.31	0.09
Dessert banana	0.07	-	0.06	0.10	0.14	0.07
Banana for beer	0.10	0.06	0.08	0.06	0.19	0.10
Pineapple	0.09	-	-	0.03	0.03	0.09
Avocado	0.04	0.04	-	-	-	0.04
Passion fruits	0.04	0.03	0.08	-	-	0.04
Other fruits	-	-	0.02	-	-	0.02
Soya beans	0.03	-	0.06	0.10	3.44	0.04
Ground nuts	0.05	-	0.05	0.04	0.12	0.05
sun flower	0.01	-	0.02	0.00	0.00	0.01
coffee	0.06	-	0.02	0.03	0.05	0.06
Pyrethrum	-	0.06	-	-	-	0.06
Other seasonal crops	0.07	-	0.19	-	0.01	0.09
Other annual crops	0.05	0.01	0.02	0.05	-	0.05
Other perennial crops	0.02	-	0.07	0.00	-	0.03
Pasture	2.20	1.55	1.69	1.35	8.64	3.20
Fallow land	0.10	0.12	0.08	0.13	1.02	0.10
Non agriculture land	0.12	0.09	0.89	1.45	2.91	0.15

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For LSF, the average size of crop area was as follows: paddy rice (110.7 Ha), jatropha (94.8 Ha), soybeans (23.5 Ha) and bush beans (11.2 Ha).

Table 62. Average size of crop area per large-scale farmers (Ha)

Crops	Average Size
Maize	4.0
Paddy rice	110.7
Sorghum	3.3
Wheat	6.7
Bush beans	11.2
Climbing beans	2.8
Peas	3.9
Cassava	1.7
Irish potatoes	3.2
Sweet potatoes	3.4
Tomotoes	7.5
White cabbage	8.7
Flower cabage	0.0
Onions	0.6
Carrots	6.1
Eggplant	3.6
Cooking Banana	1.5
Dessert banana	1.0
Banana for beer	1.9
Pineapple	3.5
Avocado	4.5
Passion fruits	0.9
Other fruits	2.4
Soya beans	23.5
Ground nuts	0.7
coffee	8.1
Pyrethrum	7.2
Sweet pepper	1.2
Pepper	1.4
Amaranths	1.9
Celery	0.0

Crops	Average Size
Small red beans	0.2
Sugar beet	0.3
Leeks	0.3
French beans	5.4
Napia grass	0.5
Sugar cane	2.3
Fodder crop	6.6
Macadamia	3.2
Olive crop	10.9
Mango	2.0
Apple	1.1
Papaya	2.5
Tree tomato	0.8
Orange	0.8
Lemon	0.2
Guava	0.5
White Mulberry	4.4
Mucuna	3.0
Jatropha	94.8
Pumpkins	1.4
Cucumber	0.1
Palm tree	48.8
Tea	2.2
Taro	0.6
Other seasonal vegetables	0.0
Other seasonal crops	1.1
Other annual crops	1.8
Other perennial crops	51.0

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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)

C	Strata					
	1.1	1.2	2.1	2.2	3.0	All Rwanda
Maize	1,082	1,058	1,367	554	983	1,106
Paddy rice	2,914	-	2,626	2,104	-	3,729
Sorghum	900	-	1,045	938	563	895
Wheat	886	724	-	-	-	856
Other cereals	401	-	298	-	-	396
Cassava	1,888	-	2,634	3,272	1,316	1,887
Sweet Potatoes	5,478	2,309	7,257	3,567	5,657	5,559
Irish Potatoes	3,697	8,930	11,897	2,427	3,203	5,922
Yams & Taro	2,920	-	7,577	2,723	824	3,103
Cooking Banana	3,429	-	2,780	4,143	2,746	3,407
Dessert banana	2,508	-	3,236	1,584	1,637	2,519
Banana for beer	2,562	-	3,422	2,586	2,685	2,568
Beans	792	1,115	858	834	769	790
Bush beans	684	-	734	813	782	684
Climbing beans	1,005	1,096	1,291	1,163	-	1,015
Peas	485	408	818	-	156	471
Groundnuts	369	-	616	607	130	368
Soya beans	347	-	640	627	160	371
Vegetables	8,154	20,747	13,410	25,694	32,574	10,023
Fruits	1,343	3,253	-	-	-	1,299

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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 (42.7%) followed by banana (29.5%) and cereals (8.5%). Other crop groups contributed as follows: legumes and pulses (6.7%) and vegetables and fruits (4.5%).

Table64. 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	**171,321**	**6,351**	**13,456**	**4,257**	**6,402**	**201,788**	**55,567.5**	**257,355**	**8.5**
Maize	59,146	5,536	3,573	374	2,843	71,472	2,465.5	73,937	2.4
Sorghum	103,969	-	7,255	509	3,560	115,292	1,018.6	116,310	3.8
Paddy rice	3,095	-	2,613	3,375	-	9,083	52,031.5	61,114	2.0
Wheat	4,692	814	-	-	-	5,506	51.9	5,558	0.2
Other Cereals	420	-	15	-	-	436	-	436	0.0
Tubers and Roots	**1,025,540**	**177,192**	**76,183**	**2,072**	**11,475**	**1,292,463**	**2,550.6**	**1,295,014**	**42.7**
Cassava	501,360	-	12,659	787	9,161	523,967	291.9	524,259	17.3
Sweet potatoes	350,075	2,020	37,889	1,065	526	391,574	539.4	392,114	12.9
Irish potatoes	111,931	175,172	18,460	61	1,707	307,332	1,719.3	309,052	10.2
Yams & Taro	62,174	-	7,175	159	81	69,590	-	69,590	2.3
Bananas	**869,005**	**-**	**10,418**	**523**	**10,895**	**890,841**	**1,951.0**	**892,792**	**29.5**
Cooking Banana	377,562	-	2,999	270	9,436	390,267	1,618.8	391,886	12.9
Dessert banana	87,829	-	2,298	79	278	90,484	236.0	90,720	3.0
Banana for beer	403,615	-	5,121	174	1,181	410,090	96.2	410,186	13.5
Legumes and	**181,338**	**3,121**	**9,407**	**666**	**7,650**	**202,182**	**1,349.7**	**203,531**	**6.7**
Beans	166,274	2,809	7,681	489	7,043	184,297	653.9	184,951	6.1
Bush beans	95,590	-	5,082	435	7,152	108,260	642.0	108,902	3.6
Climbing beans	70,609	2,750	2,620	59	-	76,037	11.9	76,049	2.5
Peas	3,717	371	66	-	29	4,183	9.3	4,192	0.1
Ground nuts	4,972	-	168	7	48	5,195	10.7	5,206	0.2
Soya beans	6,450	-	1,471	165	421	8,507	675.8	9,183	0.3
Vegetables and Fruits	**88,947**	**16,859**	**18,675**	**2,330**	**2,080**	**128,891**	**6,873.1**	**135,764**	**4.5**
Vegetables	78,338	16,589	18,675	2,330	2,080	118,012	6,789.0	124,801	4.1
Fruits	10,609	270	-	-	-	10,879	84.1	10,963	0.4
Other crops	**181,629**	**1,414**	**49,336**	**2,123**	**35**	**234,537**	10,329.1	**244,866**	**8.1**
All Rwanda	**2,517,781**	**204,937**	**177,475**	**11,972**	**38,537**	**2,950,701**	**78,621**	**3,029,322**	**100.0**

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The share of crop production for individual crops was highest for Cassava (17.3%) followed by banana for beer (13.5%), sweet potatoes (12.9%), and cooking banana (12.9%).

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

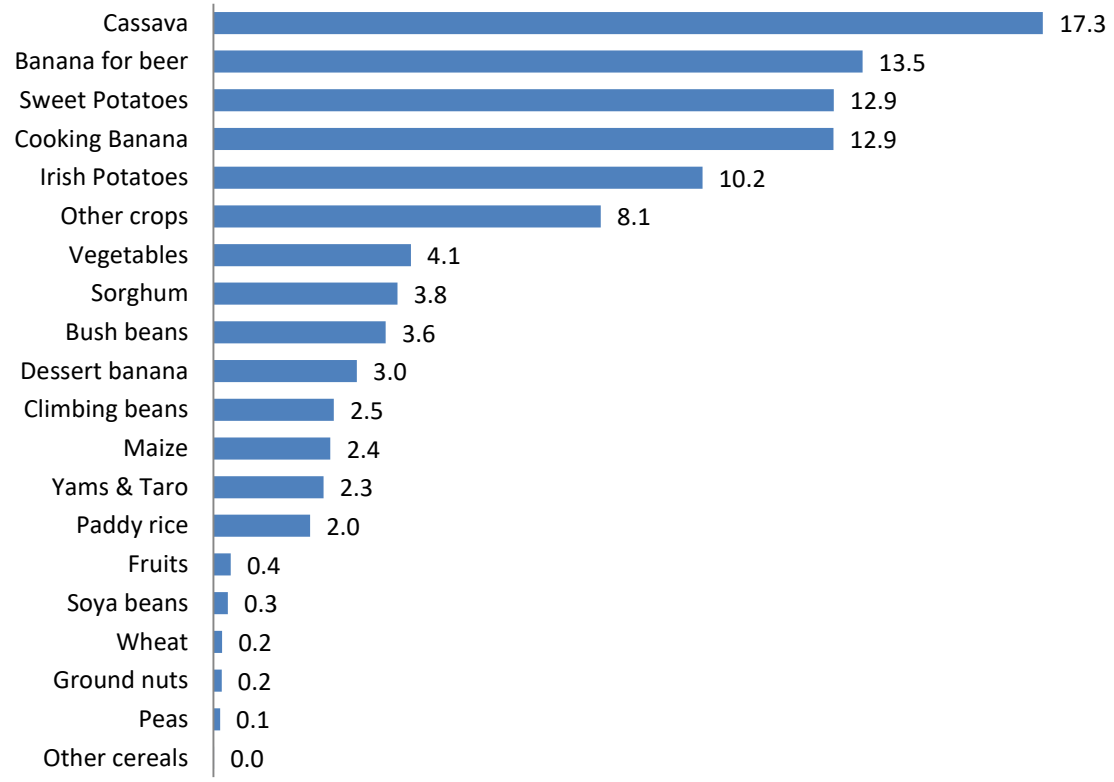
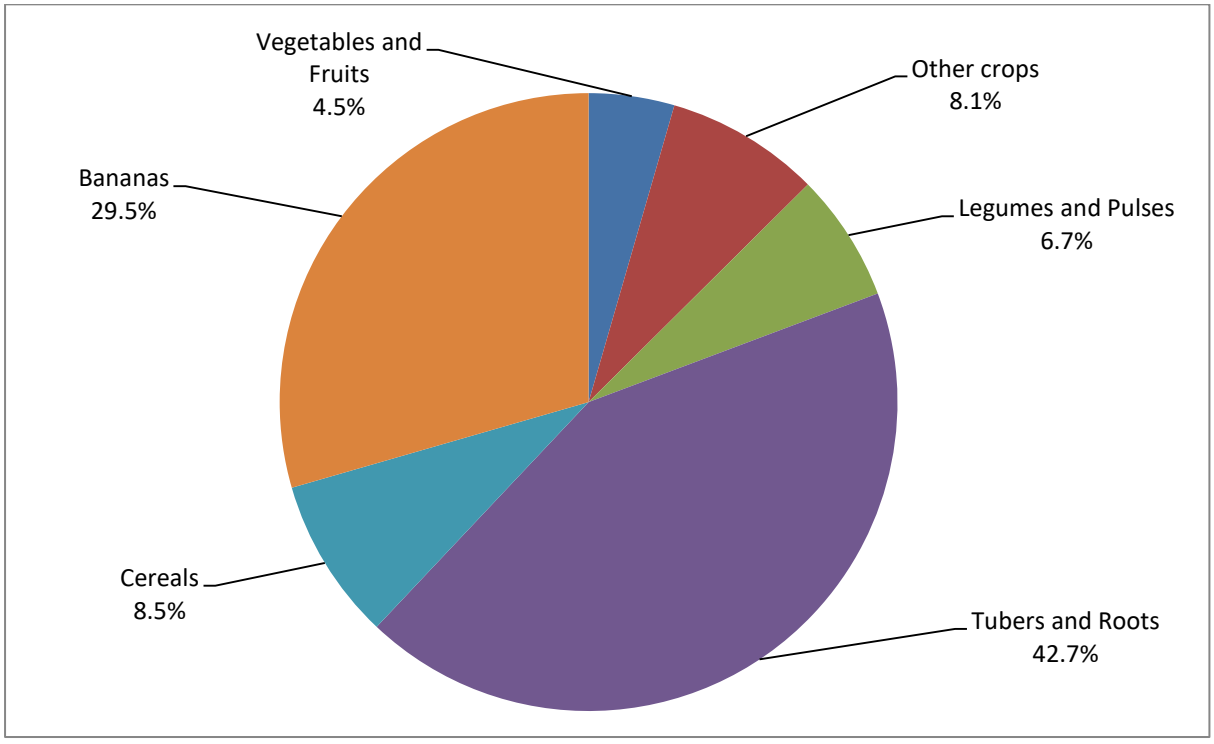


Figure 9: Share of production by group of crops (%)



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 41.0 and 59.0 percent respectively (see Table 65). For LSF the share between pure stand and mixed stand was 80.6 and 19.4 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**	40.0	60.0	100
	1.2	70.5	29.5	100
	2.1	46.7	53.3	100
	2.2	64.6	35.4	100
	3.0	36.9	63.1	100
	All Rwanda	41.0	59.0	100
LSF		80.6	19.4	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 25.3 percent of total land for pure stand in mainly cassava cultivation followed by Banana (24.3%) and sorghum (7.8%). Stratum 1.2 used 61.9 percent of total land for pure stand cropping mainly for Irish potatoes, Stratum 2.1 for Sorghum (19.1%), Stratum 2.2 used 53.7 percent of total land for pure cropping for paddy rice and stratum 3.0 used 23.7 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	3.9	0.2	7.8	25.3	8.0	4.5	24.3	4.0	7.4	0.9	13.8	100
1.2	13.4	-	-	0.2	3.3	61.9	0.2	0.0	5.3	2.6	13.0	100
2.1	4.1	5.3	19.1	9.8	21.5	7.5	7.1	7.1	6.1	0.2	12.2	100
2.2	5.3	53.7	12.4	3.6	8.5	0.5	2.4	6.8	1.0	0.1	5.6	100
3.0	5.8	-	23.7	16.3	0.5	1.2	14.4	14.4	-	0.3	23.3	100
All Rwanda	4.4	0.7	8.2	23.3	8.1	7.0	22.3	4.2	7.0	0.9	13.9	100

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5.4.2 Users of organic fertilizer

In segments, 49.8% of all agricultural operators in Rwanda reported that they used organic fertilizer. For LSF, 64.3 percent used organic fertilizer (see Table 67).
Organic fertilizers were mostly used in Stratum 1.2 (56.8%) followed by Stratum 2.1 (52.6%), Stratum 1.1 (51.9%), Stratum 2.2(35.9%) and Stratum 3.0 (11.4%).

Table 67. Users of organic fertilizers (%)

	Strata	Used organic fertilizers
Agricultural Operators	**1.1**	51.9
	1.2	56.8
	2.1	52.6
	2.2	35.9
	3.0	11.4
	All Rwanda	49.8
LSF		64.3

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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 (%)

Crop \ Strata	Agricultural operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	47.0	66.5	39.9	44.2	11.0	44.7	44.9
Paddy rice	25.0	0.0	7.7	13.4	0.0	14.9	54.3
Sorghum	37.3	0.0	28.3	13.6	5.2	32.8	32.0
Wheat	66.1	6.3	0.0	0.0	0.0	53.3	80.0
Bush Beans	43.3	0.0	37.2	43.9	8.4	39.4	44.2
Climbing beans	77.3	60.7	89.5	100.0	0.0	77.1	60.0
Peas	71.1	70.6	83.3	100.0	12.5	69.8	40.0
Cassava	41.1	0.0	39.5	54.3	11.5	40.1	41.2
Irish potatoes	70.6	79.1	60.0	55.6	2.9	70.3	73.1
Sweet potatoes	53.1	19.0	53.6	35.8	0.0	51.8	62.5
Cooking banana	47.1	0.0	33.3	45.5	28.8	45.7	55.8
Banana for beer	46.5	100.0	20.8	41.7	21.4	45.1	100.0
Soybeans	52.7	0.0	47.6	35.0	0.0	50.7	43.8
Groundnuts	24.6	0.0	18.8	0.0	4.0	22.1	10.0
Taro	56.2	0.0	73.0	53.5	16.7	59.1	0.0
Vegetables	79.0	35.0	83.9	77.4	14.3	74.8	66.7
Fruits	52.0	83.3	48.0	33.3	33.3	51.5	70.5

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5.4.3 Use of inorganic fertilizers by agricultural operators and large-scale farmers

The survey results showed that 18.0 percent of agricultural operators used inorganic fertilizers while 50.8 percent of LSF used inorganic fertilizers during 2016 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**	13.3
	1.2	55.0
	2.1	19.1
	2.2	34.1
	3.0	1.5
	All Rwanda	18.0
LSF		50.8

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For agricultural operators in segments, NPK was highly used (43.1%) followed by DAP (28.1%) and UREA (27.0%). For LSF, NPK was the most highly used (39.5%) followed by UREA (38.9%) and DAP (15.6%).

Table 70. Users of inorganic fertilizers by type and by Stratum (%)

	Strata	NPK	UREA	UREA(LIQUID)	DAP	OTHER Fertilizers	Total
Agricultural Operators	**1.1**	31.2	31.1	0.9	36.1	0.6	100
	1.2	79.0	9.7	1.3	10.0	-	100
	2.1	25.9	33.3	0.6	39.7	0.6	100
	2.2	40.4	39.0	2.2	15.4	2.9	100
	3.0	42.9	14.3	-	42.9	-	100
	All Rwanda	43.1	27.0	1.1	28.1	0.7	100
LSF		39.5	38.9	2.4	15.6	3.6	100

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In Stratum 3.0 and Stratum 2.1, the survey showed that DAP was highly used by 42.9 and 39.7 percent of all agricultural operators within the Stratum respectively and NPK was highly used in Stratum 1.2 and 3.0 by 79.0 and 42.9 percent of all agricultural operators within the Stratum. UREA was also ranked first in the Strata 2.2 and 2.1 (39.0% and 33.3% respectively).

Agricultural operators used inorganic fertilizers mostly on paddy rice (63.6%), Irish potatoes (46.2%), vegetables (43.3%) and wheat (33.3%). The use of inorganic fertilizers by LSF was also important on paddy rice (100%) followed by wheat (60.0%) and vegetables (52.4%).

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	7.2	10.8	6.8	14.0	0.0	7.0	26.5
Paddy rice	67.9	0.0	38.5	71.6	0.0	63.6	100.0
Sorghum	3.9	0.0	2.7	3.4	0.0	3.4	8.0
Wheat	42.4	0.0	0.0	0.0	0.0	33.3	60.0
Bush Beans	2.9	0.0	3.5	9.1	0.0	2.9	15.6
Climbing beans	17.5	0.0	50.0	36.4	0.0	19.0	20.0
Peas	6.9	2.9	0.0	0.0	0.0	6.0	0.0
Cassava	0.4	0.0	0.0	0.0	0.0	0.4	2.9
Irish potatoes	20.5	82.5	23.3	22.2	2.9	43.1	46.2
Sweet potatoes	0.6	0.0	1.8	3.0	0.0	0.9	12.5
Cooking banana	0.3	0.0	0.0	0.0	0.0	0.3	3.9
Banana for beer	0.1	0.0	0.0	0.0	0.0	0.1	0.0
Soybeans	2.6	0.0	8.3	5.0	0.0	3.7	37.5
Groundnuts	1.3	0.0	0.0	0.0	0.0	1.1	10.0
Taro	1.1	0.0	2.0	0.0	0.0	1.2	0.0
Vegetables	35.1	45.0	60.9	64.5	42.9	43.3	52.4
Fruits	0.9	16.7	12.0	0.0	0.0	1.7	11.4

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5.4.4 Use of seeds

In Rwanda, agricultural operators used more traditional seeds (89.5%) than improved seeds (10.5%). The same to LSF, the use of traditional seeds (69.3%) was more than the use of improved seeds (30.7%).

For agricultural operators, stratum 3.0 had the largest share of users of traditional seeds (98.2%) and stratum 1.2 had the largest share of users of improved seeds (18.6%).

Table 72. Agricultural operators by type of seeds used (%)

	Strata	Traditional seeds	Improved seeds
Agricultural Operators	**1.1**	89.8	10.2
	1.2	81.4	18.6
	2.1	91.0	9.0
	2.2	86.3	13.7
	3.0	98.2	1.8
	All Rwanda	89.5	10.5
LSF		69.3	30.7

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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 (%)

Crops \ Strata	Agricultural operators						LSF
	1.1	1.2	2.1	2.2	3.0	All Rwanda	
Maize	91.0	76.8	94.3	88.4	99.4	90.7	69.6
Paddy rice	89.3	0.0	100.0	97.0	0.0	95.9	51.4
Sorghum	99.8	0.0	100.0	98.3	100.0	99.8	96.0
Wheat	88.1	100.0	0.0	0.0	0.0	90.7	80.0
Bush Beans	99.5	0.0	97.1	100.0	98.9	99.2	85.7
Climbing beans	99.9	100.0	97.7	100.0	100.0	99.7	80.0
Peas	99.1	97.1	100.0	100.0	100.0	98.9	100.0
Cassava	99.7	0.0	100.0	97.8	100.0	99.6	94.1
Irish potatoes	99.0	98.3	100.0	88.9	100.0	98.7	76.9
Sweet potatoes	99.9	100.0	100.0	98.5	100.0	99.9	100.0
Cooking banana	99.5	100.0	100.0	90.9	100.0	99.5	80.5
Banana for beer	99.4	100.0	100.0	91.7	100.0	99.4	50.0
Soybeans	99.2	0.0	98.8	90.0	100.0	98.8	62.5
Groundnuts	100.0	0.0	100.0	66.7	100.0	99.6	100.0
Taro	99.4	100.0	100.0	97.7	100.0	99.5	0.0
Vegetables	73.1	37.5	56.3	45.2	100.0	64.9	42.9
Fruits	98.4	100.0	92.0	77.8	100.0	97.7	52.3

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The results showed that improved seeds were used mostly on vegetables (41.5%), wheat (9.3%) and maize (10.4%) by agricultural operators. The remaining crops had a small percentage of users of improved seeds. LSF used improved seeds mostly on vegetables (81.0%) and paddy rice (60.0%).

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	9.7	26.5	7.3	14.0	0.6	10.4	33.3
Paddy rice	10.7	0.0	0.0	9.0	0.0	7.4	60.0
Sorghum	0.2	0.0	0.0	1.7	0.0	0.2	4.0
Wheat	11.9	0.0	0.0	0.0	0.0	9.3	20.0
Bush Beans	0.4	0.0	2.3	0.0	1.1	0.6	16.9
Climbing beans	0.4	0.0	2.3	9.1	0.0	0.6	40.0
Peas	0.9	2.9	0.0	0.0	0.0	1.1	0.0
Cassava	0.1	0.0	0.0	0.0	0.0	0.1	5.9
Irish potatoes	1.2	2.1	0.0	0.0	0.0	1.4	26.9
Sweet potatoes	0.0	0.0	0.0	1.5	0.0	0.1	0.0
Cooking banana	0.1	0.0	0.0	0.0	0.0	0.1	19.5
Banana for beer	0.1	0.0	0.0	0.0	0.0	0.1	50.0
Soybeans	0.8	0.0	0.0	5.0	0.0	0.8	37.5
Groundnuts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Taro	0.1	0.0	0.0	0.0	0.0	0.1	0.0
Vegetables	32.5	72.5	49.4	61.3	28.6	41.5	81.0
Fruits	1.6	0.0	4.0	11.1	0.0	1.9	52.3

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5.4.5 Irrigation practice

In Rwanda only 4.5% of agricultural operators practised irrigation in 2016 Season B while for LSF 34.3% practised irrigation during their farming activities. A few agricultural operators that practised irrigation were in the Stratum 2.2 (31.0%), Stratum 2.1 (12.4%), Stratum 3.0 (1.8%) and Stratum 1.1 (1.7%).

Table 75. Agricultural operators and large-scale farmers practising irrigation (%)

	Strata	Practised Irrigation
Agricultural Operators	1.1	1.7
	1.2	-
	2.1	12.4
	2.2	31.0
	3.0	1.8
	All Rwanda	4.1
LSF		34.3

2016 Seasonal Agricultural Survey - Season B

On the type of irrigation used by agricultural operators, the survey results showed that the majority of agricultural operators used water channels (47.1%) for irrigation followed by watering can and pumps/tube/wells/irrigation machines (see Table 76).
Use of water channels for irrigation was predominantly in Stratum 2.2 (77.8%). There was no use of Pumps/Tube wells/Irrigation machines by agricultural operators in stratum 2.2.

Table 76. Agricultural operators and LSF by type of irrigation practised (%)

	Strata	Pumps/tube wells/irrigation machines	Watering can	Water channels	Others	Total
Agricultural Operators	1.1	11.6	47.8	36.2	4.3	100
	2.1	4.4	34.1	33.0	28.6	100
	2.2	-	18.1	77.8	4.2	100
	3.0	50.0	33.3	16.7	-	100
	All Rwanda	6.3	33.2	47.1	13.4	100
LSF		29.4	17.6	52.9	-	100

2016 Seasonal Agricultural Survey - Season B

Most of the LSF in Rwanda practised the water channels type of irrigation (52.9%), pumps/tube/wells/irrigation machines (29.4%) and watering can (17.6%) types of irrigation.

Table 77. Practice of irrigation by crop (%)

Crops \ Strata	Agricultural operators					LSF
	1.1	2.1	2.2	3.0	All Rwanda	
Maize	0.2	1.6	2.3	0.6	0.4	8.8
Paddy rice	92.9	88.5	79.1	0.0	84.3	94.3
Sorghum	0.0	0.0	0.0	0.0	0.0	0.0
Wheat	0.0	0.0	0.0	0.0	0.0	20.0
Bush Beans	0.1	0.6	1.5	0.0	0.2	2.6
Climbing beans	0.1	0.0	0.0	0.0	0.1	0.0
Peas	0.0	16.7	0.0	0.0	0.4	20.0
Cassava	0.1	0.7	0.0	0.0	0.2	0.0
Irish potatoes	0.0	30.0	0.0	0.0	1.2	7.7
Sweet potatoes	0.1	2.5	1.5	0.0	0.5	0.0
Cooking banana	0.0	3.7	0.0	0.0	0.1	3.9
Banana for beer	0.0	0.0	0.0	0.0	0.0	16.7
Soybeans	0.0	1.2	0.0	0.0	0.2	50.0
Groundnuts	0.8	0.0	0.0	0.0	0.7	0.0
Taro	0.4	2.0	0.0	0.0	0.7	0.0
Vegetables	11.8	49.4	45.2	57.1	21.3	47.6
Fruits	0.5	4.0	0.0	0.0	0.6	13.6

2016 Seasonal Agricultural Survey - Season B

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 72.1 percent of agricultural operators and 64.4% of LSF in Season 2016 B. Most of the anti-erosion activities were practised by agricultural operators in the Stratum 1.2 (83.2%), followed by Stratum 1.1 (72.2%), Stratum 2.1 (71.1%), Stratum 2.2 (64.6%) and Stratum 3.0 (15.6%) (See Table78).

Table 78. Anti-erosive activities by agricultural operators and large-scale farmers (%)

	Strata	Practised Anti-erosion
Agricultural Operators	1.1	72.2
	1.2	83.2
	2.1	71.1
	2.2	64.6
	3.0	15.6
	All Rwanda	72.1
LSF		64.4

2016 Seasonal Agricultural Survey - Season B

The Survey shows that in Rwanda the most practised erosion control measures by agricultural operators in all Strata were grasses (67.1%) and progressive terracing (18.0%) followed by beds (3.9%) (See Table 79). Other erosion control measures such as planting of trees, radical terracing, waterway and mulching were also practised by a small number of agricultural operators.

Table 79. Anti-erosive activities by agricultural operators and LSF (%)

	Strata	Ditches	Trees	Bench terraces	Progressive terraces	Cover plants/grasses	Water drainage	Mulching	Beds	Others	Total
Agricultural Operators	**1.1**	2.6	2.2	4.3	18.7	68.5	0.4	1.3	1.9	0.0	100
	1.2	3.4	2.3	4.4	0.9	26.4	-	-	62.7	-	100
	2.1	1.4	0.7	0.2	9.0	29.3	29.7	0.9	27.0	1.9	100
	2.2	0.5	1.4	4.2	1.2	12.0	47.0	2.1	31.5	-	100
	3.0	10.0	15.0	-	18.5	39.4	4.6	12.1	0.4	-	100
	All Rwanda	2.6	2.2	4.2	18.0	66.1	1.6	1.3	3.9	0.1	100
LSF		13.7	9.3	5.6	8.0	24.7	18.0	16.2	4.5	0.1	100

2015 Seasonal Agricultural Survey - Season B

The anti-erosion activities were generally for all cropland. With regards to cropland for paddy rice, Irish potatoes, peas, wheat, climbing beans, and vegetables.

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	68.8	94.6	56.5	62.8	9.8	64.4	8.8
Paddy rice	66.7	0.0	57.7	59.7	0.0	60.8	94.3
Sorghum	71.9	0.0	64.2	32.2	11.3	64.9	0.0
Wheat	83.1	87.5	0.0	0.0	0.0	84.0	20.0
Bush Beans	65.6	0.0	62.8	63.6	7.9	59.8	2.6
Climbing beans	81.5	100.0	75.6	72.7	0.0	82.4	0.0
Peas	82.3	85.3	83.3	100.0	12.5	80.8	20.0
Cassava	74.7	0.0	70.7	54.3	21.8	72.0	0.0
Irish potatoes	76.9	94.9	90.0	55.6	2.9	80.6	7.7
Sweet potatoes	78.2	57.1	75.5	74.6	11.1	77.0	0.0
Cooking banana	68.7	50.0	74.1	36.4	45.8	67.3	3.9
Banana for beer	73.4	100.0	50.0	50.0	28.6	71.6	16.7
Soybeans	76.8	0.0	61.9	65.0	0.0	73.1	50.0
Groundnuts	55.5	0.0	68.8	0.0	20.0	52.5	0.0
Taro	77.1	33.3	78.1	67.4	33.3	76.4	0.0
Vegetables	74.9	97.5	80.5	71.0	57.1	77.5	47.6
Fruits	77.2	100.0	68.0	55.6	22.2	75.5	13.6

2016 Seasonal Agricultural Survey - Season B

5.4.7 Use of pesticides

The survey results showed that in Rwanda 11.6 percent of agricultural operators used pesticides in their farming activities while 42.7% 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 (54.8%) followed by the ones in Stratum 2.2 (17.5%), Stratum 2.1 (9.5%), Stratum 1.1(6.7%) and Stratum 3.0 (2.2%).

Table 81. Agricultural operators and LSF using pesticide (%)

	Strata	Used Pesticides
Agricultural Operators	1.1	6.7
	1.2	54.8
	2.1	9.5
	2.2	17.5
	3.0	2.2
	Rwanda	11.6
LSF		42.7

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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 1.1 and Ridomil was predominantly used in Stratum 1.2. Countrywide, for agricultural operators, survey showed that dithane is the most used pesticide (41.5%) followed by cypermetrine (23.2%) while the majority of LSF used cypermetrine pesticide (35.6%), followed by dithane pesticide (17.8%), ridomil pesticide (8.1%), dimethoate pesticide (2.2%), and dursiban (0.7%).

Table 82.Type of pesticide used by agricultural operators and LSF

	Strate	DITHANE	RIDOMIL	DIMETHOATE	CYPERMETRINE	DURSIBAN	TILT	PILKARE	OTHER PESTICIDE	Total
Agricultural Operators	11	44.2	6.7	12.0	28.7	2.3	-	0.6	5.6	100
	12	45.3	32.0	8.1	14.4	-	-	-	0.2	100
	21	25.9	-	10.6	50.6	-	-	-	12.9	100
	22	14.3	-	25.4	38.1	1.6	1.6	1.6	17.5	100
	30	33.3	13.3	13.3	26.7	-	-	-	13.3	100
	All Rwanda	41.5	19.5	10.6	23.2	0.8	0.1	0.3	4.0	100
LSF		17.8	8.1	2.2	35.6	0.7	-	0.7	34.8	100

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The survey results showed that agricultural operators used pesticides mostly on Irish potatoes (43.2%), vegetables (43.1%) and paddy rice (29.8%). The use of pesticides by LSF was considerably high on paddy rice (91.4%) and vegetables (76.2%).

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	0.6	0.5	1.6	4.7	0.0	0.8	8.7
Paddy rice	28.6	0.0	15.4	35.8	0.0	29.8	91.4
Sorghum	0.2	0.0	0.0	0.0	0.0	0.1	2.0
Wheat	0.0	0.0	0.0	0.0	0.0	0.0	40.0
Bush Beans	0.2	0.0	0.6	1.5	0.0	0.3	9.1
Climbing beans	3.1	2.4	4.7	0.0	0.0	3.1	40.0
Peas	4.7	0.0	16.7	0.0	0.0	4.3	40.0
Cassava	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Irish potatoes	19.8	86.3	10.0	0.0	0.0	43.2	42.3
Sweet potatoes	0.2	0.0	0.4	0.0	0.0	0.2	0.0
Cooking banana	0.1	0.0	0.0	0.0	0.0	0.1	3.9
Banana for beer	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Soybeans	0.0	0.0	1.2	5.0	0.0	0.4	0.0
Groundnuts	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Taro	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vegetables	35.4	62.5	54.0	48.4	71.4	43.1	76.2
Fruits	0.2	66.7	12.0	0.0	0.0	1.7	18.2

2016 Seasonal Agricultural Survey - Season B

5.5 Small agricultural equipment

The survey results showed that countrywide, most of the expenditure by agricultural operators was on the hoe (25.0%) followed by sheeting (10.7%) and bike (10.0%) (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 (41.3%) and sheeting (31.8%) (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	28.0	13.3	43.3	14.9	23.3	25.0	10.7
Spring Hoe	1.7	0.4	1.5	0.1	0.1	1.1	0.0
Fork hoe	8.9	5.3	3.9	1.9	7.4	6.4	0.1
Rake	0.0	0.1	0.1	-	-	0.0	-
Pick/ Ipiki	0.8	-	0.5	0.1	1.1	0.5	0.0
Wheelbarrow	2.6	-	-	-	1.1	1.4	0.2
Shovel/igitiyo	0.7	0.4	0.8	40.8	0.4	9.7	0.1
Watering pump	1.1	-	0.7	-	-	0.6	0.2
Crops Sprayer	2.1	35.6	2.5	2.9	0.1	5.4	2.9
Watering can	1.3	0.1	3.1	1.0	0.1	1.3	0.1
Scie	0.0	-	-	-	-	0.0	-
Sickle	2.0	0.3	2.4	2.7	0.6	2.0	3.0
Secataur	0.0	-	-	-	-	0.0	0.3
Scythe	0.2	-	0.1	0.0	0.0	0.1	0.0
Machete	3.9	2.1	3.0	2.3	5.4	3.4	2.3
Billhook	0.1	0.0	0.2	-	-	0.0	-
Basket	2.8	0.9	3.7	0.8	0.2	2.1	0.3
Sack	8.0	19.3	7.9	9.5	11.8	9.6	41.3
Big basket	0.1	0.0	-	-	-	0.0	-
Winnower	2.9	0.5	3.8	1.6	2.9	2.5	3.0
Basket(ikibo)	0.7	0.7	0.1	0.1	0.2	0.5	-
Basket(inkangara)	0.0	-	-	-	-	0.0	-
Scale	0.7	3.2	1.1	0.5	2.5	1.0	1.1
Jerry-can	2.1	3.6	0.7	0.4	0.6	1.6	0.1
Barrel	0.4	0.1	0.4	-	-	0.3	0.1
Bike	12.7	1.8	9.1	4.3	23.2	10.0	-
Craft bike	0.0	-	-	-	-	0.0	-
Bowl	0.4	0.0	0.5	0.2	0.3	0.3	0.1
Sheeting	10.4	7.6	6.1	14.1	12.6	10.7	31.8
Hoe sleeve	3.8	3.2	4.4	1.5	2.7	3.2	1.3
Thresher machine	0.0	-	-	0.0	0.0	0.0	0.1
Others (Specify)	1.6	1.3	0.2	0.4	3.4	1.2	0.9
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 (80.4%) was the largest donation followed by fork hoe (18.7%). For LSF the largest donation was rake (66.0%) followed by sack (33.0%).

Table 85. 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	33.0	100.0	93.9	100.0	-	80.4	-
Spring Hoe	0.0	-	-	-	-	0.0	-
Fork hoe	65.9	-	-	-	28.6	18.7	-
Rake	-	-	-	-	28.6	0.0	66.0
Pick/ Ipiki	-	-	-	-	-	-	-
Wheelbarrow	-	-	-	-	-	-	-
Shovel/igitiyo	0.2	-	-	-	-	0.0	-
Watering pump	-	-	-	-	-	-	-
Crops Sprayer	-	-	-	-	-	-	1.0
Watering can	-	-	0.1	-	14.3	0.0	-
Scie	-	-	-	-	-	-	-
Sickle	-	-	-	-	-	-	-
Secataur	-	-	-	-	-	-	-
Scythe	-	-	1.2	-	-	0.1	-
Machete	-	-	-	-	-	-	-
Billhook	-	-	-	-	-	-	-
Basket	-	-	-	-	-	-	-
Sack	0.3	-	0.6	-	-	0.1	33.0
Big basket	-	-	0.1	-	-	0.0	-
Winnower	-	-	-	0.0	-	0.0	-
Basket (ikibo)	-	-	-	-	-	-	-
Basket (inkangara)	-	-	-	-	-	-	-
Scale	-	-	-	-	-	-	-
Jerry-can	-	-	3.0	-	28.6	0.2	-
Barrel	0.2	-	-	-	-	0.1	-
Bike	0.3	-	-	-	-	0.1	-
Craft bike	-	-	-	-	-	-	-
Bowl	0.1	-	-	-	-	0.0	-
Sheeting	-	-	-	-	-	-	-
Hoe sleeve	-	-	-	-	-	-	-
Thresher machine	-	-	-	-	-	-	-
Others (Specify)	-	-	1.2	-	-	0.1	-
Total	**100**	**100**	**100**	**100**	**100**	**100**	100

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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 Tables 86 and 87.

Table 86. Use of production by agricultural operators (%)

	Sold	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	Stored	Damaged	Used in any other way	Total
Maize	6.4	86.5	.4	.6	2.1	.1	3.5	.1	.1	.0	.1	100
Paddy rice	45.0	45.0	1.0	1.8	3.1	.0	3.9	.0	.0	.0	.0	100
Sorghum	28.7	59.0	.4	1.1	4.2	.1	6.1	.0	.4	.0	.0	100
Wheat	16.8	65.6	.0	.0	1.7	.0	15.9		.0	.0	.0	100
Other cereals	.0	90.0	.0	.0	.0	.0	10.0	.0	.0	.0	.0	100
Bush beans	10.2	75.0	.5	1.0	1.5	.1	11.1	5.9	.5	.0	.1	100
Climbing beans	6.8	77.6	.3	.3	2.1	.1	12.5	.0	.4	.0	.0	100
Peas	8.9	78.6	.0	.0	1.1	.2	11.2		.0	.0	.0	100
Cassava	11.7	84.6	.5	.2	2.6	.0	.0	.0	.2	.2	.0	100
Irish potatoes	19.2	64.3	.3	.1	2.3	.1	13.7		.0	.1	.0	100
Sweet potatoes	12.6	83.3	.7	.1	2.8	.0		.4	.0	.0	.0	100
Tomotoes	71.1	22.8	.0	.0	4.6	.0	.4		.0	1.1	.0	100
White cabbage	44.5	47.8	.0	.0	7.2	.3		.1	.0	.1	.0	100
Flower cabage	27.3	66.5	.0	.0	6.3	.0		.0	.0	.0	.0	100
Onions	70.0	28.8	.0	.0	1.1	.0	.2		.0	.0	.0	100
Carrots	59.7	38.6	.0	.0	1.7	.0		.0	.0	.0	.0	100
Eggplant	35.5	60.5	.0	.0	3.9	.0	.1		.0	.0	.0	100
Cooking Bananas	15.7	81.8	.4	.0	1.9	.0			.0	.0	.0	100
Dessert banana	55.0	43.3	.0	.0	1.4	.0			.0	.3	.0	100
Banana for beer	58.0	40.3	.1	.0	1.5	.0	.0		.0	.0	.1	100
Pineapple	37.7	57.5	.0	.0	5.0	.0			.0	.0	.0	100
Avocado	62.0	30.0	.0	.0	7.5	.0			.0	.0	.5	100
Passion fruits	54.7	40.8	.0	.0	4.5	.0	.0		.0	.0	.0	100
Soya beans	7.8	75.9	.0	.0	.6	.2	14.8	.0	.8	.0	.0	100
Ground nuts	17.4	61.6	.2	.2	1.2	.0	19.4		.2	.0	.0	100
sun flower	5.9	83.8	.0	.0	1.7	.9	7.8		.0	.0	.0	100
coffee	99.1	.9	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Pyrethrum	100.0		.0	.0	.0	.0			.0	.0	.0	100
Black eggplants	100.0	.0	.0	.0	.0	.0	.0		.0	.0	.0	100
Sweet pepper	71.8	23.6	.0	.0	4.6	.0	.0		.0	.0	.0	100
Pepper	96.1	2.3	.0	.0	1.4	.0	.2		.0	.0	.0	100
Amaranths	29.2	68.2	.0	.0	2.6	.0		.0	.0	.0	.0	100
Celery	100.0	.0	.0	.0	.0	.0		.0	.0	.0	.0	100
Spinach	.0	80.0	.0	.0	20.0	.0		.0	.0	.0	.0	100
Small red beans	.0	72.5	.0	.0	.0	.0	27.5		.0	.0	.0	100
Sugar beet	81.7	17.3	.0	.0	1.0	.0			.0	.0	.0	100
Garlic	84.3	1.1	.0	.0	2.1	6.7			5.7	.0	.0	100

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Table 87. Use of Production by agricultural operators (%) (Cont).

	Sold	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	Stored	Damaged	Used in any other way	Total
Leeks	63.0	29.9	.0	.0	1.9	.0			5.2	.0	.0	100
French beans	55.3	40.2	.0	.0	4.5	.0			.0	.0	.0	100
Napia grass	50.0		.0	.0	.0	.0	.0	.0	.0	.0	50.0	100
Sugar cane	37.9	56.2	.3	.0	5.5	.0	.2		.0	.0	.0	100
Fodder crop	4.8	25.0	.2	.0	2.0	.0	4.6	87.5	.5	.0	.5	100
Papaya	37.3	62.7	.0	.0	.0	.0			.0	.0	.0	100
Tree tomato	56.8	39.1	.0	.0	4.0	.0			.0	.0	.0	100
Millet	.0	85.0	.0	.0	.0	.0	15.0		.0	.0	.0	100
Pumpkins	18.0	66.6	.0	.0	15.2	.0	.1		.0	.0	.0	100
Taro	10.6	85.2	.5	.2	2.1	.0	1.3	.0	.0	.0	.2	100
Yams	9.1	87.1	.0	.0	1.0	.0	2.8	.0	.0	.0	.0	100
Other seasonal vege	.0	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Other annual vegeta	.0	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Other seasonal crops	42.5	55.0	.0	.0	2.5	.0	.0	.0	.0	.0	.0	100
Other annual crops	66.0	14.0	.0	.0	.0	.0	.0	.0	.0	.0	20.0	100
Other perennial crops	50.0	.0	.0	.0	50.0	.0	.0	.0	.0	.0	.0	100

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Table 88. Use of production by large-scale farmer (%)

	Sold	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	Stored	Damaged	Used in any other way	Total
Maize	31.1	56.1	.9	.0	1.2	.0	3.6	7.1	.0	.1	.0	100
Paddy rice	82.1	17.5	.0	.0	.0	.0	.3	.0	.1	.0	.0	100
Sorghum	76.0	9.9	1.0	.0	.5	.0	10.4	2.1	.0	.0	.0	100
Wheat	65.0	21.2	.0	.0	2.0	.0	11.8		.0	.0	.0	100
Bush beans	33.2	51.9	2.1	.0	.8	.2	10.9		.9	.0	.0	100
Climbing beans	58.0	14.8	4.6	.0	7.0	.0	15.6		.0	.0	.0	100
Peas	67.9	19.8	.0	.0	1.7	.0	10.6		.0	.0	.0	100
Cassava	41.0	47.7	.0	.0	4.8	.0		100.0	.0	.3	.0	100
Irish potatoes	45.3	38.6	.0	.0	.9	.0	15.1		.0	.0	.0	100
Sweet potatoes	37.8	47.5	2.6	.0	2.8	.0		9.3	.0	.1	.0	100
Tomotoes	95.9	2.2	.2	.0	.4	.0	.3		.0	1.1	.0	100
White cabbage	58.3	31.1	.0	.0	3.8	.0		6.7	.0	.1	.0	100
Flower cabage	70.0	.0	.0	.0	10.0	.0		20.0	.0	.0	.0	100
Onions	25.0	75.0	.0	.0	.0	.0	.0		.0	.0	.0	100
Carrots	.0	100.0	.0	.0	.0	.0		.0	.0	.0	.0	100
Eggplant	93.2	4.7	.0	.0	.9	.0	.0		.0	1.2	.0	100
Cooking Bananas	54.4	42.4	.6	.0	2.6	.0			.0	.0	.0	100
Dessert banana	75.3	22.1	.2	.0	2.4	.0			.0	.0	.0	100
Banana for beer	75.8	23.6	.0	.0	.6	.0			.0	.0	.0	100
Pineapple	75.0	24.5	.0	.0	.5	.0			.0	.0	.0	100
Avocado	90.0	8.0	.0	.0	2.0	.0			.0	.0	.0	100
Passion fruits	99.0	1.0	.0	.0	.0	.0	.0		.0	.0	.0	100
Other fruits	97.8	2.3	.0	.0	.0	.0	.0		.0	.0	.0	100
Soya beans	65.4	31.2	.0	.0	.0	2.8	.6	.0	.0	.0	.0	100
Ground nuts	19.9	67.0	5.0	.0	.0	.0	8.1		.0	.0	.0	100
sun flower	.0	97.5	.0	.0	.0	.0	2.5		.0	.0	.0	100

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Table 89. Use of production by large-scale farmer (%) (cont.)

	Sold	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	Stored	Damaged	Used in any other way	Total
coffee	100.0	.0	.0	.0	.0	.0	.0		.0	.0	.0	100
Sweet pepper	92.9	3.5	.0	.0	3.1	.0	.0		.0	.5	.0	100
Pepper	99.5	.5	.0	.0	.0	.0	.0		.0	.0	.0	100
Amaranths	28.0	71.4	.0	.0	.6	.0		.0	.0	.0	.0	100
Celery	100.0	.0	.0	.0	.0	.0		.0	.0	.0	.0	100
Sugar beet	70.8	26.0	.0	.0	3.1	.0			.0	.1	.0	100
Leeks	80.0	.0	.0	.0	20.0	.0			.0	.0	.0	100
French beans	100.0	.0	.0	.0	.0	.0			.0	.0	.0	100
Napia grass	.0		.0	.0	.0	.0	.0	.0	.0	.0	100.0	100
Fodder crop	1.4	.0	.0	.0	.0	.0	4.2	93.0	1.4	.0	.0	100
Macadamia	100.0	.0	.0	.0	.0	.0	.0		.0	.0	.0	100
Apple	100.0	.0	.0	.0	.0	.0	.0		.0	.0	.0	100
Papaya	35.0	55.0	.0	.0	10.0	.0			.0	.0	.0	100
Tree tomato	50.0	50.0	.0	.0	.0	.0			.0	.0	.0	100
Orange	47.3	52.8	.0	.0	.0	.0			.0	.0	.0	100
Lemon	91.7	8.3	.0	.0	.0	.0			.0	.0	.0	100
Mucuna	.0		.0	.0	.0	.0		100.0	.0	.0	.0	100
Pumpkins	85.0	12.5	.0	.0	1.0	.0	.0		.0	1.5	.0	100
Cucumber	95.0	2.0	.0	.0	.0	.0			.0	3.0	.0	100
Taro	.0	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Other seasonal vegetables	50.0	50.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100
Other seasonal crops	57.5	15.0	.0	.0	.0	.0	.0	.0	.0	2.5	25.0	100
Other annual crops	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100.0	100
Other perennial crops	100.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	100

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Chapter 6: Results of the 2016 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 963 out of 8,987agricultural 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 2.1 (43.1%), followed by Stratum 1.2 (40.2%).

Table 88. Agricultural operators by Stratum

	Strata	Total	
		Number	%
Agricultural Operators	1.2	387	40.2
	2.1	415	43.1
	2.2	161	16.7
	All Rwanda	963	100

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The survey results showed that most of the agricultural operators in segments (99.0%) were individual farmers and only 1.0% were cooperatives (see table 89).

Table 89. Agricultural operators by type (%)

	Strata	Individual		Cooperative		Total	
		Number	%	Number	%	Number	%
Agricultural Operators	12	386	99.7	1	.3	387	100.0
	21	407	98.1	8	1.9	415	100.0
	22	160	99.4	1	0.6	161	100.0
	All Rwanda	953	99.0	10	1.0	963	100.0

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31.0% of agricultural operators were members of agricultural cooperatives in Season C, the highest proportion being in Stratum 2.2 (44.1%) followed by the Stratum 2.1(37.6%)

Table 90. Cooperative membership

		Yes	No	Total
	Strata	Percent	Percent	Percent
Agricultural Operators	1.2	18.6	81.4	100
	2.1	37.6	62.4	100
	2.2	44.1	55.9	100
	All Rwanda	31.0	69.0	100

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6.1.2 Number of agricultural operators by gender

In 2016 Season C, the percentage distribution of agricultural operators in Rwanda by gender was 68.7 % male and 31.3% 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	69.2	30.8	100
2.1	68.3	31.7	100
2.2	68.8	31.3	100
Rwanda	68.7	31.3	100

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6.1.3 Age distribution of agricultural operators

The majority (28.2%) of agricultural operators in Rwanda were in the age group of between 55 and above (see Table 92). This is followed by 27.0 percent of agricultural operators in age group of 35 and 44. The age group distribution of agricultural operators by Stratum varied more in the age groupof between 45 and 54 with Stratum 2.2 (23.1%) being the highest and Stratum 1.2 (15.8%) being the lowest. The least variation was in the age group of between 14and 24 with the Stratum 1.2 being the highest (6.5%) and Stratum 2.2 (3.8%) 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	6.5	26.2	26.9	15.8	24.6
2.1	3.9	15.2	28.0	20.9	31.9
2.2	3.8	21.3	24.4	23.1	27.5
All Rwanda	4.9	20.7	27.0	19.2	28.2

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The majority (29.3%) of male agricultural operators in Rwanda in Season C were in the age group of between 35 and 44 (see Table 93). This is followed by 24.6 percent of agricultural operators in age group of between 25 and34.

Table 93. Age distribution of male agricultural operators

	Agricultural Operators				
Strata	14-24	25-34	35-44	45-54	55 and Above
1.2	7.1	31.5	30.0	15.7	15.7
2.1	3.2	18.0	30.2	20.5	28.1
2.2	3.6	24.5	25.5	19.1	27.3
All Rwanda	4.9	24.6	29.3	18.3	22.9

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The distribution of female agricultural operators in Rwanda in Season C was high in the age group of 55 and above (39.9%) followed by 21.8 percent of female agricultural operators in age group ofbetween 35 and 44, 21.1 percent of female agricultural operators in age groupof between 45 and 54, 12.1 percent of female agricultural operators in age group of between 25 and 34 and 5.0 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	5.0	14.3	20.2	16.0	44.5
2.1	5.4	9.3	23.3	21.7	40.3
2.2	4.0	14.0	22.0	32.0	28.0
All Rwanda	5.0	12.1	21.8	21.1	39.9

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6.1.4 Education Level of agricultural operators

The Survey results of the 2016 Season C showed that in Rwanda, 67.6% of agricultural operators had attended primary level education, 22.9% had no education, 8.4% attended secondary level education and only 1.2% had attended tertiary level education. For those agricultural operators that had attented primary level education (67.8%) their distribution by Stratum was reasonably uniform with Stratum 2.2 having a higher percentage of 80.0 (see Table 95).

Table 95. Education level of agricultural operators by Stratum (%)

	Agricultural Operators				
Strata	Primary	Secondary	Tertiary	No education	Total
1.2	63.0	12.4	1.8	22.8	100
2.1	67.1	6.6	1.0	25.3	100
2.2	80.0	3.1	0.0	16.9	100
All Rwanda	67.6	8.4	1.2	22.9	100

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In Rwanda, 71.8% of male agricultural operators had attended primary education, 17.3% of agricultural operators did not attend school, 9.6 % attended secondary education and 1.4% 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	69.3	15.0	1.9	13.9	100
2.1	69.4	7.6	1.4	21.6	100
2.2	83.6	1.8	0.0	14.5	100
All Rwanda	71.8	9.6	1.4	17.3	100

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As Table 97 shows, Stratum 2.1 had the highest percentage of female agricultural operators with primary education (72.0%**)** and the lowest percentage of female agriculture operators with no education level (22.0%).

Table 97. Education level of female agricultural operators (%)

	Agricultural Operators				
Strata	Primary	Secondary	Tertiary	No education	Total
1.2	48.7	6.7	1.7	42.9	100
2.1	62.0	4.7	0.0	33.3	100
2.2	72.0	6.0	0.0	22.0	100
All Rwanda	58.4	5.7	.7	35.2	100

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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 (90.6%) were non-resident while 9.4% were residents (See Table 98).
Stratum 1.2 had the lowest percentage of non-resident operators (70.0%) and the biggest percentage of resident operators (30.0%), 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	30.0	70.0	100
2.1	1.7	98.3	100
2.2	.5	99.5	100
All Rwanda	9.4	90.6	100

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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 2016 Season C crops was mainly done in May, June and July 2016.

Table 99. Agricultural operators indicating the sowing date in segments by crop

Crop name	Before 30/04/2016	01-31/05/2016	01- 30/06/2016	After June 2016	Total
Bush beans	1.2	6.7	35.4	56.7	100.0
Climbing beans	63.3	13.3	6.7	16.7	100.0
Peas	27.0	23.8	30.2	19.0	100.0
Irish potatoes	20.2	14.7	25.3	39.8	100.0
Sweet potatoes	16.9	28.9	33.9	20.4	100.0
Tomotoes	13.2	28.6	25.3	33.0	100.0
White cabbage	5.6	6.7	40.0	47.8	100.0
Flower cabage	0.0	0.0	100.0	0.0	100.0
Onions	16.0	32.0	36.0	16.0	100.0
Carrots	10.0	20.0	25.0	45.0	100.0
Eggplant	25.9	24.1	29.6	20.4	100.0
Other fruits	0.0	50.0	50.0	0.0	100.0
Soya beans	11.1	7.4	63.0	18.5	100.0
Black eggplants	0.0	0.0	100.0	0.0	100.0
Sweet pepper	33.3	13.3	40.0	13.3	100.0
Amaranths	2.7	21.6	35.1	40.5	100.0
Celery	33.3	0.0	33.3	33.3	100.0
Spinach	0.0	100.0	0.0	0.0	100.0
Sugar beet	0.0	0.0	42.9	57.1	100.0
Garlic	14.3	42.9	14.3	28.6	100.0
Leeks	0.0	0.0	33.3	66.7	100.0
French beans	0.0	31.6	21.1	47.4	100.0
Pumpkins	0.0	0.0	0.0	100.0	100.0
Other seasonal vegetables	0.0	100.0	0.0	0.0	100.0

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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 2016 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 (28.7%), sweet potatoes (26.9%), vegetables (21.8%) and beans (15.3%).

Table 99. Areacultivated by crop and group of crops by Stratum (Ha)

Crops	12	21	22	Total	Percent
Tubers and Roots	6,487	8,961	994	16,442	55.6
Sweet potatoes	343	6,634	981	7,958	26.9
Irish potatoes	6,144	2,327	12	8,483	28.7
Yams & Taro	-	-	1	1	0.0
Legumes and Pulses	625	5,399	625	6,649	22.5
Beans	245	3,781	485	4,512	15.3
Bush beans	27	3,743	484	4,254	14.4
Climbing beans	219	38	2	258	0.9
Peas	380	852	4	1,236	4.2
Ground nuts	-	1	-	1	0.0
Soya beans	-	765	135	900	3.0
Vegetables and Fruits	607	5,294	578	6,478	21.9
Vegetables	607	5,294	548	6,449	21.8
Fruits	-	-	30	30	0.1
Developed	7,720	19,653	2,196	29,569	100.0
Physical	7,720	19,653	2,196	29,569	100.0

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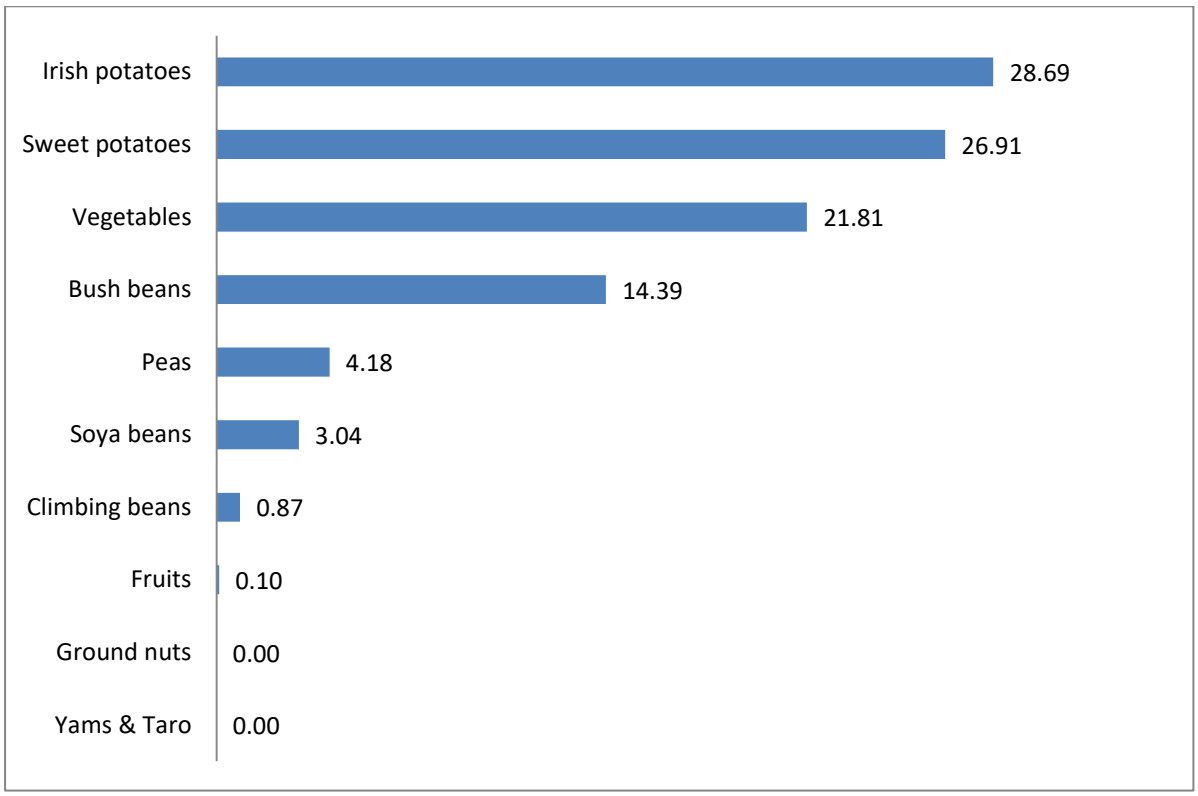
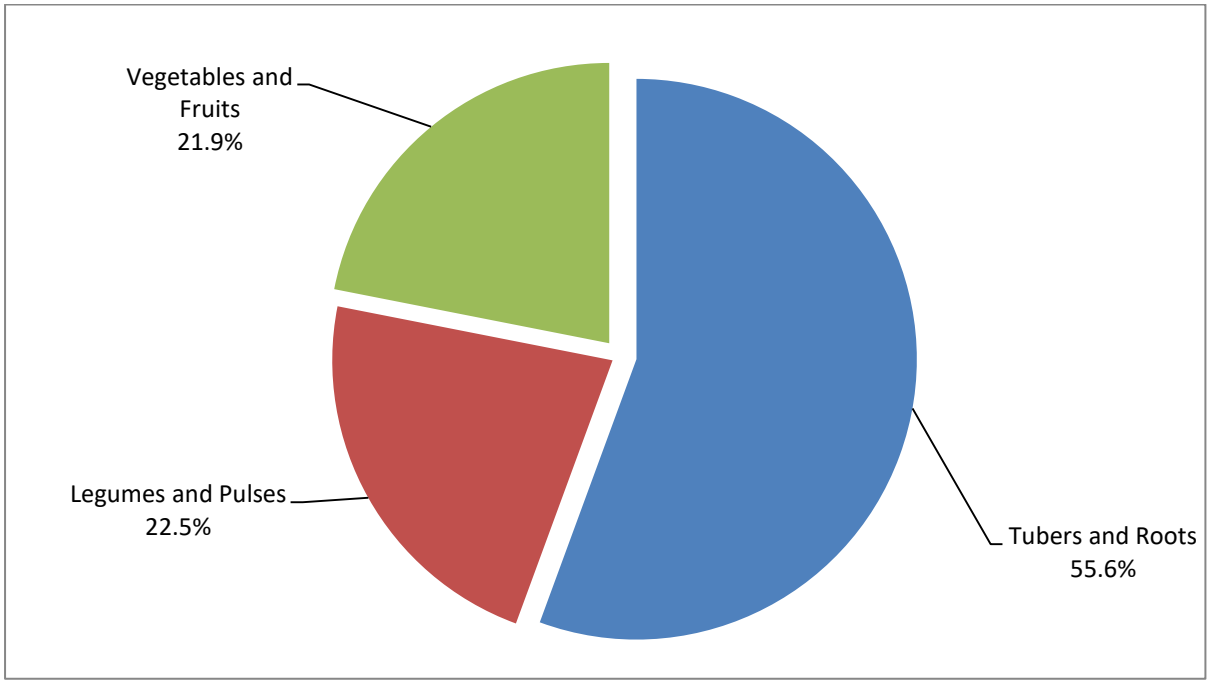
The total developed land means simply the cropland with regards to perennial crops cultivation standards and being sometimes mixed with Seasonal crops while the physical land means the real size in terms of cultivated plot area. Total developed crop land remains the same with total physical crop land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

Figure 10: Share of agriculture land by crops



The survey results showed that the dominant individual crops in Rwanda were: Irish potatoes (28.69%), Sweet potatoes (26.91%) and vegetables (21.81%).Survey results showed that the dominant groups of agricultural crops in Rwanda were: Tubers and roots (55.60%), legumes and pulses (22.49%).(see figure 10 and 11).

Figure 11: Shares of agriculture land by groups ofcrops



The survey results (see Table 101) showed that the average size of tracts for agricultural operators in Rwanda in 2016 Season C was 0.17 hectares.

Stratum 1.2 had the largest average size of tract for agricultural operators (0.19Ha) followed by Stratum 2.1 (0.17 Ha) and Stratum 2.2 (0.16 Ha).

The survey results confirmed that plot sizes for the agricultural operators in Rwanda are very small.

Table 100. Average size of tracts by Stratum

Strata	Average (Ha)
1.2	.19
2.1	.17
2.2	.16
All Rwanda	.17

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The average size of crops area was below 0.10Ha for all crops during 2016 Season C.

Table 101. Average size of crop area per agricultural operators (Ha)

Crops / Stra	12	21	22	All Rwanda
Bush beans	.1	.0	.1	.0
Climbing beans	.1	.0	.0	.0
Peas	.1	.0	.0	.1
Irish potatoes	.1	.1	.0	.1
Sweet potatoes	.1	.0	.0	.0
Tomatoes	.0	.1	.0	.1
White cabbage	.0	.0	.0	.0
Flower cabage	.1			.1
Onions	.1	.0	.0	.1
Carrots	.1	.0	.0	.0
Eggplant	.0	.0	.0	.0
Other fruits			.3	.3
Soya beans		.0	.0	.0
Ground nuts		.0		.0
Black eggplants		.0	.0	.0
Sweet pepper		.0	.0	.0
Amaranths	.0	.0	.0	.0
Celery		.0	.0	.0
Spinach	0.0			0.0
Sugar beet	0.0	0.0	0.0	0.0
Garlic	0.1			0.1
African cabbage	0.0			0.0
Leeks	0.0	0.0		0.0
Fresh beans		0.0	0.0	0.0
Pumpkins		0.0		0.0
Cucumber		0.0		0.0
Pasture	1.1	2.2	0.8	1.7
Fallow	0.1	0.1	0.1	0.1
Non_Agr	0.1	0.9	0.8	0.3
Taro			0.0	0.0
Other seasonal vegetables	0.0			0.0

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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 2016 Season C (See table 103).

Table 102. Crops yield by Stratum (Kg/Ha)

Crops	12	21	22	Total
Sweet potatoes	2,069	3,001	2,681	2,921
Irish potatoes	9,118	7,099	-	8,551
Legumes and Pulses	780	815	405	773
Beans	773	900	383	837
Bush beans	-	895	385	831
Climbing beans	867	1,390	-	939
Peas	785	764	-	768
Soya beans		453	494	459
Vegetables	4,131	13,220	9,203	12,023

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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 vegetables (43.4%), Irish potatoes (40.6%) followed sweet potatoes (13.0%) and beans (2.1%).

Table 103. Production of main crops (MT)

Crops	12	21	22	Total	Percent
Sweet potatoes	710	19,908	2,631	23,249	13.0
Irish potatoes	56,023	16,518	-	72,541	40.6
Legumes and Pulses	488	4,399	253	5,140	2.9
Beans	190	3,402	186	3,778	2.1
Bush beans	-	3,349	186	3,535	2.0
Climbing beans	190	53	-	242	0.1
Peas	299	650	-	949	0.5
Soya beans	-	347	67	413	0.2
Vegetables and Fruits	2,508	69,978	5,042	77,528	43.4
Vegetables	2,508	69,978	5,042	77,528	43.4

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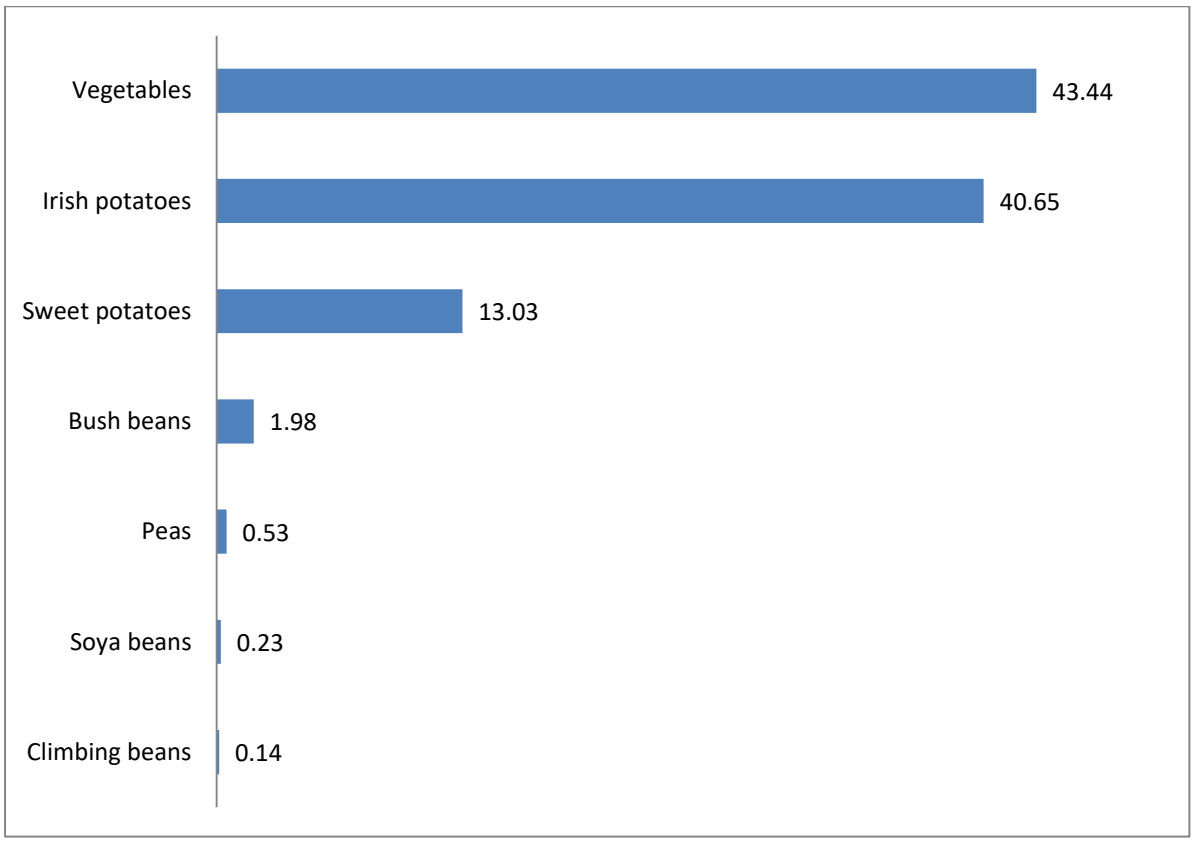
Figure 12: Share of production by main crops (%)



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 76.6 and 23.4 percent respectively (see Table 105).

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

Table 104. Share of pure and mixed crop agricultural land (%)

	Strata	Pure Crop Land	Mixed Crop Land	Total
Agricultural Operators	**1.2**	83.4	16.6	100
	2.1	73.6	26.4	100
	2.2	79.8	20.2	100
	All Rwanda	76.6	23.4	100

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The results showed that Stratum 1.2 used 78.7 percent of total land for pure stand cropping mainly for Irish potatoes, Strata 2.1 and 2.2 for sweet potatoes40.1%, 51.7% respectively.

Table 105. Pure crop agricultural land (Ha) in segments by type of crop (%)

Strata	Bush beans	Climbing beans	Peas	Irish potatoes	Sweet potatoes	Tomatoes	White cabbage	Onions	Eggplant	Soya beans	Fresh beans	Total
1.2	0.4	3.1	4.7	78.7	4.6	0.0	1.6	4.8	0.0	0.0	0.0	100
2.1	10.5	0.1	3.0	14.6	40.1	17.0	3.8	0.3	4.8	1.9	1.1	100
2.2	20.5	0.1	0.1	0.5	51.7	12.0	4.3	0.2	4.9	1.5	0.1	100
All Rwanda	8.4	0.9	3.3	31.7	30.9	11.8	3.2	1.6	3.4	1.3	0.7	100

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6.4.2 Use of Organic Fertilizer

In segments, 69.2% of all agricultural operators in Rwanda reported that they used organic fertilizer (see Table 107). Organic fertilizers were mostly used in Stratum 1.2 (74.5%) followed by Stratum 2.1 (72.9%) and Stratum 2.2 (46.9%).

Table 106. Users of organic fertilizers (%)

	Strata	Used organic fertilizers
Agricultural Operators	1.2	74.5
	2.1	72.9
	2.2	46.9
	All Rwanda	69.2

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Generally, 69.2% 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 107. Users of organic fertilizers by crop (%)

Crops	12	21	22	Total
Bush Beans	0.0	67.0	23.1	57.9
Climbing beans	57.1	60.0	0.0	57.7
Peas	72.0	73.7	100.0	73.3
Irish potatoes	79.0	90.9	0.0	80.1
Sweet potatoes	52.0	59.4	32.1	51.4
Soybeans	0.0	25.9	20.0	23.4
Vegetables	55.3	85.2	90.4	80.8
Fruits	0.0	0.0	100.0	100.0

2016 Seasonal Agricultural Survey - Season C

6.4.3 Use of inorganic Fertilizers by Agricultural Operators

The survey results showed that 45.4 percent of agricultural operators used inorganic fertilizers during 2016 Season C (see Table 109).

Table 108. Use of inorganic fertilizer

	Strata	Used inorganic fertilizers
Agricultural Operators	**1.2**	65.9
	2.1	32.9
	2.2	28.8
	All Rwanda	45.4

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The survey results showed that NPK was highly used (53.3%) followed by UREA (25.6%) and DAP (18.3%). In Stratum 2.1 and Stratum 2.2, the survey showed that the UREA was highly used by 44.9 and 43.7 percent of all agricultural operators within the Stratum respectively and NPK was highly used in Stratum 1.2 by 75.4 percent of all agricultural operators within Stratum.

Table 109. Users of inorganic fertilizers by type and by Stratum (%)

	Agricultural Operators						
	Strata	NPK	UREA	UREA(LIQUID)	DAP	OTHER Fertilizers	Total
Agricultural Operators	12	75.4	9.2	0.7	14.4	.4	100
	21	26.1	44.9	2.3	26.7	0.0	100
	22	32.4	43.7	11.3	12.7	0.0	100
	All Rwanda	53.3	25.6	2.6	18.3	.2	100

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Agricultural operators used inorganic fertilizers mostly on Irish potatoes (72.9%) and vegetables (62.1%).

Table 110.Users of inorganic fertilizers by crop (%)

Crops	12	21	22	Total
Bush Beans	0.0	39.6	15.4	34.6
Climbing beans	14.3	40.0	0.0	19.2
Peas	16.0	26.3	0.0	20.0
Irish potatoes	72.9	72.7	0.0	72.9
Sweet potatoes	0.0	2.0	0.9	1.6
Soybeans	0.0	11.1	0.0	6.4
Vegetables	52.6	59.3	75.0	62.1
Fruits	0.0	0.0	0.0	0.0

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6.4.4 Use of seeds

In Rwanda, agricultural operators used more traditional seeds (85.5%) than improved seeds (14.5%). For agricultural operators, Stratum 1.2 had the largest share of users of traditional (89.8%) and stratum 2.2 had the largest share of users improved seeds (19.9%).

Table 111.Agricultural operators by type of seeds used (%)

	Strata	Traditional seeds	Improved seeds	
		Percent	Percent	Total
Agricultural Operators	1.2	89.8	10.2	100.0
	2.1	83.9	16.1	100.0
	2.2	80.1	19.9	100.0
	All Rwanda	85.5	14.5	100.0

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As indicated below, traditional seeds were used by agricultural operators to grow almost all crops during 2016 Season C.

Table 112. Users of traditional seeds by type of crop (%)

Crops	12	21	22	Total
Bush Beans	100.0	95.3	96.2	95.5
Climbing beans	95.2	100.0	0.0	96.2
Peas	96.0	100.0	100.0	97.8
Irish potatoes	97.8	100.0	0.0	98.0
Sweet potatoes	100.0	100.0	99.1	99.7
Soybeans	0.0	85.2	100.0	91.5
Vegetables	39.5	57.4	57.7	54.0

2016 Seasonal Agricultural Survey - Season C

Improved seeds were used on vegetables (60.6%), climbing beans (7.7%), bush beans (5.3%), soybeans (8.5%) and Irish potatoes (2.0 %) by all agricultural operators who grew them during 2016 Season C (see table 114).

Table 113. Users of improved seeds by type of crop (%)

Crops	12	21	22	Total
Bush Beans	0.0	4.7	7.7	5.3
Climbing beans	9.5	0.0	0.0	7.7
Peas	4.0	0.0	0.0	2.2
Irish potatoes	2.2	0.0	0.0	2.0
Sweet potatoes	0.0	0.0	0.9	0.3
Soybeans	0.0	14.8	0.0	8.5
Vegetables	68.4	58.3	59.6	60.6

2016 Seasonal Agricultural Survey - Season C

6.4.5 Irrigation Practice

The survey results showed that about 29.2% 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 (51.1% and 41.3% respectively).

Table 114. Agricultural operators practising irrigation

	Strata	Practised Irrigation	Did not practise irrigation	Total
Agricultural Operators	12	.5	99.5	100.0
	21	51.1	48.9	100.0
	22	41.3	58.8	100.0
	All Rwanda	29.2	70.8	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 (41.7%) for irrigation followed by pumps/tube wells/irrigation machines (5.1%) and water channels (4.5%) (see Table 116). Use of water can for irrigation was predominantly in Stratum 2.2 (68.8%).

Table 115.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	100.0	0.0	0.0	100
	2.1	6.0	32.3	4.3	57.4	100
	2.2	2.6	68.8	5.2	23.4	100
	All Rwanda	5.1	41.7	4.5	48.7	100

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The survey results showed that agricultural operators practised irrigation mainly on vegetables, bush beans and peas during the 2016 Season C (see table 117).

Table 116.Practice of irrigation by crops (%)

Crops	12	21	22	Total
Bush Beans	0.0	50.9	11.5	42.9
Climbing beans	0.0	60.0	0.0	11.5
Peas	0.0	94.7	0.0	40.0
Irish potatoes	0.0	48.5	0.0	4.6
Sweet potatoes	0.0	30.5	18.9	25.3
Soybeans	0.0	25.9	0.0	14.9
Vegetables	5.3	87.0	94.2	73.2

2016 Seasonal Agricultural Survey - Season C

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 practising anti-erosion activities.

Anti-erosion was practised by 78.4 percent of agricultural operators. Most of the anti-erosion activities were practised by agricultural operators in the Stratum 1.2 (85.7%), followed by Stratum 2.2 (85.3%), Stratum 2.1(72.5%) (See Table 118).

Table 117. Anti-erosive activities by agricultural operators (%)

	Strata	Practised Anti-erosion
Agricultural Operators	1.2	88.7
	2.1	72.5
	2.2	85.3
	All Rwanda	78.4

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The Survey shows that in Rwanda the most practised erosion control measures by agricultural operators in all Strata were beds (36.5%), water drainage (29.8%) and grasses (20.0%) (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.

Table 118. 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	0.8	7.7	3.9	9.9	23.6	0.0	0.0	53.6	0.4	100.0
	2.1	1.2	.8	.2	2.6	21.8	38.0	4.5	30.2	.7	100.0
	2.2	.2	3.6	0.1	.5	3.7	61.5	5.0	25.4	0.0	100.0
	All Rwanda	1.0	3.2	1.3	4.5	20.0	29.8	3.3	36.5	.5	100.0

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The anti-erosion activities were generally for all cropland. With regards to cropland for Irish potatoes (92.2%) and climbing beans (96.2%), more than 83.5% of agricultural operators reported that their plots for the remaining crops are protected against erosion.

Table 119. Practice of anti-erosion by crop (%)

Crops	12	21	22	Total
Bush Beans	100.0	80.2	96.2	83.5
Climbing beans	95.2	100.0	0.0	96.2
Peas	76.0	94.7	100.0	84.4
Irish potatoes	93.0	84.8	0.0	92.2
Sweet potatoes	76.0	85.2	98.1	88.1
Soybeans	0.0	74.1	100.0	85.1
Vegetables	94.7	79.6	100.0	87.9

2016 Seasonal Agricultural Survey - Season C

6.4.7 Use of Pesticides

The survey results showed that in Rwanda 50.7 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 (67.5%) followed by the Stratum 2.2 (40.6%), Stratum 2.2 (39.2%).

Table 120. Agricultural operators using pesticide (%)

	Strata	Used Pesticides
Agricultural Operators	1.2	67.5
	2.1	39.2
	2.2	40.6
	All Rwanda	50.7

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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 121. Type of pesticide used by agricultural operators (%)

Strata	DITHANE	RIDOMIL	DIMETHOATE	CYPERMETRINE	DURSIBAN	TILT	PILKARE	OTHER PESTICIDE
12	50.3	13.3	8.8	27.1	0.0	0.0	0.0	0.5
21	19.9	1.0	17.5	45.6	1.0	0.0	0.5	14.6
22	32.0	5.2	4.1	43.3	1.0	0.0	0.0	14.4
Total	39.5	8.8	10.6	34.3	.4	.0	0.1	6.2

2016 Season Agricultural Survey - Season C

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

Table 122. Users of pesticides by crops (%)

Crops	12	21	22	Total
Bush Beans	0.0	50.9	73.1	54.9
Climbing beans	47.6	20.0	0.0	42.3
Peas	12.0	89.5	0.0	44.4
Irish potatoes	70.1	39.4	0.0	67.1
Sweet potatoes	0.0	3.9	2.8	3.4
Soybeans	0.0	44.4	15.0	31.9
Vegetables	78.9	76.9	82.7	78.8

2016 Season Agricultural Survey - Season C

6.5 Small Agricultural Equipment

The survey results showed that countrywide, most of the expenditure by agricultural operators was on the hoe (34.0%) followed by crops sprayer (12.9%).

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 123. Expenditure by type of small agricultural equipment

Small Agricultural Equipment	1.2	2.1	2.2	All Rwanda
Hoe	28.2	35.8	38.9	34.0
Spring Hoe	2.2	2.1	2.0	2.1
Fork hoe	3.6	1.7	1.8	2.3
Rake	0.0	0.1	.0	.1
Pick/ Ipiki	.4	0.6	0.2	.4
Wheelbarrow	0.0	2.2	4.8	2.0
Shovel/igitiyo	1.4	.7	.5	.9
Watering pump	0.0	4.7	6.3	3.5
Crops Sprayer	27.1	6.3	6.1	12.9
Watering can	0.5	3.2	10.2	3.8
Scie	.0	0.6	2.0	0.7
Sickle	1.9	2.0	1.2	1.8
Secataur	0.0	0.0	0.1	0.0
Scythe	.0	0.1	0.1	.0
Machete	3.0	2.7	2.1	2.7
Basket	1.9	3.4	3.7	3.0
Sack	9.2	5.5	3.8	6.3
Winnower	1.0	1.3	1.3	1.2
Basket(ikibo)	1.0	0.8	0.4	.8
Scale	1.3	1.6	0.0	1.2
Jerry-can	1.6	3.8	1.5	2.6
Bike	5.1	10.9	6.3	8.0
Bowl	0.2	0.3	0.1	0.2
Sheeting	1.0	4.4	2.8	3.0
Hoe sleeve	5.0	3.6	3.8	4.1
Thresher machine	0.1	0.1	0.0	0.1
Others (Specify)	4.4	1.6	0.2	2.2
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 (66.2%) was the largest donation followed by sack (33.0%).

Table 124. Small Equipment received from non-agricultural donors (%)

Small Agricultural Equipment received	12	21	22	Total
Hoe	100.0	0.5		66.2
Spring Hoe	0.0	0.0		0.0
Fork hoe	0.0	0.0		0.0
Rake	0.0	0.0		0.0
Pick/ Ipiki	0.0	0.0		0.0
Wheelbarrow	0.0	0.0		0.0
Shovel/igitiyo	0.0	0.0		0.0
Watering pump	0.0	0.0		0.0
Crops Sprayer	0.0	0.0		0.0
Watering can	0.0	0.0		0.0
Scie	0.0	0.0		0.0
Sickle	0.0	0.0		0.0
Secataur	0.0	0.0		0.0
Scythe	0.0	1.1		0.4
Machete	0.0	0.0		0.0
Billhook	0.0	0.0		0.0
Basket	0.0	0.0		0.0
Sack	0.0	97.3		33.0
Big basket	0.0	0.0		0.0
Winnower	0.0	0.0		0.0
Basket (ikibo)	0.0	0.0		0.0
Basket (inkangara)	0.0	0.0		0.0
Scale	0.0	0.0		0.0
Jerry-can	0.0	1.0		0.4
Barrel	0.0	0.0		0.0
Bike	0.0	0.0		0.0
Craft bike	0.0	0.0		0.0
Bowl	0.0	0.0		0.0
Sheeting	0.0	0.0		0.0
Hoe sleeve	0.0	0.2		0.1
Thresher machine	0.0	0.0		0.0
Others (Specify)	0.0	0.0		0.0

2016 Seasonal Agricultural Survey - Season C

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 125. Use of production by agricultural operators (%)

Crops	Sold	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	Stored	Damaged	Used in any other way	Total
Bush beans	15	69	2	0	4	0	10		0	0	0	100
Climbing beans	12	72	0	0	6	0	10		0	0	0	100
Peas	54	39	0	0	1	0	5	0	0	0	0	100
Irish potatoes	28	53	0	0	4	0	14	0	0	0	0	100
Sweet potatoes	19	74	2	0	4	0		1	0	1	0	100
Tomotoes	72	20	1	0	4	0	0		0	2	0	100
White cabbage	47	47	0	0	4	0	0	0	0	0	1	100
Flower cabage	100	0	0	0	0	0		0	0	0	0	100
Onions	81	17	0	0	2	0	0		0	0	0	100
Carrots	71	19	4	0	3	0		0	0	0	2	100
Eggplant	59	36	1	0	4	0	0		0	0	0	100
Other fruits	64	24	0	0	12	0	0		0	0	0	100
Soya beans	23	64	0	0	2	1	10	0	0	0	0	100
Black eggplants	90	10	0	0	0	0	0		0	0	0	100
Sweet pepper	83	14	0	0	2	0	0		0	1	0	100
Amaranths	48	46	0	0	4	1		0	0	0	0	100
Celery	65	34	0	0	1	0		0	0	0	0	100
Spinach	0	70	0	0	30	0		0	0	0	0	100
Sugar beet	92	8	0	0	0	0			0	0	0	100
Garlic	79	0	0	0	0	0	28		0	0	0	100
Leeks	54	39	0	0	1	0			0	0	6	100
French beans	84	15	0	0	1	0			0	0	0	100
Pumpkins	63	37	0	0	0	0	0		0	0	0	100
Other seasonal vegetables	0	100	0	0	0	0	0	0	0	0	0	100

2016 Seasonal Agricultural Survey - Season C

Indicators	2015	2016
Season A		
Crop Areas	In terms of land area under crops the main crops grown in Season A were: o Banana (22.9%), o Cassava (21.5%), o Beans (19.8%), and o Maize (12.4%)	In terms of land area under crops the main crops grown in Season A were: o Banana (23.2%), o Cassava (20.8%), o Beans (19.8%), and o Maize (12.3%)
Crops Yield (Kg/Ha)	o Maize: 1,742 o Cassava: 1,364 o Irish Potatoes: 6,772 o Bush Beans: 828 o Climbing beans: 1,047	o Maize: 1,758 o Cassava: 1,409 o Irish Potatoes: 6,840 o Bush Beans: 835 o Climbing beans: 1,046
Crops Production (Tons)	o Maize: 295,365 o Cassava: 402,436 o Irish Potatoes: 335,394 o Bush Beans: 146,682 o Climbing beans: 98,497	o Maize: 300,330 o Cassava: 405,961 o Irish Potatoes: 369,691 o Bush Beans: 151,715 o Climbing beans: 97,230
Season B		
Crop Areas (%)	In terms of land area under crops the main crops grown in Season A were: o Banana (23.1%), o Cassava (22.8%), o Beans (16.6%), and o Sorghum (8.8%)	In terms of land area under crops the main crops grown in Season A were: o Banana (23.6%), o Cassava (21.1%), o Beans (17.8%), and o Sorghum (9.9%)
Crops Yield (Kg/Ha)	o Maize: 1,036 o Cassava: 1,664 o Irish Potatoes: 5,675 o Bush Beans: 747 o Climbing beans: 943	o Maize: 1,106 o Cassava: 1,187 o Irish Potatoes: 5,559 o Bush Beans: 684 o Climbing beans: 1,015
Crops Production (Tons)	o Maize: 74,775 o Cassava: 522,215 o Irish Potatoes: 326,631 o Bush Beans: 109,994 o Climbing beans: 76,640	o Maize: 73,937 o Cassava: 524,259 o Irish Potatoes: 309,052 o Bush Beans: 108,902 o Climbing beans: 76,049
Season C		
Crop Areas	In terms of land area under crops the main crops grown in Season A were: o Irish potatoes (34.5%), o Sweet potatoes (20.5%), o Vegetables (16.9%), and o Beans (17.2%)	In terms of land area under crops the main crops grown in Season A were: o Irish potatoes (28.7%), o Sweet potatoes (26.9%), o Vegetables (21.8%), and o Beans (15.3%)
Crops Yield (Kg/Ha)	o Irish potatoes 10,586 o Sweet potatoes 2,576 o Vegetables 11,324 and o Beans 597	o Irish potatoes 8,551 o Sweet potatoes 2,921 o Vegetables 12,023 and o Beans 837
Crops Production (Tons)	o Irish potatoes 80,601 o Sweet potatoes 11,625 o Vegetables 49,251 and o Beans 2,264	o Irish potatoes 72,541 o Sweet potatoes 23,249 o Vegetables 77528 and o Beans 3,778