RWANDA DEVELOPMENT BOARD

RWANDA SKILLS SURVEY 2012

AGRICULTURE SECTOR REPORT

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List of Acronyms

CAADP	Comprehensive African Agriculture Development Program
CIP	Crop Intensification Program
GIRINKA	the One Cow per Poor Family program
GOR	Government of Rwanda
HCID	Human Capital and Institutional Development
HLI	Higher learning Institutions
IPRC	Integrated Polytechnic Regional Center
LWH	Land Husbandry, Water Harvesting and Hillside Irrigation
NAP	National Agricultural Policy
NCHE	National Council for Higher Education
NSIR	National Institute of Statistics Rwanda
NUR	National University of Rwanda
PSTA	Strategic Plan for Agricultural Transformation
RDB	Rwanda Development Board
TSS	Technical Secondary School
TVET	Technical Vocational Education and Training
VTC	Vocational Training Centers

Acknowledgement

This research was funded by the Rwanda Development Board in the Human Capital and Institutional Development Department. The research was carried out by Abagi OWN & Associates Limited an East African regional consulting firm and overseen by a steering group of various sector stakeholders and chamber members chaired by Apollo Munanura, head of HCID.

Special thanks to the National Institute of Statistics of Rwanda (NSIR), for providing the database of establishments from which the survey sample was drawn, as well as their invaluable input to the process.

To the Ministry of Agriculture, RDB's Agriculture Promotion team for their input in the process and validation of the report.

The team of enumerators and data entry must also be thanked for their efficiency and professionalism in conducting the survey of all the establishments included in this research.

We would not, of course, have had the data on which the project is based without the many organisations throughout Rwanda which took the time to participate in this project.

Executive Summary

This Report presents the findings of the skills survey of the Agriculture Sector Establishments in the Private Sector in Rwanda. The focus is on skills profiles, proficiencies, and gaps in the Agriculture Sector. The survey was commissioned by Rwanda Development Board as a national private sector skills survey targeting 8 priority sectors including ICT, Mining, Energy, Tourism, Manufacturing, Construction, Agriculture, Finance and Insurance. The survey was carried out in the five provinces in the country targeting large, medium, small and micro financial sector establishments in the Private Sector.

Principal Activities and Overall Labor Units in the Sector

The Agriculture establishments in the private sector in Rwanda have 23 principal activities. The top principal activities include raising and breeding of cattle (10.6%), raising of poultry (9.7%), plant propagation (9.0%), production of milk (7.4%), growing of beverage crops and post-harvest crop activities each (7.1%), seed processing (6.5%), growing of cereals except (rice) and growing of leguminous crops each (4.5%). Large establishments account for 35.5%, micro establishments accounts 27.5%, whereas small and medium establishments accounts for 19.0% and 18.0% respectively.

The Agriculture sector establishments in Rwanda had a total of 30,044 labor units employed as managers, professionals (engineers), liberal professionals, technicians and artisans. In terms of gender, men constitute 56.6% and women 43.4% of the total labor units. 85.2% of the employees were agricultural artisans, 10.8% technicians and 2.4% managers. Scientists, professionals and liberal professionals constituted 0.7% and 0.9% respectively.

Skills Gaps: - Agriculture establishments in the private sector in Rwanda had a skills gap of 13, 095 labor units. This represents 59.2% of total employment. Artisans dominate the skills gap accounting for 87.4%, Technicians accounts for 8.3%, Scientists 1.1%, managers 1.9% and Liberal Professionals accounting for 1.3%. Additionally, the current employees are not fully competent and need further training in soft skills like leadership, business communication, identification and risk management, leadership, and innovativeness.

Supply of Skills by Training Institutions: - Training institutions in Rwanda offering agriculture related courses include universities, Integrated Polytechnic Regional Centers (IPRC), Vocational Training Centers (VTC) and Technical Secondary Schools (TSS). Courses offered include Agricultural Economics & Agribusiness, Animal Science, Crop Science, Soil Science and Environmental Management, Animal Production, Crop Production, Human Nutrition & Dietetics, Rural Development & Agribusiness, Agricultural Mechanization, Agricultural Engineering, and Agri-business among other courses. The output from the training institutions is about 1,200 graduates (both bachelor degrees and diploma certificates) annually

The agriculture sector establishment in the private sector in Rwanda has a total skills gap of 13,095 labor units in the short run. This represented 59.2% of total employment in the sector. More critical, there is a mismatch between supply and demand of skills for the agriculture sector in the labor market. While training institutions in Rwanda are concentrating on producing graduates (managers and professionals), the establishments in the private sector need technicians and trained artisans to increase the quality and quantity of production.

Specific recommendations that are to be implemented include, but are not limited to the following:

a) Establish an Agriculture sector skills council that brings together employers, employee, training institutions and other stakeholders to address the skill shortage.
b) Establish and promote linkages and partnerships for skills development
c) Enhance industry and training institutions linkages to share best practice and provide internship / apprenticeship opportunities.
d) Increase supply of Agriculture Extension Officers
e) Investment in demonstration/research Farms
f) Increase the supply of human capital stock
g) Promote Agricultural and Innovation Exhibitions
h) Investment in education tours for business people

In conclusion, this lack of skills negatively affects the production (output) of the industry. Thus there is need for concerted, coordinated and practical efforts as well as strategy and investment to enhance skills development for the agriculture sector establishments.

1.0 RWANDA AGRICULTURE SECTOR

1.1 Sector Overview

Agriculture is at the heart of Rwanda's economy. The sector occupies 79.5 percent of the labor force, contributes one-third of GDP and generates more than 45.0 percent of the country's export revenues. Agriculture is also important for national food self-sufficiency, accounting for well over 90.0 percent of all food consumed in the country (Republic of Rwanda 2007; 2010; World Banks 2011). The agricultural sector grew at an average of 4.9 percent over the last five years, contributing about 36.0 percent to the overall Gross Domestic Product (GDP).

Due to enabling sector policies and strategies, Agriculture sector was the fourth top performing sector in 2011 after tourism, ICT and Energy & Water. Investments in the agriculture sector grew to US$78m in 2011, as compared to $68.5m in 2010.

Agriculture expenditure forms one of the priority expenditures of the Government of Rwanda's annual budget with focus on increasing productivity in the sector. Over the past three years, allocations to the agricultural sector have increased from 4.2 percent of the budget in 2008 to 6.6 percent in the 2010/11 budget. Together with agricultural related spending allocated to other institutions, Rwanda now complies with the 10 percent commitment made under the Africa Union's Comprehensive African Agriculture Development Program (CAADP) , of which Rwanda was the first signatory (World Bank, 2011). The main recipient of the agriculture budget shares were the Government's flagship programs, such as the Crop Intensification Program (CIP) and the Land Husbandry, Water Harvesting and Hillside Irrigation (LWH) Project, the latter being also supported with donor funds.

Table 1 shows that total value added in agriculture reached RWF billion 814.6 in 2010. Food crops provides the highest amount of value added in agriculture rising from RWF billion 545.5 in 2006 to RWF billion 691.9 in 2010.

Table 1: Value Added for the Agriculture Sector (in RWF Billion, at 2006 Constant Prices)

	2006	2007	2008	2009	2010
Food crops	545.5	567.5	602.9	659.5	691.9
Export crops	25.3	18	23.2	19.7	22.5
Livestock	30.9	32.3	33.4	34.2	35.6
Forestry	52	53.4	54.9	56.4	57.9
Fisheries	6	6.2	6.3	6.5	6.7
Total Value added in Agriculture	**659.7**	**677.4**	**720.7**	**776.3**	**814.6**

Source: National Institute of Statistics, Rwanda (NISR)

1.2 Agriculture Policy Environment

In recent years a framework was set up for the modernization of agriculture in Rwanda. In 2004, a National Agricultural Policy (NAP) was formulated and a Strategic Plan for Agricultural Transformation (PSTA) was developed and updated in 2009. The updated PSTA II became the basis of the first CAADP-approved Agricultural Sector Investment Plan in Africa.

In the implementation of these frameworks, programs were put in place, such as the Crop Intensification Program (CIP), the One Cow per Poor Family (GIRINKA program) and later, the LWH Program. To date, results are noticeable in terms of sustained agricultural growth and increased productivity, as well as improved land management.

In the past five years export crops contributed on average 48.1 percent to Rwanda's total export earnings. They accounted during the same time for 1.1 percent of GDP. Coffee and tea are the major export products, concentrating more than 90.0 percent of the value of export crops. While the Government started the promotion of non-traditional export crops, in order to stimulate growth and increase foreign exchange earnings, the heavy reliance on coffee and tea remained unchanged to date.

In an attempt to create a more-diversified export sector, efforts are being made to promote horticultural crops, including fruits, vegetables, and cut flowers; essential oils such as petunia and geranium; macadamia nuts; vanilla; and silk. Given favorable climate and soil conditions, Rwanda has the potential to develop a vibrant horticulture industry. High-value export crops, such as passion fruit, desert bananas, Japanese plums and Bird's Eyes Chilies could be produced by Rwanda and are in high demand at the international market. Other exotic fruits and vegetables also have the potential to be grown in Rwanda's fertile and diverse terrain.

1.3 Challenges

The strategic focus on agriculture, through continued public investments, has contributed to marked productivity increases and solid agriculture growth rates over recent years. However, in order to sustain these productivity increases in the future, and in order to fully realize the growth potential for the agriculture sector, a number of challenges would need to be addressed. These challenges include the need for greater focus on:

(i) Reducing dependency on rain-fed agriculture through greater use of different models of irrigation;
(ii) Better erosion control and integrated soil fertility management; and
(iii) Diversifying agriculture production, in particular agricultural export

goods, for example in areas of horticulture and flowers,

(iv) Changing the skills profile of people employed in agriculture, to foster the creation of increased agricultural off-farm employment such as agro-processing and other value chain activities, and

(v) Developing a market-based food crop distribution system to contribute to country-wide food security.

Through PSTA II, Government is focusing on providing irrigation to hillside farms and on increasing the water retention capacity of watersheds. There are a number of projects funded jointly by the Government and Developments Partners to this effect: (i) the Rural Sector Support Project (marshland irrigation); (ii) the LWH Project; (iii) the *Project d'Appui au Développement Agricole de Bugesera*; (iv) the Kirehe Watershed and Agricultural Management Project, (v) the Project to Support PSTA II implementation, and (vi) the Hillside Irrigation Project in Bugesera.

Other operational challenges include:

i. Preserving soil fertility and preventing soil erosion: - There exist many very small and scattered farms as more than 80% of households hold less than 1.0 ha of land. This land is over-cultivated leading to disappearance of traditional techniques of soil fertility such as fallowing practices. Also encroachment on marginal land results in heavy erosion especially on the slopes where 80% of arable land is situated.

ii. Large irrigation needs: - Agriculture is characterized by predominantly rain fed practices. Drought, irregular rains, landslides, and climate change related phenomena are major concerns for improving agricultural productivity.

iii. Poor post harvest management: - Poor post harvest management results in loss of up to 15% of total harvest. In order to address this challenge, the Government initiated post-harvest infrastructure through farmer and cooperative investments in storage facilities, drying grounds and procurement of silos and grain stocks.

iv. Limited access to financial services: - The agriculture sector is constrained by insufficient access to finance and insufficient investment capital for farming, agro-processing and export development. Mechanisms to increase access to financial services mostly benefit the export and livestock subsectors.

v. Lack of adequate qualified skills, especially in agribusiness, to transform the agriculture sector faster and effectively.

At the core of addressing these challenges is the availability of qualified and effective stock of human capital, readily available and spread all over the country where agricultural production is taking place. But what is the profile of skills (labor) currently employed in agriculture and what gaps exist in terms of meeting demand for the required skills in the market?

This report provides insights into these issues.

2.0 CONTEXT OF THE SKILLS SURVERY

The Rwanda Development Board's (RDB) mandate is to promote private sector development though investment promotion. In order to attract the requisite investment, it's important to ensure that the country has the right quantity and quality do skills to support the emerging and growing industries. The Human Capital and Institutional Development (HCID) Department at RDB supports the private sector by developing mechanisms to ensure there is adequate and availability skills with the right quality. It is expected to address the human capital challenge both from an institutional and individual level, through sustainable interventions. Establishing and running such strategic interventions to fill skills gaps in the private sector requires evidence-based quantitative and qualitative data/information. HCID is committed to supporting interventions that would fill the potential gaps and reconcile both labor supply and demand in the private sector in Rwanda.

2.1 Rationale for the survey

Strategic and sustained investment in skills development requires credible and comprehensive labor market data and information in the private sector and training institutions. Presently, there is inadequate data and information on skills gaps in the private sector and the match and/or mismatch between the supply of skills by various training institutions (TVET and university institutions) and the labor market demand particularly in the priority sectors.

In addition, though RDB has a Labor Market Information system (LMIS), it is still new and hence difficult to know the actual skills needs and gaps of various sectors of development let alone identifying the labor/skills challenges and opportunities the various sectors are facing/having. It is also not possible to conduct medium and long-term labor force forecasting for the various sub-sectors in the private sector. This is mainly because of lack of a series of cumulative credible data and limited use of robust methodological a approaches. This skills survey is a strategic start towards building a credible skills database for decision making and planning.

It is from the above context that RDB-HCID commissioned a national private sector skills survey targeting 8 priority sectors including ICT, Mining, Energy, Tourism, Manufacturing, Construction, Agriculture, Finance and Insurance. A regional consultancy firm OWN and Associates Limited, working with the HCID team, was commissioned to lead this strategic national skills survey in the private sector in Rwanda. The survey was launched in August 2011.

2.2 Objectives

This national skills survey targeted the Private Sector in Rwanda, with a focus on:

- ❖ Establishing a robust methodology for strengthening Labor Market Information System (LMIS) and conducting periodical labor market forecasting and manpower surveys.
- ❖ Collecting, collating and reconciling both labor supply and private sector labor demand: establishing sufficient quantitative and qualitative information to identify the potential skills gaps in the private sector.
- ❖ Providing RDB/HCID with comprehensive empirical data on the existing and/or projected human capacity gaps against which training /capacity development interventions and performance can be based, including sustainable and cost effective interventions such as internships, trainings, and scholarships.
- ❖ To conduct a SWOT analysis of respective private sector companies with respect to human capital covering individual, institutional and environment.
- ❖ Provide prioritized recommendations and an action plan that the government and other key stakeholders should undertake to address these gaps.

2.3 Design and Methodology

To carry out a comprehensive, credible and informative skills survey in the selected sub-sectors a rapid assessment methodology, applying qualitative and quantitative techniques was used. The survey was national and carried out on appropriately selected sectors in all the 5 provinces of the country, reflecting both the urban and rural settings. The research team worked with the National Institute of Statistics Rwanda (NISR) to get the right sampling framework and sample size for the skills survey. The NISR Establishment Census 2011 was used as a basis for the selection of the organisations to be visited during the study.

The key respondents during the survey were; employers (owners or/CEOs), employees, and representatives of academic departments of training institutions in Rwanda. The results of the "Establishment Census 2011" conducted by the Ministry of Public Service and Labor, Ministry Commerce and Industry, National Institute of Statistics Rwanda and the Private Sector

Federation[1] were used as the framework to determine the sample sizes of the respective sectors for the National Skills Sector Survey.

Based on the Establishment Census 2011 data, NISR worked with the research core team and used a stratified sampling method to select the establishments for the survey across the country. The respondents were stratified using the following 3 criteria:

1. Sectorial activity,
2. Firm size,
3. Geographical location

The stratification by firm size divides the population of firms into a 4 strata as in the Establishment Census, 2011: i.e.

- Micro firms (1 Employee)
- Small Firms (2-3 Employees)
- Medium Firms (4-9Employees)
- Large Firms (10+Employees)

A geographical distribution is defined to reflect the distribution of the economic establishments across the country within the different provinces i.e. Kigali, Southern, Eastern, Northern and Western Provinces.

Sector activity was based on the eight (8) priority sector identified by RDB as part of the terms of reference.

2.4 Sampling framework

The sectors identified by RDB were categorized within the economic activities of the establishment census as shown in Table 2 below. Suing the formulae below the sample size was determined for each sector.

Using Yamane (1967:888) $n = \frac{N}{1 + N(e)^2}$

Where N is the population size

n- Sample size

e -level of precision: a precision of 5% was assumed for the skills sector surveys

Weights

[1] *Republic of Rwanda. (June 2011). Establishment Census, 2011: Final Results. Kigali: Ministry of Public Service and Labor, Ministry of Commerce and Trade, National Institute of Statistics Rwanda, and Private Sector Federation.*

To ensure that all sample estimates are reflective of the population parameters, weights for the different strata against the respective sample sizes have been tabulated. These have been reported in the respective sections. Weights have been computed using $w = n / N$, the reciprocal of which will be used to weight the sample results to get the overall population skills status magnitude. All weights have been incorporated in the databases.

Table 2: Sector Survey Sampling Framework

Sector*	Population**	Sample Size	Sample%
ICT (Information and Communication)	558	223	40
Energy	360	250	69
Mining	50	50	100
Construction	117	117	100
Tourism	33,305	476	1
Manufacturing	4,559	439	10
Agriculture	675	282	42
Finance & Insurance	970	330	34

This population is based on the NISR* ***Establishment Census, 2011 Report

2.5 Data collection

Through a collaborative process between the research core team, RDB and NSIR, a questionnaire was developed which had a core set of questions along with a series of sector specific modules which directly related to the footprints of each of the sectors. The core set of questions which examined generic recruitment issues, skills gaps, resources for training and future skills needs were drawn form to the international skill survey instruments.

For each of the sectors an individual set of questions (or modules) were developed which varied depending upon the priorities of that particular sector. The importance of such an approach was twofold. First, it allowed each of the sectors to gather specific workforce data on organizations which fell into their footprint. Second, it captured the duality of functions that employees often fulfill within private organizations and that would have otherwise not been captured through the more generic core questions.

Given the complexity of the questionnaire and the need to ensure that as many as possible establishments and training institutions within the sector were included in the research, focus groups and telephone interviews were deemed to be the most appropriate, manageable and cost effective method. The interviews were conducted by trained bilingual enumerators.

A total of 310 Agriculture establishments and 19 training institutions spread across all provinces in Rwanda responded to the survey. Experts from RDB HCID and agriculture department, and key stakeholders in agriculture sector validated the survey instruments and were also involved in focus group discussion and/or interviews

The number of respondents from the organizations and training institutions are shown in table 3.

Table 3: Sector Survey Respondents per Sector

Sector*	Population**	Sample Size	Sample%
ICT (Information and Communication)	558	223	40
Energy	360	250	69
Mining	50	50	100
Construction	117	117	100
Tourism	33,305	476	1
Manufacturing	4,559	439	10
Agriculture	675	282	42
Finance & Insurance	970	330	34

This population is based on the NISR* ***Establishment Census, 2011 Report

2.6 Report structure

While the surveys were conducted over three phases with at least 2 sectors being analyzed at a time, the reports have been developed separately for each of the eight sectors under review.

The following sections of this report present the **Agriculture sector** finding and recommendations.

The findings are divided into two parts.

Part 1 (Section 3) focuses on principal activities in the Agriculture establishments in Rwanda, as well as employment by categories of occupation (labor profiles), skills proficiency, skills gaps, and capacity building issues.

Part II (Section4) deals with supply of skills for the Agriculture sector (capacities of training institutions) including: courses offered, enrolment and output from HLIs, equipment/training facilities and academic staff.

Section 5 of the reports presents the implications of the findings and specific recommendations that need to be studied and implemented to bridge the skills gaps in the industry.

3.0 PART 1- PRINCIPAL ACTIVITIES AND SKILL PROFICIENCY PROFILE

3.1 Principal Activities and Ownership

The information was collected on principal activity of establishments in the private sector across Rwanda. Table 4 shows a total of 23 principal activities were identified within the 310 establishments surveyed. The top principal activities were raising and breeding of cattle (10.6%), raising of poultry (9.7%), plant propagation (9.0%), and production of milk (7.4%), growing of beverage crops and post-harvest crop activities each (7.1%), seed processing (6.5%), growing of cereals except (rice) and growing of leguminous crops each (4.5%).

Table 4: Distribution of Establishments by Economic Activity

Economic Activity	Number of establishments	%
Growing of non-perennial crops:	7	2.3
Growing of cereals (except rice), leguminous crops and oil seeds (maize, sorghum, millet, among others)	14	4.5
Growing of leguminous crops such as: beans, peace, groundnuts, sesame seeds, sunflower seeds, caster beans and others	14	4.5
Growing of rice	8	2.6
Growing of vegetables and melons:	14	4.5
Growing of root, bulb or tuberous vegetables	9	2.9
Growing of roots and tubers	8	2.6
Growing of fruit bearing vegetables	7	2.3
Growing of tropical and subtropical fruits	5	1.6
Growing of citrus fruits	0	0.0
Growing of beverage crops	22	7.1
Growing of spices, aromatic, drug and pharmaceutical crops	4	1.3
Plant propagation	28	9.0
Raising and breeding of Cattle:	33	10.6
Production of milk from cows	23	7.4
Raising of sheep and goats	12	3.9
Raising and breeding of swine/pigs	13	4.2
Raising of poultry	30	9.7
Raising of bees	4	1.3
Raising of fish	8	2.6
Post-harvest crop activities	22	7.1
Seed processing for propagation	20	6.5
Processing	5	1.6

Total	310	100.0

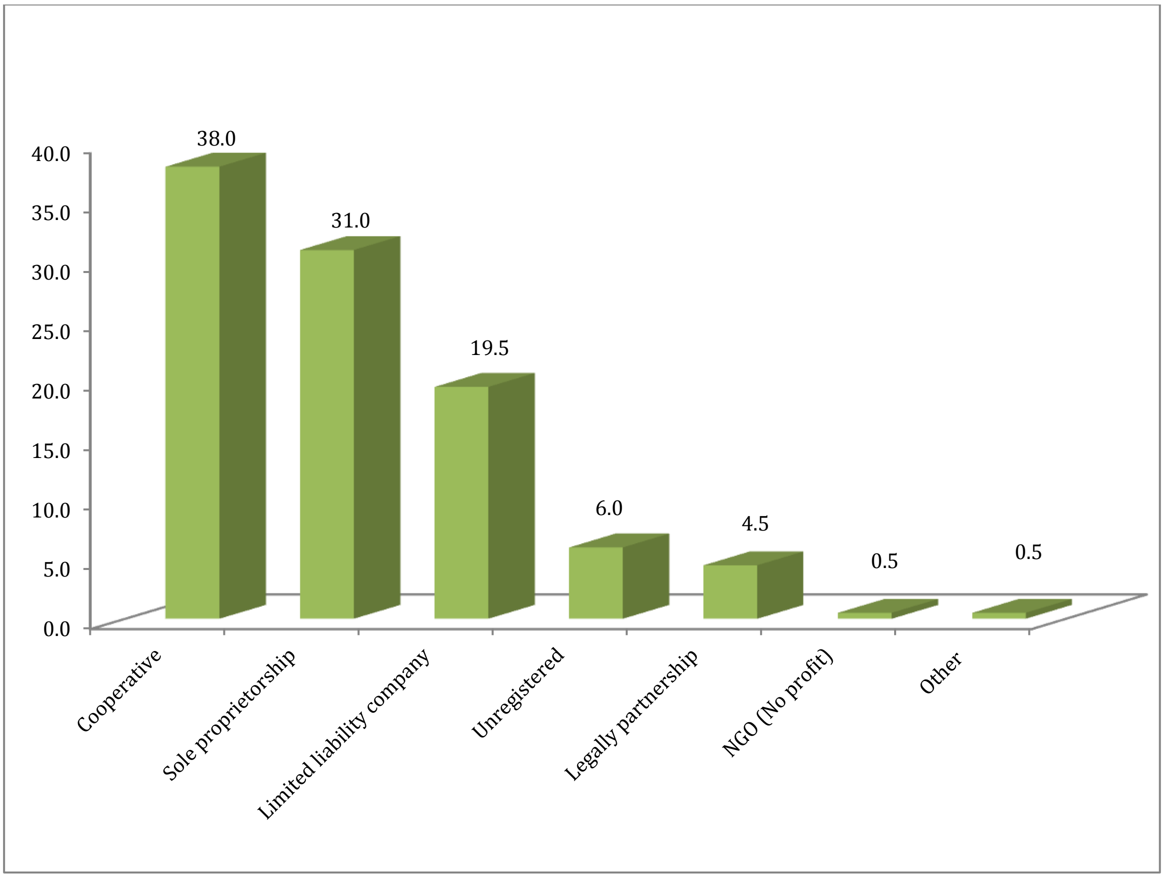
Location of Establishments by Province: - Geographical distribution of agriculture establishments in Rwanda is presented in Table 5. The establishments are mainly located in Kigali (34.1%) and in the Southern Province (19.6%), Eastern Province (17.7%), and in Northern and Western Province 14.1% and 14.5% respectively.

Table 5: Location of Agricultural Establishments by Province

Province	Frequency	Percent
Kigali	106	34.1
Northern	44	14.1
Southern	60	19.6
Western	45	14.5
Eastern	55	17.7
Total	**310**	**100**

Legal Status: - In terms of legal status, 38.0% were cooperatives, 31.0% sole proprietorship, 19.5% limited liability by share capital, 4.5% legally established partnership, and 6% were unregistered (Figure 1).

Figure 1: % Distribution of Establishment by Legal Status



Size of Establishments: - The size of the establishments was adopted from the establishment census that was done by the National Institute of Statistics which defined micro establishments as employing one labor unit, Small (1-4) labor units, medium (5-9) and large (10 plus). Figure 2 indicates that large establishments, accounts for 35.5%, micro establishments accounts 27.5%, whereas small and medium establishments accounted for 19.0% and 18.0% respectively.

Figure 2: % Distribution of Establishments by Size

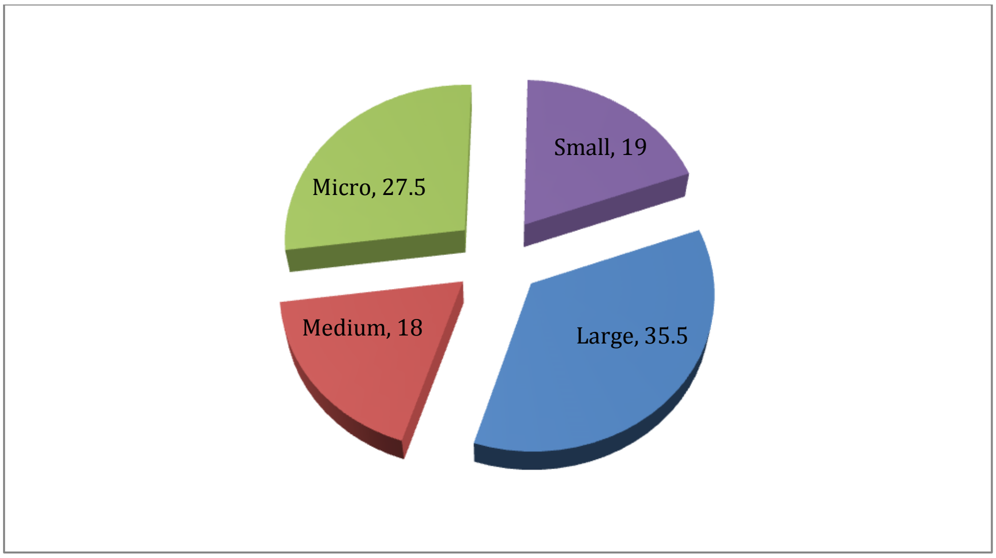


Table 6 shows information on the ownership of the establishments. The majority of the establishments (60%) were private fully Rwandese owned, 16.5% private Rwandese majority owned and 14.0% were public Government (Rwandese) owned.

Table 6: Distribution of Establishments by Ownership Structure

Ownership structure	Number	%
Joint Public and Private (Rwandese)	6	3.0
Private, Fully Foreign Owned	5	2.5
Private, Fully Majority Owned	8	4.0
Private, fully Rwandese owned	120	60.0
Private, Rwandese majority owned	33	16.5
Public, Fully Rwandese (Government)	28	14.0
Total	**200**	**100.0**

3.2 Education and Training of Owners/Managers

Information on the level of education for management staff was collected. In this survey respondents were asked of the highest education level and professional qualifications of managers. The results show that out of 200 managers, 33% were university graduates, 24.0% primary school graduates, 17.5% upper secondary graduates and 10.5% lower secondary school graduates. Table 7 presents the detailed breakdown.

Table 7: Number of Managers of Establishments by Highest Level of Education

Highest level of education	Number	%
Never attended school	2	1.0
Primary school graduate	48	24.0
Lower secondary graduate	21	10.5
Attended but didn't finish upper secondary	1	0.5
Upper secondary graduate	35	17.5
University Student	7	3.5
University graduate	66	33.0
Didn't specify	20	10.0
Total	**200**	**100.0**

3.3 Skill profiles by occupation

3.3.1 Overall Labor Units in the Sector

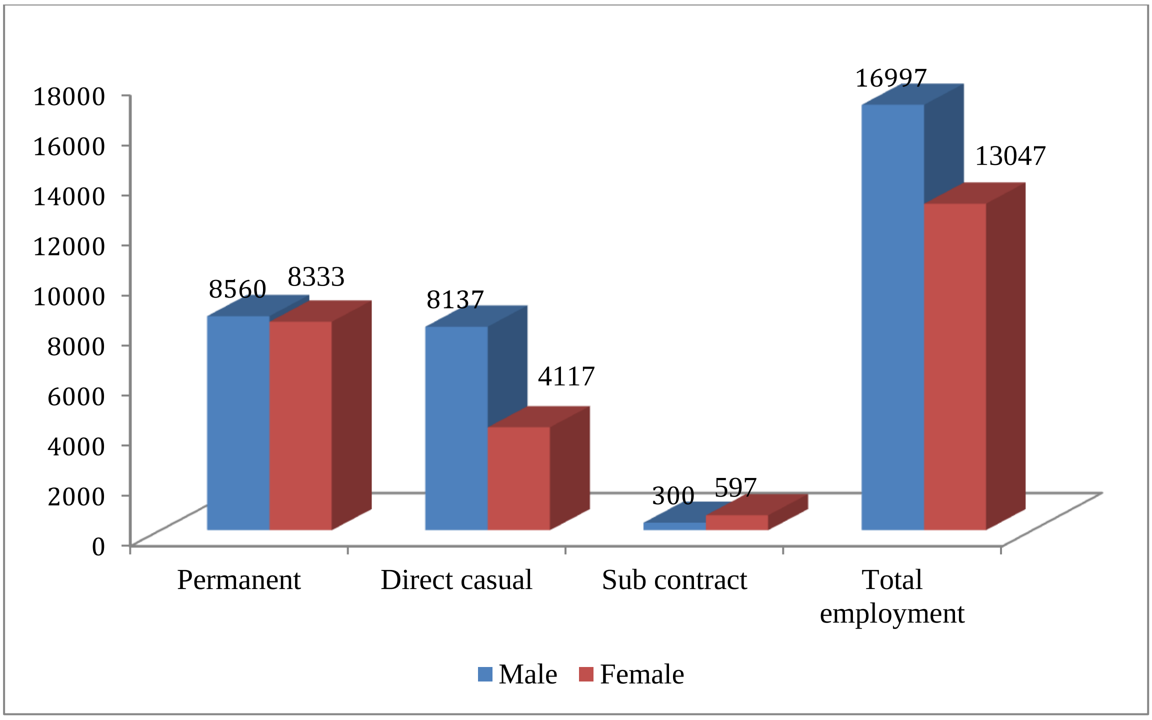
In this survey establishments were asked to give data on the existing labor units they employed by occupation/function which was classified in line with major internationally recognized occupation groups.

The results of the survey indicate that the agriculture sector has a total labor force of 30,044 labor units (Table 8 and Figure 3). Analysis by terms of employment reveal that out of total employees, 56.2% were permanent, 40.8% direct casuals and 3.0% were in sub-contract. In terms of gender, men constitute 56.6% and women 43.4% of the total labor units.

Table 8: Distribution of Employment in Terms of Employment & Gender

Terms of employment	Male	Female	Total
Permanent	8,560	8,333	16,893
Direct casual	8,137	4,117	12,254
Sub contract	300	597	897
Total	**16,997**	**13,047**	**30,044**

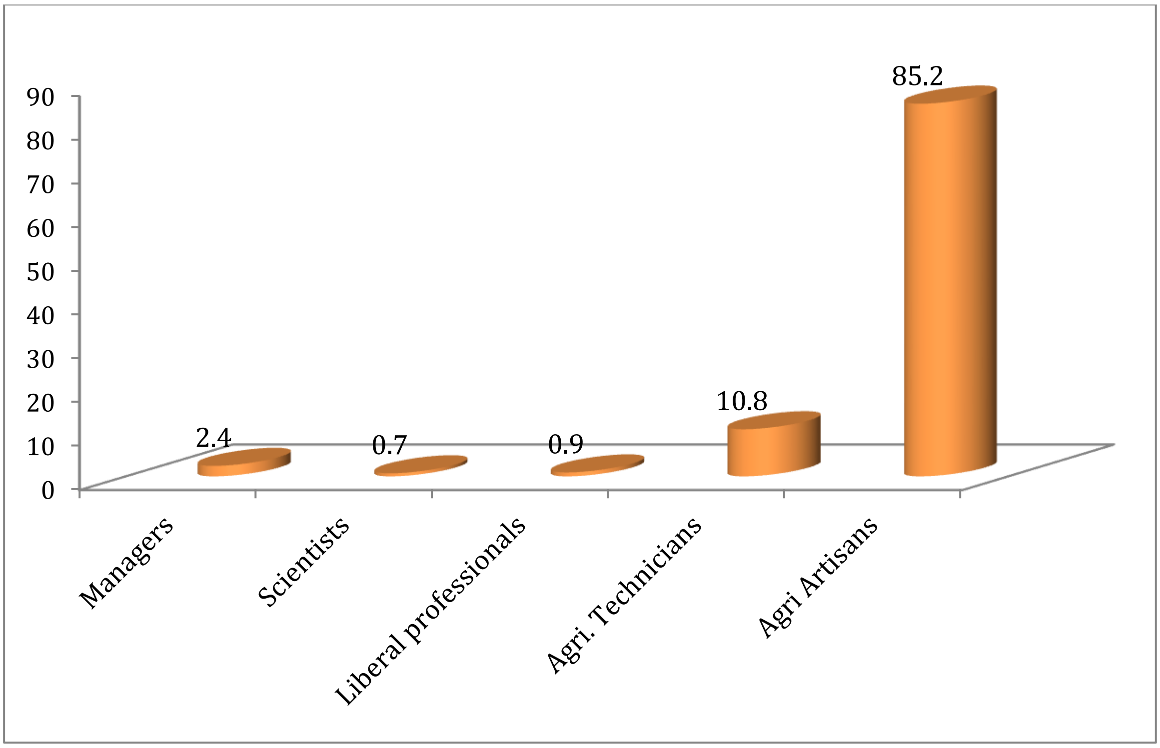
Figure 3: Employment in Terms of Service & Gender



3.3.2 Employment by Categories of Occupation

The labor profile for the employees in private establishments in the agriculture sector was analyzed. Figure 4 indicates that 85.2% of the employees were agricultural artisans, 10.8% technicians and 2.4% managers.

Figure 4: Distribution of Employees by Broad Category



a) **Managers In Agriculture Establishments: -** Table 9 shows that there were 528 managers of whom 342 (64.8%) were Managing Directors or Chief Executives. Of the 342 the managing directors, 34.2% were women and 20 (0.6%) expatriates. Other major categories were sales and marketing managers (64), agricultural and food production mangers (33) and research and development managers (24) of whom 15 or 62.5% were expatriates and there was no woman.

Table 9: Categories & Numbers of Managers

Occupations	Employees	Women	Expatriates
Managing directors and chief executives	342	117	20
Research and development managers	24	0	15
Agricultural and forestry production managers	33	9	0
Aquaculture and fisheries production managers	1	3	0
Supply, distribution and related managers	23	4	3
Information and communications technology service managers	3	2	0
Human resource managers	18	3	2
Policy and planning managers	10	2	0
Sales and marketing managers	64	23	1
Advertising and public relations managers	10	1	3
Total	**528**	**164**	**44**

b) **Scientists Professionals in Agriculture Establishments:** - Table 10 shows that there were 148 scientists professionals working in the agriculture sector. 'Agronomists' constituted the highest share (90 out of 148 or 60.8%) followed by 'Crop Scientists' (18), 'Veterinary specialists' (14) and 'Chemists" (14). The 10 expatriate's employed were 'Agronomists' (7) and 'Physical and Earth Science' professionals (3).

Table 10: Number & Categories of Scientists in the Sector

Occupations	Employees	Of which women	Of which expatriates
Physical and Earth Science professionals	9	0	3
Crop Scientists	18	0	0
Agronomists	90	16	7
Agricultural Economist	2	2	0
Veterinary Specialists/advisor	14	0	0
Meteorologists	0	0	0
Chemists	14	7	0
Biologists, botanists, zoologists & related professionals	1	0	0
Farming, forests, and fisheries advisors	0	0	0
Environmental protection professionals	0	0	0
Total	**148**	**25**	**10**

c) **Liberal Professionals: -** Table 11 indicates that out of 200 liberal professionals, 113 or 56.5% were accountants and of these, 60 were women. The expatriates were mainly accountants and financial advisors /analysts.

Table 11: Categories & Numbers of Liberal Professionals in the Sector

Occupations	Employees	Women	Expatriates
Accountants	113	60	4
Financial and investment advisers	4	0	2
Financial analysts	9	4	3
Management and organization analysts	3	0	2
Policy administration professionals	0	0	0
Personnel and career (HR) professionals	0	0	0
Training and staff development professionals	0	0	0
Advertising and marketing professionals	24	0	3
Public relations professionals	9	1	1

Technical and medical sales professionals (excluding ICT)	32	11	1
Information and communications technology professionals	4	1	0
Legal professionals	2	0	0
Total	**200**	**77**	**16**

d) **Agricultural Technicians: -** Table 12 shows that out of 2,387 technicians, 2,300 (96.4%) were agricultural technicians, 54 livestock technicians and 26 veterinary technicians. Women and expatriates accounts for 24.9% and 0.4% respectively of the total number of technicians. Out of 9 expatriates 5 were livestock technicians.

Table 12: Categories & Numbers of Agricultural Technicians

Occupations	Employees	Women	Expatriates
Life science technicians (excluding medical)	1	0	0
Agricultural technicians	2,300	588	2
Forestry technicians	2	0	0
Livestock technicians	54	1	5
Fisheries technicians	2	2	0
Veterinary technicians/assistants	26	3	0
Medical records and health information technicians	2	0	2
Environmental and occupational health inspectors and associates	0	0	0
Total	**2,387**	**594**	**9**

e) **Artisan Workers: -** Table 13 shows both skilled and unskilled artisan workers. Out of 18,851 artisans, the categories with the highest number of employees were crop farm laborers (50.2%, other unskilled laborers (21.5%) and agricultural, forestry and fishery laborers (16.6%).

Table 13: Categories & Numbers of Artisans in the Agriculture Sector

Occupations	Employees	Women	Expatriates
Market-oriented Animal producers	20	12	0
Market oriented Mixed crop and animal producers	1	0	0
Market oriented Forestry and related workers	10	4	0
Market oriented Fishery workers, hunters and trappers	0	0	0
Agricultural, forestry and fishery laborers	3,140	1,030	217

Crop farm laborers	9,472	3,129	1,195
Livestock farm laborers	1791	81	0
Mixed crop and livestock farm laborers	297	45	0
Garden and horticultural laborers	39	3	0
Forestry laborers	3	0	0
Fishery and aquaculture laborers	32	10	0
Other unskilled laborers like security and grounds people	4,046	2,288	12
Total	**18,851**	**6,602**	**1,424**

3.4 Existing Vacancies

The skills survey also sought to establish the number of existing vacancies in the sector. The results show that, 19.5% of the establishments reported to have had vacancies in the 12 months prior to the survey and 80.5% had no vacancies. A total of 132 vacancies were reported to have existed in that period.

The vacancies reported were mainly for 'Coffee sorters' (60), 'Accountants' (15) and 'Agronomists' (14). The number and occupational profile of the vacancies are shown in Table 14.

Table 14: Number of Vacancies by Occupation

Occupation	Number	%	Occupation	Number	%
Accountant	15	11.4	Laboratory attendant	1	0.8
Agronomist	14	10.6	Logistics	4	3.0
			Machine operators	2	1.5
Animator	1	0.8	Manager	2	1.5
Assistant tea maker	1	0.8	Marketing officer	3	2.3
Boiler operator	1	0.8	Office clerk	1	0.8
Cashier	2	1.5	Tractor technician	1	0.8
Coffee sorters	60	45.5	Planner	1	0.8
Commercial	1	0.8	Plant director	1	0.8
Director of company	1	0.8	Procurement	1	0.8
Factory manager	1	0.8	Production	1	0.8
Farming activities	3	2.3	Quality manager	1	0.8
Finance director	1	0.8	Stacker	1	0.8
Financial	1	0.8	Stock taker	1	0.8
Gardener	1	0.8	Storekeeper	1	0.8
General supervisor	1	0.8	Tea maker	1	0.8
Head maize reception	1	0.8	Technician	1	0.8

ICT	1	0.8	Hides & Leather technician	1	0.8

3.5 Hard to fill skills by Occupation and Duration

Overall 2.5% of establishments reported to have hard-to-fill vacancies. Table 15 shows that hard to fill vacancies were 13 of which most of them had taken 6 months to fill.

Table 15: Hard to Fill Vacancies by Occupation & Duration of Vacancy

Occupation	Number of hard to fill vacancies	Duration vacant in Months
Agronomist	2	6
Quality manager	1	4
Researchers	1	6
Accountant	1	0
Head maize Reception	1	4
ICT	1	6
Procurement	1	6
Logistics	4	6
Planner	1	6
Total	**13**	

The main reasons given for hard to fill vacancies were that applicants did not have core job specific skills required and lack of experience. These specifically referred to quality managers and agronomists.

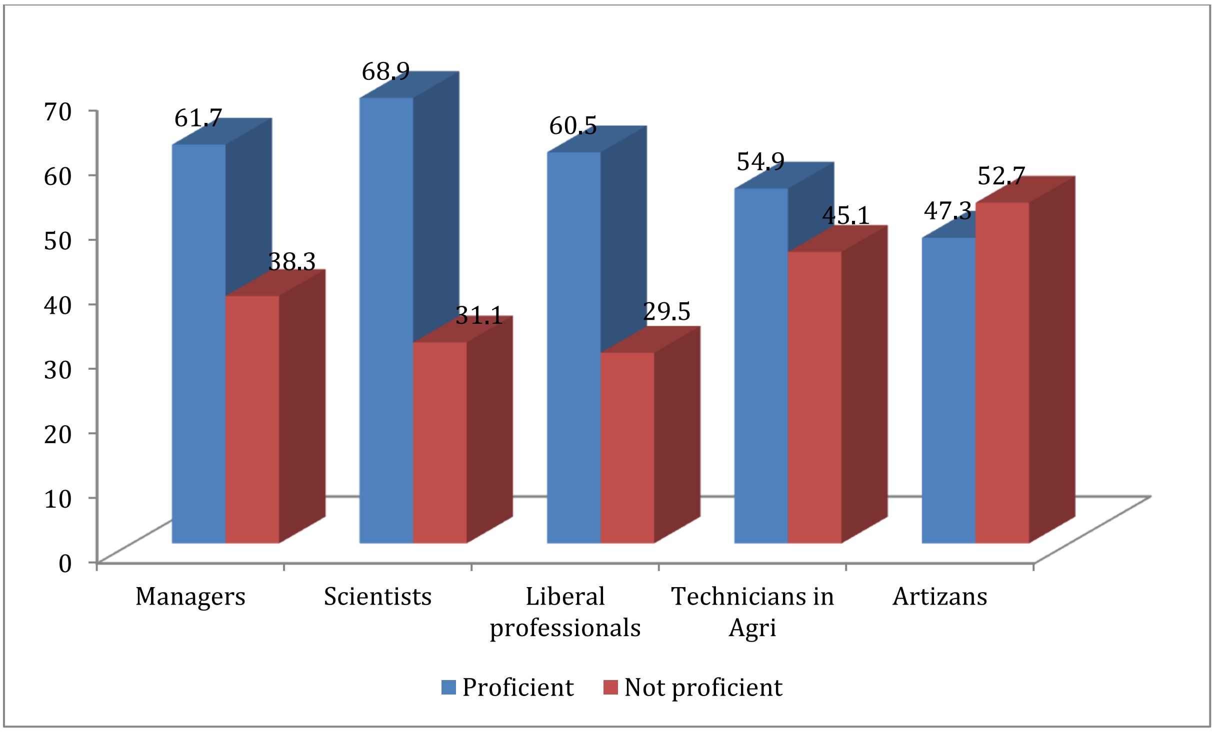
The employees were asked to state steps they had taken to overcome recruitment difficulties. From the responses given majority of the establishments were redefining existing job roles, increasing salaries, training staff and using new recruitment methods.

3.6 Proficiency of employee by occupation

3.6.1 Overall Proficiency levels by Occupation

Employers were asked to rate their staff technical competence in their core jobs. The findings by major occupations are presented in Figure 5. According to employers, the proficiency of managers is 61.7%, Scientists 68.9%, Liberal professional 60.5%, Technicians 54.9% and Artisans 47.3%. Specific details by broad occupations are highlighted below.

Figure 5: Overall Proficiency by Broad Occupation(%)



i. **Proficiency Levels of Managers: -** Table 16 presents proficiency levels of various categories of managers. While 'Agriculture Production managers' and 'ICT Service managers' are reported to 100% proficient, 'Policy and Planning mangers', have the least levels of proficiency at 30% followed by 'Agriculture and Forestry Production managers' (39.4%) and "Sales and 'Marketing managers' (46.9%).

Table 16: Proficiency Levels among Managers

Occupations	Employees	Number proficient	%
Managing directors and chief executives	342	230	67.3
Research and development managers	24	17	70.8
Agricultural and forestry production managers	33	13	39.4
Aquaculture and fisheries production managers	1	1	100.0
Supply, distribution and related managers	23	11	47.8
Information and communications technology service managers	3	3	100.0
Human resource managers	18	10	55.6
Policy and planning managers	10	3	30.0
Sales and marketing managers	64	30	46.9
Advertising and public relations managers	10	8	80.0

Total	528	326	61.7

ii. **Proficiency Levels among Scientists: -** Overall level of scientists' proficiency is 68.9%. Those with the highest proficiency levels are 'Crop Scientists' (77.8%) and 'Agronomists' (77.3%) while 'Physical and Earth Scientists' have the lowest proficiency level at 22.2% as shown in Table 17.

Table 17: Proficiency Levels among Scientists

Occupations	Employees	Number proficient	%
Physical and Earth Science professionals	9	2	22.2
Crop Scientists	18	14	77.8
Agronomists	90	66	73.3
Agricultural Economist	2	0	0.0
Veterinary Specialists/advisor	14	9	64.3
Chemists	14	10	71.4
Biologists, Botanists, Zoologists & related professionals	1	1	100.0
Total	**148**	**102**	**68.9**

iii. **Proficiency Levels among Liberal Professionals:** - The total proficiency level of liberal professions is 60.5%. Table 18 presents proficiency levels among liberal professionals. The results show that 'ICT professionals' are reported by employers to be 100% proficient followed by 'Accountants' (73.5%). 'Public relations professionals' are reported to be the least proficient (22.2%).

Table 18: Proficiency Levels among Liberal Professionals

Occupations	Employees	Number proficient	%
Accountants	113	83	73.5
Financial and investment advisers	4	2	50.0
Financial analysts	9	7	77.8
Management and organization analysts	3	0	0.0
Advertising and marketing professionals	24	2	8.3
Public relations professionals	9	2	22.2
Technical and medical sales professionals (excluding ICT)	32	21	65.6
Information and communications technology professionals	4	4	100.0

Legal professionals	2	0	0.0
Total	**200**	**121**	**60.5**

iv. **Proficiency Levels of Agricultural Technicians: -** Table 19 gives detailed proficiency levels of agricultural technicians by occupation categories. The overall level of proficiency level of artisans was reported by employers to be was 54.9%. 'Agricultural technicians' have the highest level of proficiency at 55.1% while 'Fisheries Technicians' we have no fisheries and life science technicians.

Table 19: Proficiency Levels among Technicians in the Sector

Occupations	Employees	Number proficient	%
Life science technicians (excluding medical)	1	0	0.0
Agricultural technicians	2,300	1,267	55.1
Forestry technicians	2	1	50.0
Livestock technicians	54	28	51.9
Fisheries technicians	2	0	0.0
Veterinary technicians/assistants	26	14	53.8
Medical records and health information technicians	2	1	50.0
Total	**2,387**	**1311**	**54.9**

v. **Proficiency Levels of Agricultural Artisan Workers: -** The employers reported that the proficiency level of artisans in the sector is considerably low, with an overall level of 47.3%. Table 20 indicates that occupations such as 'forestry laborers' and 'fishery' and 'agriculture' laborers are not proficient at all.

Table 20: Proficiency Levels among Agricultural Artisan Workers

Occupations	Employees	Number proficient	%
Market-oriented Animal producers	20	13	65.0
Market oriented Mixed crop and animal producers	1	1	100.0
Market oriented Forestry and related workers	10	4	40.0
Agricultural, forestry and fishery laborers	3,140	863	27.5
Crop farm laborers	9,472	2,755	29.1
Livestock farm laborers	1,791	1,593	88.9
Mixed crop and livestock farm laborers	297	8	2.7
Garden and horticultural laborers	39	5	12.8
Forestry laborers	3	0	0.0
Fishery and aquaculture laborers	32	0	0.0

Other unskilled laborers like security and grounds people	4,046	3673	90.8
Total	**18,851**	**8,915**	**47.3**

3.6.2 *Employees' Competency in Qualitative "Soft" Skills*

Employers were also asked to assess their employees' competency in Qualitative (Soft) skills, which includes: communication, leaderships, customer handling, and team work. Table 21 and Figures 6 indicate employees in the agriculture establishments are challenged in soft skills and need further training. In aggregate only 0.4% are fully proficient and 95.5% require additional training.

Figure 6: Overall Qualitative Soft Skill Assessment by Employees

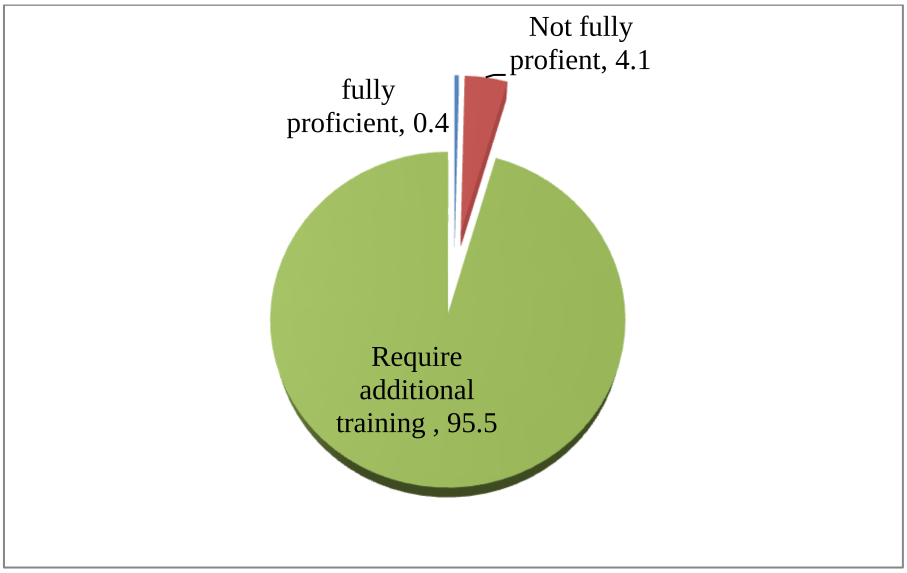


Table 21: Employees Indication of their Competency in Soft Skills

Indicators	Fully proficient	Not fully proficient	Need further training	Total
General IT skills	0.5	7.5	92.0	100.0
Written Communication	0.4	2.1	97.5	100.0
Oral communication	1.6	8.9	89.5	100.0
Customer handling skills	0.0	2.5	97.5	100.0
Team work	0.0	1.4	98.6	100.0
Leadership	0.1	2.4	97.5	100.0
Overall	**0.4**	**4.1**	**95.5**	**100.0**

Figure 7: Competence & Need for Further Training in General IT Skills

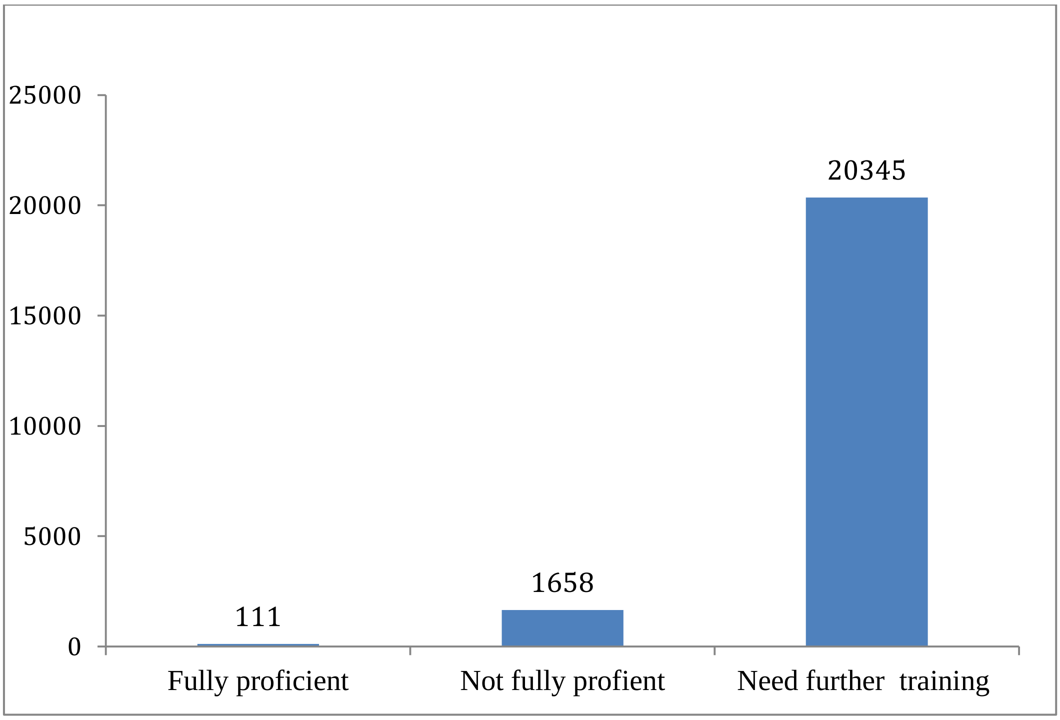


Figure 8: Competence & Need for Further Training in Written Communication

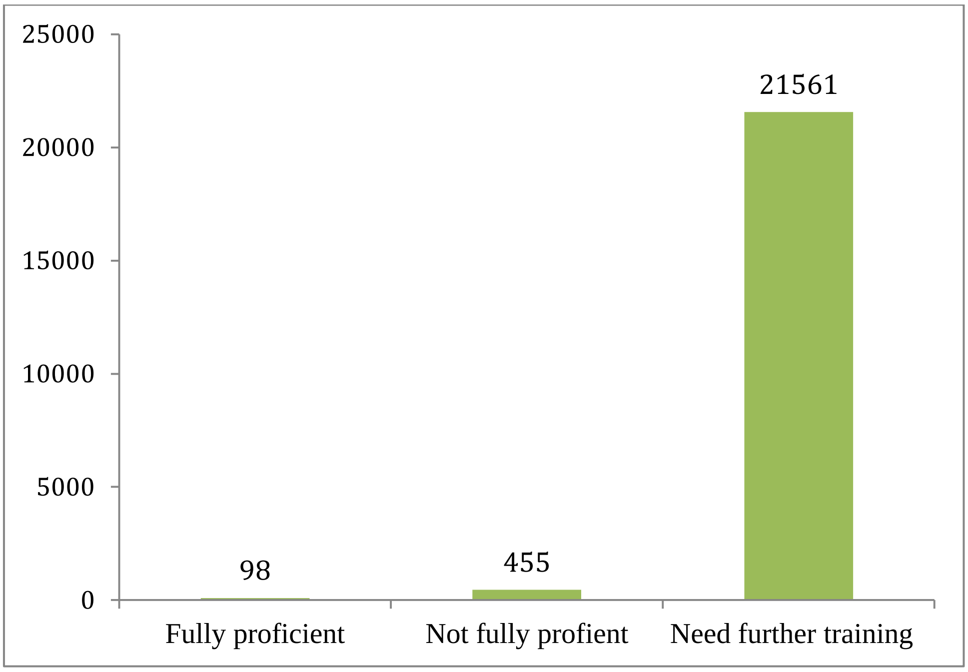


Figure 9: Competence & need for Further Training in Oral Communication

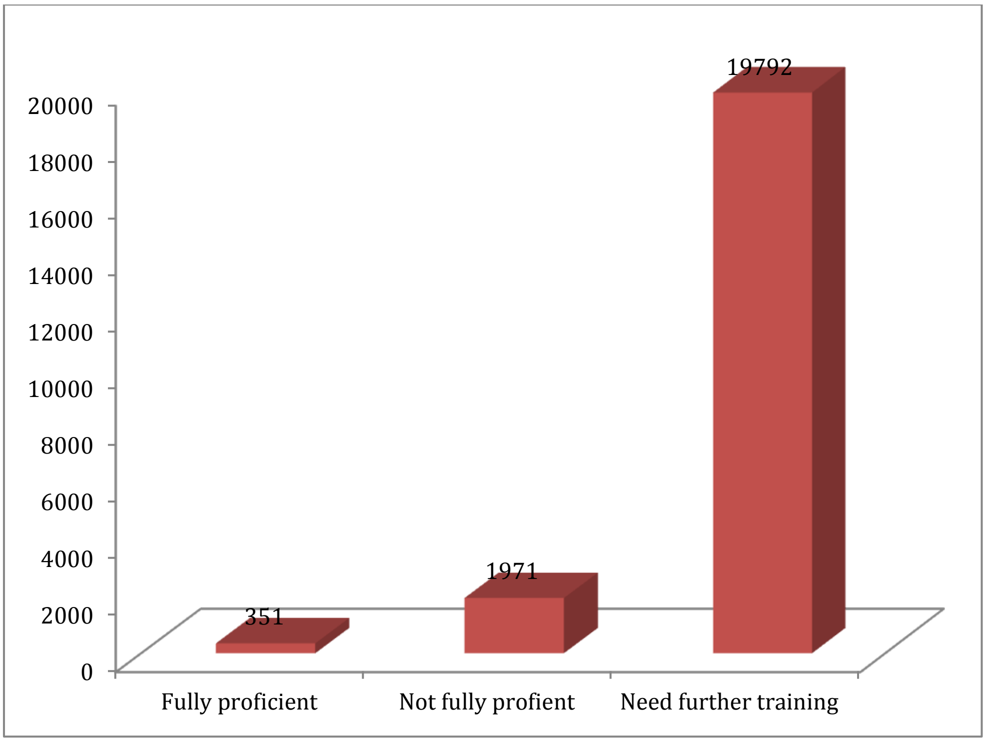


Figure 10: Competence & Need for Further Training in Customer Handling Skills

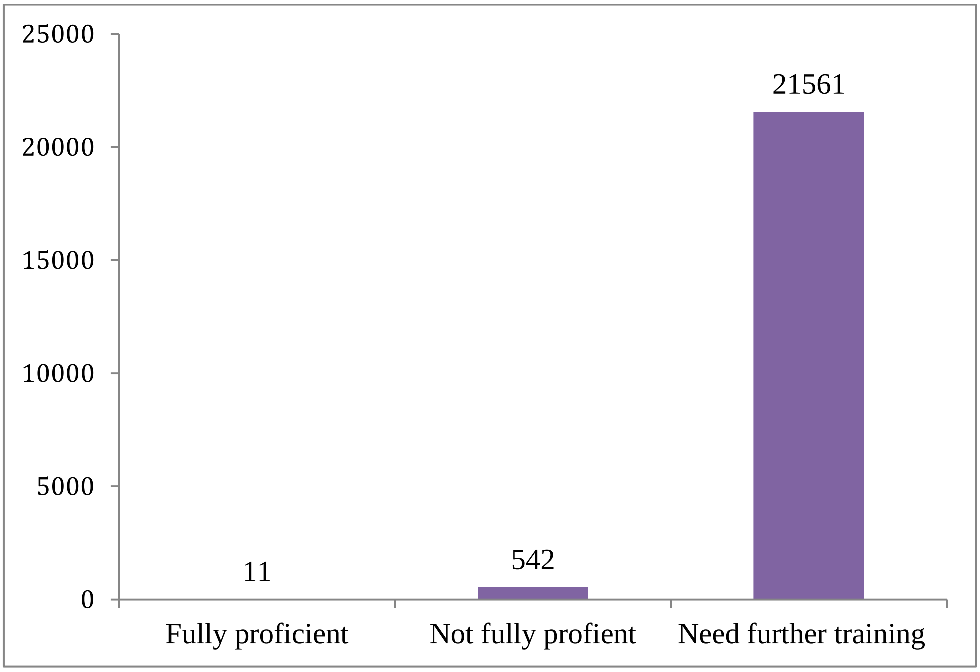
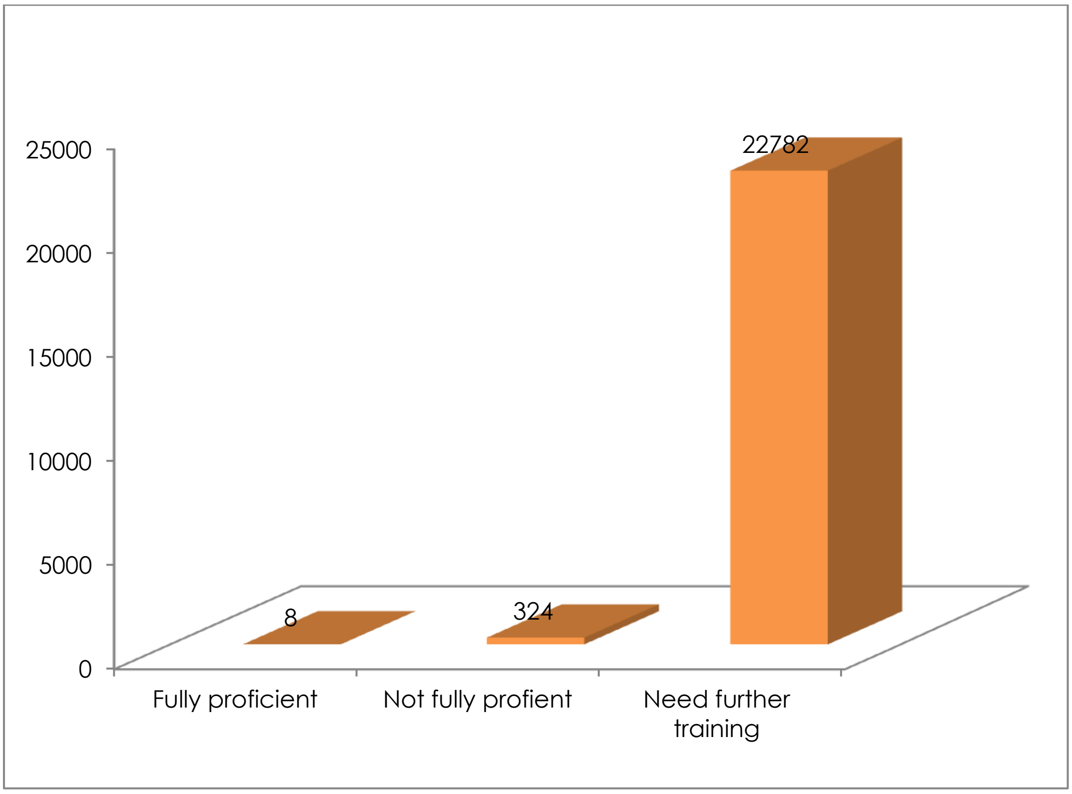


Figure 11: Competence & Need for Further Training in Team Work Skills



3.6 Overall Skills Gap in the Agriculture Establishment

A skills gap is defined as a gap between the organization skills needs and the current capabilities of its workforce. The agricultural sector had a total skills gap of 13,095 employments. This represented 59.2% of total employment. Artisans dominate the skills gap accounting for 87.4%, Technicians accounts for 8.3%, Scientists professional 1.1%, managers 1.9% and Liberal professionals accounting for 1.3%.

a) **Managers Skills Gaps:** - Table 22 presents overall skills gaps among managers. The results show that the overall skills gap 249 labor units, of which 3 were vacancies, 202 non-proficient and 44 expatriates. Managing directors/ chief executives had the highest number of skills gap at 134 labour units

Table 22: Skills Gaps among Managers

Occupation	Vacancy	Proficiency gap	Expatriates	Total gap
Managing directors and chief executives	2	112	20	134

Research and development managers	0	7	15	22
Agricultural and forestry production managers	0	20	0	20
Aquaculture and fisheries production managers	0	0	0	0
Supply, distribution and related managers	0	12	3	15
Information and communications technology service managers	0	0	0	0
Human resource managers	0	8	2	10
Policy and planning managers	1	7	0	8
Sales and marketing managers	0	34	1	35
Advertising and public relations managers	0	2	3	5
Total	**3**	**202**	**44**	**249**

b) Scientists Professionals Skills Gap: - The overall skills gap for scientists was 147 consisting of 14 vacancies, 123 proficiency gap and 10 expatriates (Table 3.20). Majority of the skills gap was for 'Agronomist (93) followed by 'Crop Scientists (20), 'Veterinary Specialists (14) and 'Physical and Earth Science' professionals (12).

Table 23: Skills Gap among Scientists Professionals

Occupation	Vacancy	Proficiency Gap	Expatriates	Total Gap
Physical and Earth science professionals	0	9	3	12
Crop Scientists	2	18	0	20
Agronomists	12	74	7	93
Agricultural Economist	0	0	0	0
Veterinary Specialists/advisor	0	14	0	14
Meteorologists	0	0	0	0
Chemists	0	7	0	7
Biologists, botanists, zoologists & related professionals	0	1	0	1
Farming, forests, and fisheries advisors	0	0	0	0
Environmental protection professionals	0	0	0	0
Total	**14**	**123**	**10**	**147**

c) **Skills Gap among Liberal Professionals:-** Liberal professionals in agriculture sector had an overall gap of 171 of these 72 were for accountants, 33 marketing professionals and 22 for technical and medical sale professionals as shown in Table 24.

Table 24: Skills Gap among Liberal Professionals

Occupations	Vacancy	Proficiency	Expatriates	Total Gap
Accountants	15	53	4	72
Financial and investment advisers	0	4	2	6
Financial analysts	1	5	3	9
Management and organization analysts	2	3	2	7
Policy administration professionals	0	3	0	3
Personnel and career (HR) professionals	3	3	0	6
Training and staff development professionals		3	0	3
Advertising and marketing professionals	6	24	3	33
Public relations professionals	4	8	1	13
Technical and medical sales professionals (excluding ICT)	0	21	1	22
Information and communications technology professionals	1	3	0	4
Legal professionals	0	2	0	2
Total	**32**	**123**	**16**	**171**

d) **Skills Gap among Technicians: -** Table 25 shows the skills gap among Technicians in agriculture is 1,089 of which agricultural technicians constituted 1,039 or 95.4% of the overall gap.

Table 25: Skill Gap among Technicians in Agriculture

Occupation	Vacancy	Proficiency	Expatriates	Total Gap
Life science technicians (excluding medical)	0	1	0	1
Agricultural technicians	4	1,033	2	1,039
Forestry technicians	0	1	0	1
Livestock technicians	0	26	5	31
Fisheries technicians	0	2	0	2
Veterinary technicians/assistants	0	12	0	12
Medical records and health information	0	1	2	3

technicians				
Environmental and occupational health inspectors and associates	0	0	0	0
Total	**4**	**1,076**	**9**	**1,089**

e) Skills Gap among Artisans: Artisans in agricultural sector had the highest number of skills gap. Table 26 indicates that the overall skills gap of artisans is 11,439. 'Crop laborers' had a skills gap of 7,973 followed by 'Agricultural, forestry and fishery laborers' with 2,494 skills gap.

Table 26: Skills Gap among Artisans in the Agricultural Sector

Occupations	Vacancy	Proficiency	Expatriates	Total gap
Market-oriented Animal producers	0	7	0	7
Market oriented Mixed crop and animal producers	0	0	0	0
Market oriented Forestry and related workers	0	6	0	6
Market oriented Fishery workers, hunters and trappers	0	0	0	0
Customer and office service workers	10	0	0	10
Agricultural, forestry and fishery laborers	0	2277	217	2494
Crop farm laborers	61	6717	1195	7973
Livestock farm laborers	1	198	0	199
Mixed crop and livestock farm laborers	0	289	0	289
Garden and horticultural laborers	1	34	0	35
Forestry laborers	0	3	0	3
Fishery and aquaculture laborers	0	32	0	32
Unskilled laborers like security and grounds people	6	373	12	391
Total	**79**	**9936**	**1424**	**11439**

3.7 Training and Internship Programs within establishments

During the skills survey, the establishments were asked if they had funded or arranged training for employees in the last 12 months. The results indicate that only 26.5% of the establishments had funded training, and 73.5% had not.

In addition, 92% or 184 out of 200 establishments did not have line budget for training. The remaining establishments had budget allocation of less than 1 per cent (Table 27).

The reasons given by establishments as to why they do not offer training for staff include lack of affordability (14.0%), did not found relevant training (30%), high staff turnover amongst others.

For those who had training programs, about 19% of the establishment offered job specific training, and 1.5% offered management/leadership training. Table 27 shows distribution of the types of training offered.

Table 27: Distribution of Establishment by Types of Training Offered

Types of training	No.	%
Job specific training/Induction	2	1.0
Job specific training/Management/leadership	1	0.5
Job specific/management/customer service	1	0.5
Induction/Orientation	2	1.0
Job specific training	38	19.0
Management/Leadership	3	1.5
Team building	1	0.5
None	152	76.0
Total	**200**	**100.0**

Table 28 indicates the total number of staff reported by the establishments as having been trained. Out of 4,585 staff 4,080 were on job specific training.

Table 28: Number of Staff Trained by Type of Training

Types of training	Number of staff trained	%
IT user skills	30	0.7
Induction/management	126	2.7
Job specific training/induction	111	2.4
Job specific/management	60	1.3
Job specific/Management/customer service	18	0.4
Induction/Orientation	6	0.1
Job specific training	4080	89.0
Management/Leadership	5	0.1
Team building	6	0.1
None	143	3.1
Total	**4585**	**100.0**

3.7 Internships Programs within Establishments

The survey sought to establish the number of interns taken by establishments and source. Table 29 shows that 46.8% of interns were university students, 33.3% university graduates, 16.5% TVET students and 3.4% TVET graduates. The average duration for internship ranged from 1-3 months and 4 -6 months. There were no interns with more than duration of 6 months.

Table 29: Number of Interns by Level & Source

Level of interns	Interns		Average duration months/establishment			
	Number	%	0 to3	4 to 6	Total	%
University graduates	79	33.3	22	5	27	47.4
University students	111	46.8	20	4	24	42.1
TVET graduates	8	3.4	2	0	2	3.5
TVET students	39	16.5	4	0	4	7.0
Total	**237**	**100.0**	**48**	**9**	**57**	**100.0**

3.8 Research/Knowledge Partnership with Academic Institutions

The number of establishments that are aware of and participate in research/knowledge transfer comprised only 3.0%. Table 30 shows the number of institutions with partnership arrangements and the area of partnerships.

Table 30: Institution by Type of Knowledge Transfer

Institution	Type of knowledge transfer partnership	No of institutions
Pub sector-National University of Rwanda	Agronomy	1
	Tea quality	3
Rwandese TVET Institution	Growing of bees	1
	Standardization of food	1
Private sector -Kigali Independent University	Profile discovery	1

3.9 Wages

As experienced in similar cases in surveys, data on salaries / wages is difficult to obtain. The data presented in this section is for occupations where complete information for the occupations was recorded.

I: Managers' Earnings:

Table 31: Average Earnings at Manager level

Occupation	Lowest	Highest	Average
Managing directors and chief executives	3,032,285	15,201,102	10,276,183
Agricultural and forestry production managers	100,000	116,800	108,400
Supply, distribution and related managers	1,200,002	1,650,002	1,425,002
Average	**1,444,096**	**5,655,968**	**,3936,528**

II: Scientists Professionals Earnings

Table 32: Average Earnings at Scientists Level

Occupation	Lowest	Highest	Average
Physical and Earth science professionals	40,002	40,002	40,002
Agronomists	170,030	170,030	170,008
Average	**105,016**	**105,016**	**105,005**

III: Liberal professions

Table 33: Average Earnings at Liberal Professionals Level

Occupation	Lowest	Highest	Average
Accountants	220,002	230,352	270,350
Financial and investment advisers	30,000	30,000	30,000
Technical and medical sales professionals (excluding ICT)	30,000	50,000	40,000
Average	**93,334**	**103,451**	**113,450**

IV: Technicians

Table 34: Average Earnings at Technicians Level

Occupation	Lowest	Highest	Average
Agricultural technicians	224,280	224,280	224,280
Fisheries technicians	25,000	25,000	25,000
Medical records and health information technicians	28,800	28,800	28,800
Average	**92,693**	**92,693**	**92,693**

V: Artisans Earnings

Table 35: Average Earnings at Artisans Level

Occupation	Lowest	Highest	Average
Agricultural, forestry and fishery laborers	268,920	509,810	334,180
Crop farm laborers	311,380	1,385,910	895,580
Livestock farm laborers	165,000	235,000	207,500
Mixed crop and livestock farm laborers	20,000	55,000	37,500
Other unskilled laborers like security and grounds people	243,000	255,000	249,000
Average	**201,660**	**488,144**	**344,752**

4.0 PART 2: SUPPLY OF SKILLS FOR THE AGRICULTURE SECTOR

Following the previous section reported on the demand and profiles of labor skills in the Agriculture Establishments, this section of the report presents issues and concerns about the supply of skills for the sector by the training institutions in Rwanda. The survey sought information on the training institutional profiles, training programs, outputs in terms of students, linkages with industry, and institutions capacities to supply needed skills.

4.1 Higher Institutions

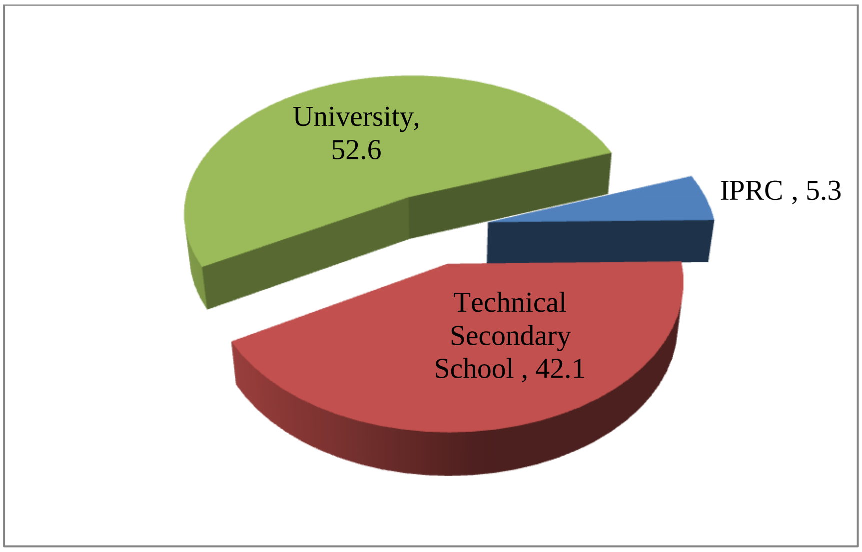
The study covered three types of institutions, Integrated Polytechnic Regional Centre (IPRC), Technical Secondary Schools (TSS) and University. Nearly three quarters (73.7%) of these institutions were located in the Province compared to 26.3% located in Kigali. Table 36 shows that 60% of the training institutions were universities and 40% were Technical Secondary schools. In the provinces half of the training institutions were universities, 42.9% Technical secondary schools and 7.1% IPRCs.

Table 36: Distribution of Training Institution by Type & Location

Type of institution	Kigali	%	Province	%	Total	%
IPRC	0	0.0	1	7.1	1	5.3
Technical Secondary School	2	40.0	6	42.9	8	42.1
University	3	60.0	7	50.0	10	52.6
Total	**5**	**100.0**	**14**	**100.0**	**19**	**100.0**

Figure 12 presents the overall distribution of surveyed institutions comprising, Universities 52.6%, Technical secondary schools 42.1% and IPRC 5.3%.

Figure 12: % Distribution of Training Institutions by Type of Institution



4.2 Education, Training programs and Graduate

In Rwanda TSS offers a course in basic agriculture as an option. This part of a certificate course for the secondary schools students. IPRC visited offers certificate courses on Science and Environmental l Management. Full-fledged agricultural courses are still missing, although it was indicated that once financial resources are available or if the institutions gets sponsors, such courses would be introduced. Rwanda has three key institutions that offer agriculture and other related courses. These include: National University of Rwanda (NUR), Higher Institute of Agriculture and Animal Husbandry, and Institute of Agriculture, Technology and Education of Kibungo.

Table 37 indicates the types of courses offered by various training institutions and level of training of such programs. Rwanda training institutions focuses more on graduates (managers and professionals) in agriculture. The annual out of graduates put is about 1,200 (bachelor degrees and diploma certificates holders). Over 70% of these are graduates.

Table 37: Agriculture & Related Courses by Institutions, Level & Graduates

Institution	Courses	Level of Programme	Graduates	
			2011	2012
1. National University of Rwanda (NUR)	- Agricultural Economics & Agribusiness	Bachelor Degree	**-**	**86**
	- Animal Science	Bachelor Degree	**-**	**32**
	- Crop Science	Bachelor Degree	**-**	**113**
	- Soil Science and Environmental Management	Bachelor Degree	**-**	**87**
	- Agro-Forestry and Soil Management	Master Degree programme (Course only)	**-**	**15**
	- Botany and Zoology Conservation	Bachelor Degree	**-**	**45**
Subtotal 1:			**-**	***378***
2. Higher Institute of Agriculture & Animal Husbandry (ISAE)	- Animal Production	i. Degree	8	28
		ii. Advanced Diploma	71	73
			19	35
			141	119
	Crop Production	i. Degree	53	14
		ii. Advanced Diploma		

Institution	Courses	Level of Programme	Graduates 2011	Graduates 2012
	Food Science & Technology	Advanced Diploma	53	23
	Human Nutrition & Dietetics	Advanced Diploma	61 86	104 111
	Rural Development & Agribusiness	i. Degree ii. Advanced Diploma	-	10
	Horticulture	Degree	-	90
	Forestry & Nature Conservation	Advanced Diploma	51	22
	Agricultural Mechanization	Advanced Diploma	14 122	39 11
	Soil & Water Management	i. Bachelor Degree ii. Advanced Diploma	31 73	35 -
	Agroforestry	i. Bachelor Degree ii. Advanced Diploma	11	28
	Irrigation & Drainage	i. Bachelor's Degree	10	3
	Animal Health	Advanced Diploma	25	9
	Veterinary Medicine	*Degree*	*25*	*9*
Subtotal II:			***829***	***754***
3. Institute of Agriculture, Technology and Education of Kibungo (INATEK)	- Agricultural Engineering	Degree	19 29	29 30
	Agri-business	Degree	29	30
Subtotal III:			***48***	***59***
Grand Total Graduates			**877**	**1,191**

As indicated in Figure 13, courses at bachelor's degree level represented the largest share of graduates slightly more than 85.0% in 2011 and 2012. The number of male graduates outnumbered female graduates, 746 and 902 in 2011 and 2012 respectively compared to 52 and 132 in 2011 and 2012 for females respectively.

Figure 13: Number of Graduates in Agriculture by Course Level 2011 & 2012

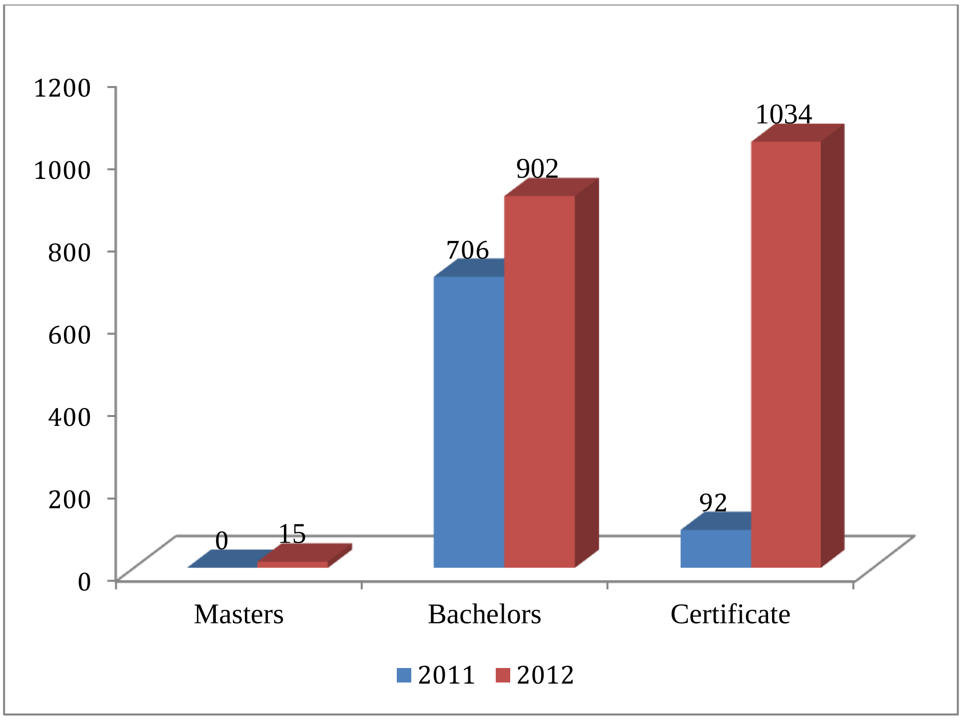


Table 38: Number of Graduates by Course & Gender, 2011 & 2012

Course	2011			2012		
	Male	Female	Total	Male	Female	Total
Agriculture						
Masters	0	0	0	13	2	15
Bachelors	678	28	706	817	85	902
Certificate	68	24	92	72	45	117
Total	746	52	798	902	132	1034
Percentage						
Masters	0.0	0.0	0.0	1.4	1.5	1.5
Bachelors	90.9	53.8	88.5	90.6	64.4	87.2
Certificate	9.1	46.2	11.5	8.0	34.1	11.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Based on comparison with well-established training institutions in the region that offer agriculture and other related courses, the programs shown in Box 1 are missing, and are required in Rwanda to supply skills that could enhance the transformation of the agriculture sector.

Box I: Missing Agriculture and other related Courses at both Technician and Professional Levels

- **Agriculture Education & Extension**
- **Horticulture**
- **Irrigation and Water Engineering**
- **Food Safety and Security**
- **Plant Pathology**
- **Veterinary Public Health & Meet Technology**
- **Comprehensive Veterinary Medicine**
- **Fisheries and Aquaculture Management**
- **Leather Science & Technology**
- **Agricultural Resource Management**
- **Animal Nutrition & Feed Sciences**
- **Poultry Science**
- **Clinical Pathology & Laboratory Diagnostics**
- **Veterinary Surgery**
- **Animal Genetics & Breeding**
- **Applied Veterinary Parasitology**
- **Dry-land Resource Management**
- **Agricultural Information & Technology and Management**
- **Marketing and business management**
- **Agro-processing and packaging**

4.3 Academic Staff in Agriculture and other Related Courses

Lecturers in the training institutions that participated in the survey are generally qualified. Figure 14 indicates the number and qualification of lectures by nationality. Rwandese lecturers with Master's degree and Bachelor's degree were the majority this being 78 and 66 respectively. The total number of Rwandese lecturers comprised of 154 males and 25 females and 35 male and 9 female foreigners. There were no foreign professors and lecturers with diploma. See details in Table 4.4

Figure 14: Number of Lecturers in Agricultural Course by Nationality

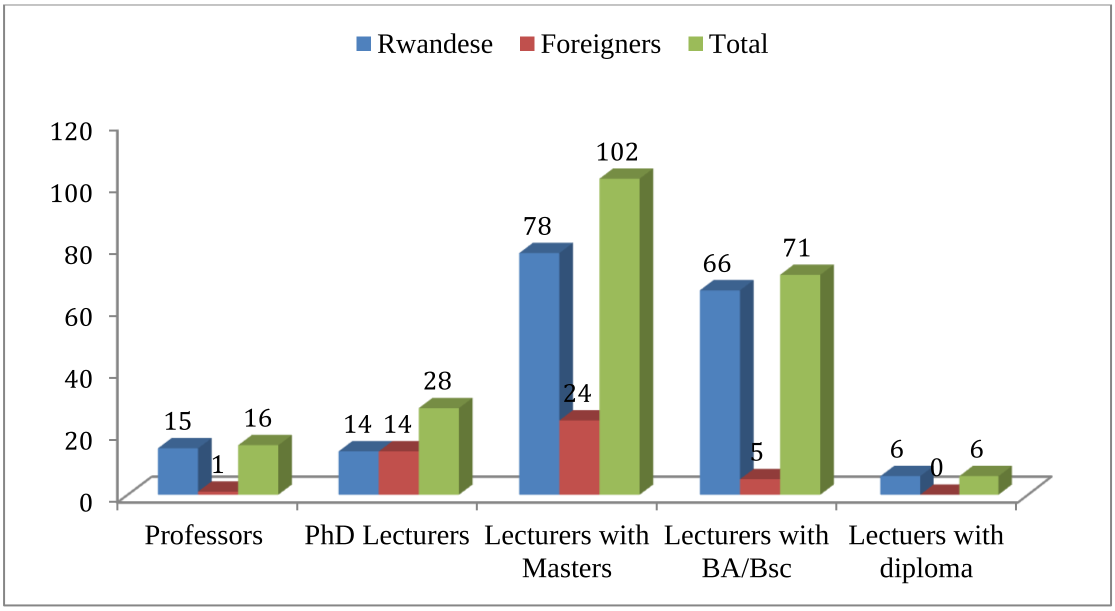


Table 39: Number of Lecturers by Level, Citizenship & Gender

Agriculture	Rwandese			Foreigners		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**
Professors	15	0	15	0	1	1
PhD Lecturers	14	0	14	13	1	14
Lecturers with Masters	65	13	78	19	5	24
Lecturers with BA/BSc	55	11	66	3	2	5
Lecturers with diploma	5	1	6	0	0	0
Total	154	25	179	35	9	44

4.4 Facilities and equipment for Agriculture Courses

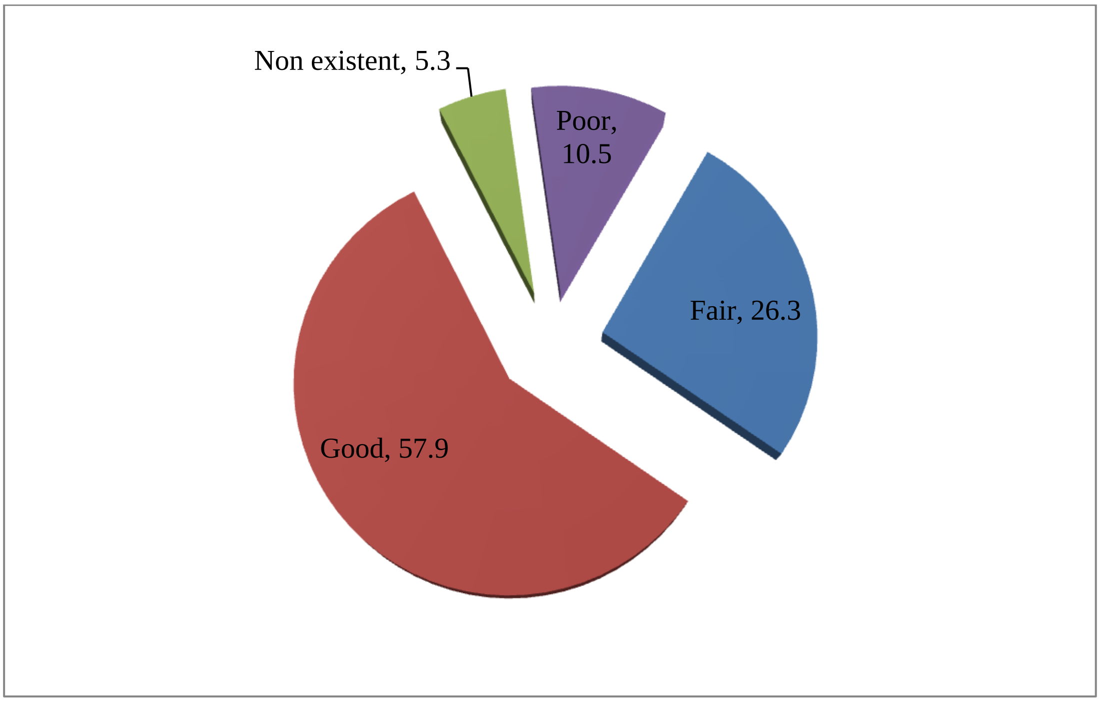
The survey sought to know the adequacy of laboratories/workshops in training institutions covered. As presented in Table 40, 94.7% of training institutions reported that they have enough laboratories/workshops and 5.3% did not have enough of these facilities.

Table 40: Training Institutions by Adequacy of Laboratories/Workshops

Type of institution	Not enough	%	Enough	%	Total	%
IPRC	0	0.0	1	100.0	1	100.0
TSS	1	12.5	7	87.5	8	100.0
University/Higher Institutes	0	0.0	10	100.0	10	100.0
Total	**1**	**5.3**	**18**	**94.7**	**19**	**100.0**

Overall state of laboratories/workshops in the training institutions visited is average. Figure 15 indicates that in 57.9% of the training institutions the workshops were good, fair in 26.3%, Non-existent in 5.3% and poor in 10.5%.

Figure 15: State of Laboratories/Workshops



Out of 11 institutions that were rated to have good workshops/laboratories 6 were universities/Higher Institutes, 4 TSS and 1IPRC. See details in Table 41:

Table 41: State of Laboratories/Workshops

Institutions	Fair	Good	Non existent	Poor	Total
IPRC	0	1	0	0	1
TSS	2	4	1	1	8
University	3	6	0	1	10
Total	**5**	**11**	**1**	**2**	**19**

Box 2: SWOT Analysis of on the Training Institutions Supply Skills for Agriculture Sector

STRENGTH	**WEAKNESS**
a) Rwanda has three well-established training institutions (one university and 2 Higher Institutes of Agriculture) offering agriculture and other related courses. b) The Institutions have qualified management and leadership structure. c) The training institutions have above average qualified academic staff. d) The training institutions are reported to have good equipment and supplies for training; e) Government, through SFAR, sponsors students to these training institutions. f) The institutions are credited by the MINEDUC.	a) The training programme is not diversified enough to cover much needed skills in Agriculture Sector in Rwanda. b) There is lack of sufficient and up to date equipment and demonstration farms to train the students to acquire practical skills rather than only knowledge of the industry c) Shortages of qualified academic staff and technicians (PhD and Professors in particular). d) Internship programme faces serious challenges, and thus not well established and effective e) The training institutions-industry linkages is very limited, if there is only in internships and a limited consultancies. f) There are no research on understand the needs of the industry.
OPPORTUNITY	**THREATS**
a) Government and RDB good will b) Existing enabling policy environment and good leadership in the country c) Agriculture sector being one of priority sector within the country and RDB has potential to attract partnership and donors d) There is viability of establishing a world-class training institution for the country and region. a) d. Increase public/students' demand for agriculture and other related courses	a) Competition from other established regional training institutions in agriculture and other related courses. b) Competition from other emerging courses like ICT and tourism c) Non-competitive salaries and incentives increases the chances of not recruiting, motivating and retaining qualified staff, who are very limited in the region. Thus end up having those who are not well suited for the job. d) Negative attitude by the youth towards agriculture.

4.5 Internship and industrial attachment

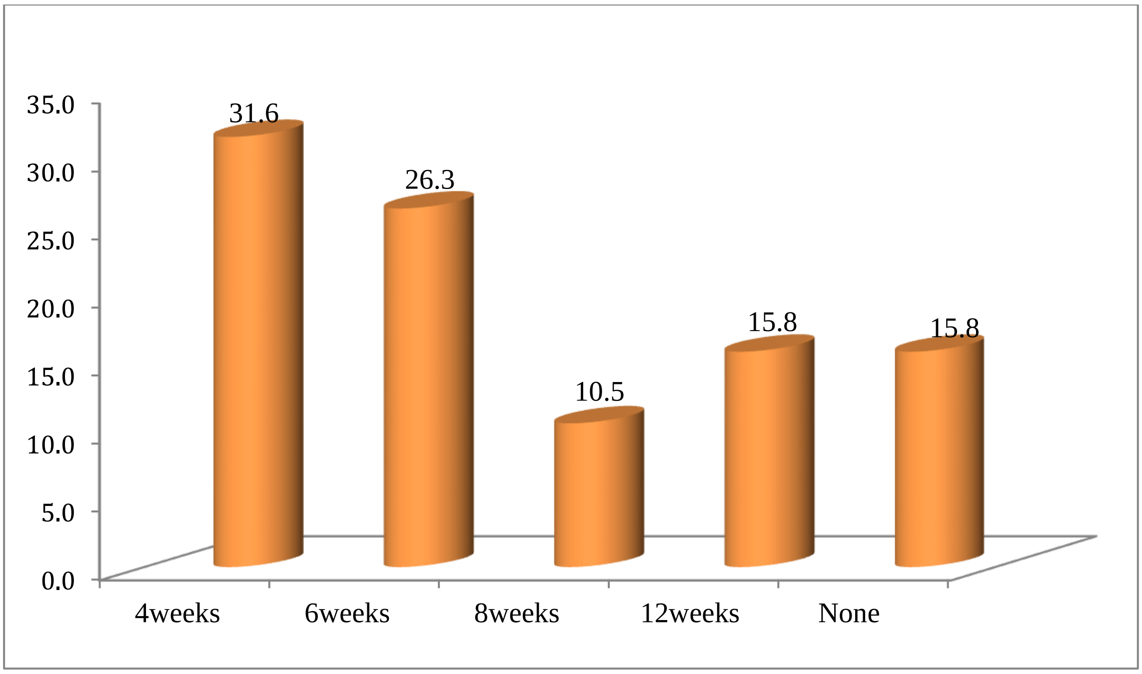
Training institutions surveyed were asked about the availability of internship or attachment in their training programs. As presented in Table 42, 16 out of 19 (84.2%) of training institutions had such programs. Of the institutions with internship programs, 62.5% were universities/Institutes, 31.3% TSS and 6.3% IPRC. In TSS, 60.0% of the institutions lacked internship programs.

Table 42: Distribution of Training Institution by Availability of Internship Program

Institution	Have internship	%	No internship	%	Total	%
IPRC	1	6.3	0	0.0	1	5.3
TSS	5	31.3	3	100.0	8	42.1
University	10	62.5	0	0.0	10	52.6
Total	**16**	**100.0**	**3**	**100.0**	**19**	**100.0**

The overall duration of internship is shown in Figure 16. The longest internship program lasted 12 weeks in 15.8% of the institutions. Majority of internship 31.6% was for duration of 4 weeks followed by 6 weeks in 26.3% of the training institutions.

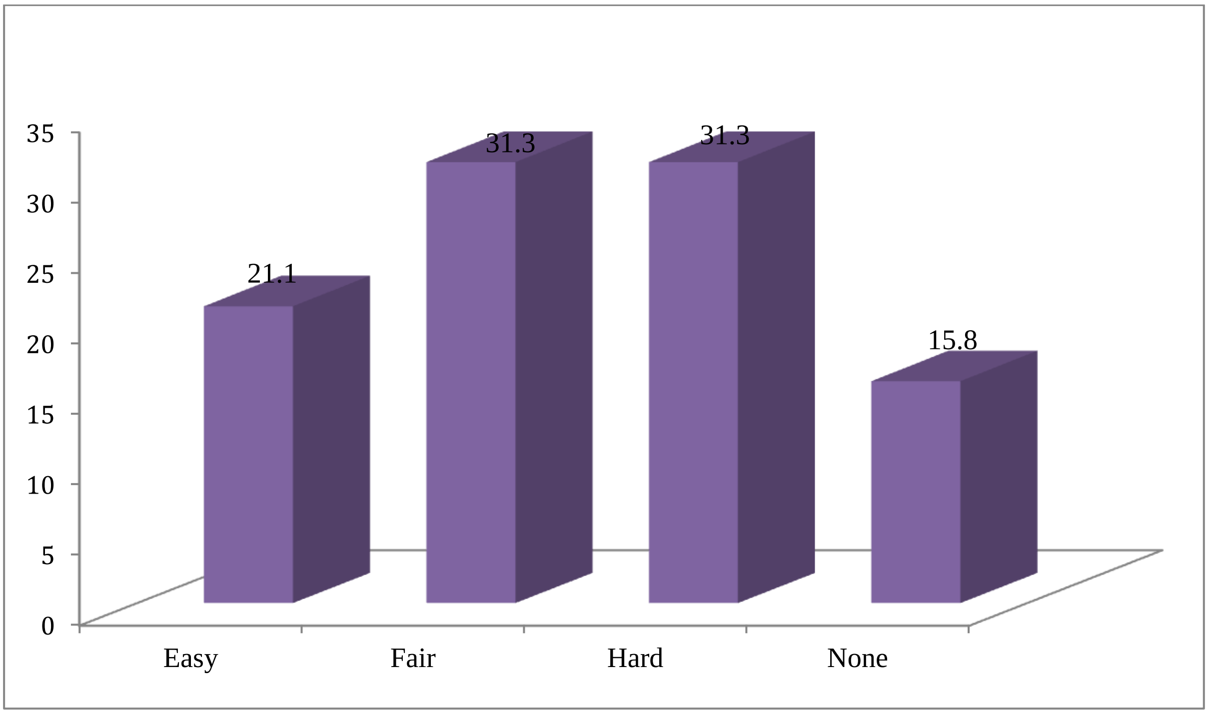
Figure 16: Distribution of Duration of Internship Programs in Training Institutions (%)



<u>RDB-HCID Internships</u>: - 78.9% of training institutions were aware of RDB/HCID internship programme this awareness was 80.0% in universities and 75.0% in TSS.

<u>Challenges with Internships</u>: - Training institutions were asked which challenges that their internship programs face. Figure 17 presents a summary of how institutions rated this challenge. Nearly one out of every three institutions felt the internship programme were hard to achieve or fairly achievable. One in every five training institutions found it easy to place students for internship programs.

Figure 17: Rating of Training Institution Challenges with Acquiring Internship Program (%)



Box 3: Respondents views on how to improve internship programmes to their trainees/student.

i. Develop an Internship policy for Rwanda
ii. Have a dialogue with the sectors in order to harmonize internship period
iii. Make a list of institutions showing required interns in their sectors
iv. Government should increase the internship allowance for students
v. Support students for internship (facilitation –transport, material/tools, allowances)
vi. Evaluating the existing internship programs across the sectors
vii. Private and Public Sector mobilization and sensitization Private to support and create room for students.
viii. Sensitizing government and private institution to be flexible on admitting students for internship.

4.6 Training Institution–Industry Linkage

Table 43 shows the type of industrial linkage existing between training institutions and industry. About 42% of training institutions reported that they have no linkages with the industry. By broad categorization, consultation/consultancy existed in 21.1% (4 out of 19) institutions; teaching /lecture 15.8%, practical work and training of staff each 5.3%.

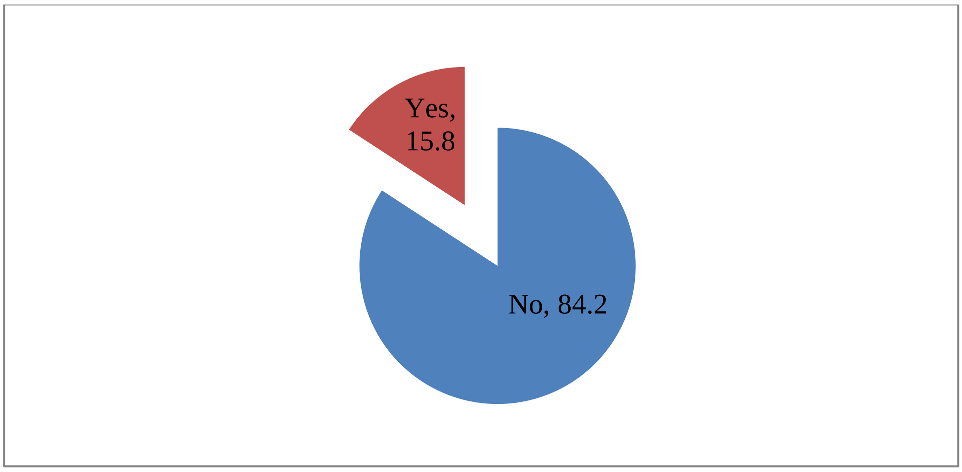
Table 43: Type of Training Institutions-Industry Linkage

Type of industrial linkage	IPRC	TSS	University	Total	% of total
Consultation and recruitment	0	1	2	3	15.8
Consultancy, combined research, publication and any other academic related work in Agriculture & community survey	1	0	3	4	21.1
Lecturing / Teaching	0	0	4	4	21.1
None	0	6	2	8	42.0
Total	**1**	**8**	**10**	**19**	**100.0**

Awareness of Labor Market information System at RDB: - Labor market information system is an important component of any labor market operation system to achieve an acceptable equilibrium of labor market demand and supply forces. RDB – HCID is in the process of building a LMIS and thus we asked the training institutions to indicate if they are aware of this system. Only 47% of the training institutions are aware of the system and its use.

The nature and function of the LMI is being developed to inform training institutions and establishments on various labor market information including vacancies through journals and of Websites. Figure 18 shows that only 15.8% of the training institutions visit RDB–HCID Website to use Labor Market Information to assess market demand needs. These were mainly the universities.

Figure 18: Do You Use LMI to Assess Market Demand Needs?



4.7 Wages and Salary for academic staff

Rwandese academic staff monthly salaries range from RWF 969,229 for professors to RWF 15, 7088 for laboratory technicians. Academic staff who are foreigners earn much more than the Rwandese for example, foreign senior lecturers and lecturers earn more than twice their Rwandese counterparts. The details are presented in Table 44.

Table 44: Monthly Salary for Academic Staff

Academic staff	Rwandese	Foreigner	Average
Professor	969,229	1,660,000	865,000
Assistant professor	828,056	1,376,667	840,000
Senior lecturer	622,178	1,350,000	950,000
Lecturer	344,234	900,000	433,333
Assistant lecturer	288,433	550,000	375,622
Lab technician	157,088	200,000	163,218

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Emerging Issues

Developing and transforming Rwanda agriculture sector from traditional/subsistence sector to robust modern sector (agribusiness and export oriented establishments) require an intensification and market-orientation of agriculture on the one hand and a diversification of economy through a proliferation of non-agricultural sectors on the other hand.

One of the requirements for this to happen is the availability of stock of skilled personnel in the country. Unfortunately, as has been indicated in the survey, the agriculture sector has a total skills gap of 13,095 employments in the short run. This represented 59.2% of total employment in the sector. Artisans dominate the skills gap accounting for 87.4%, and Technicians accounts for 8.3%.

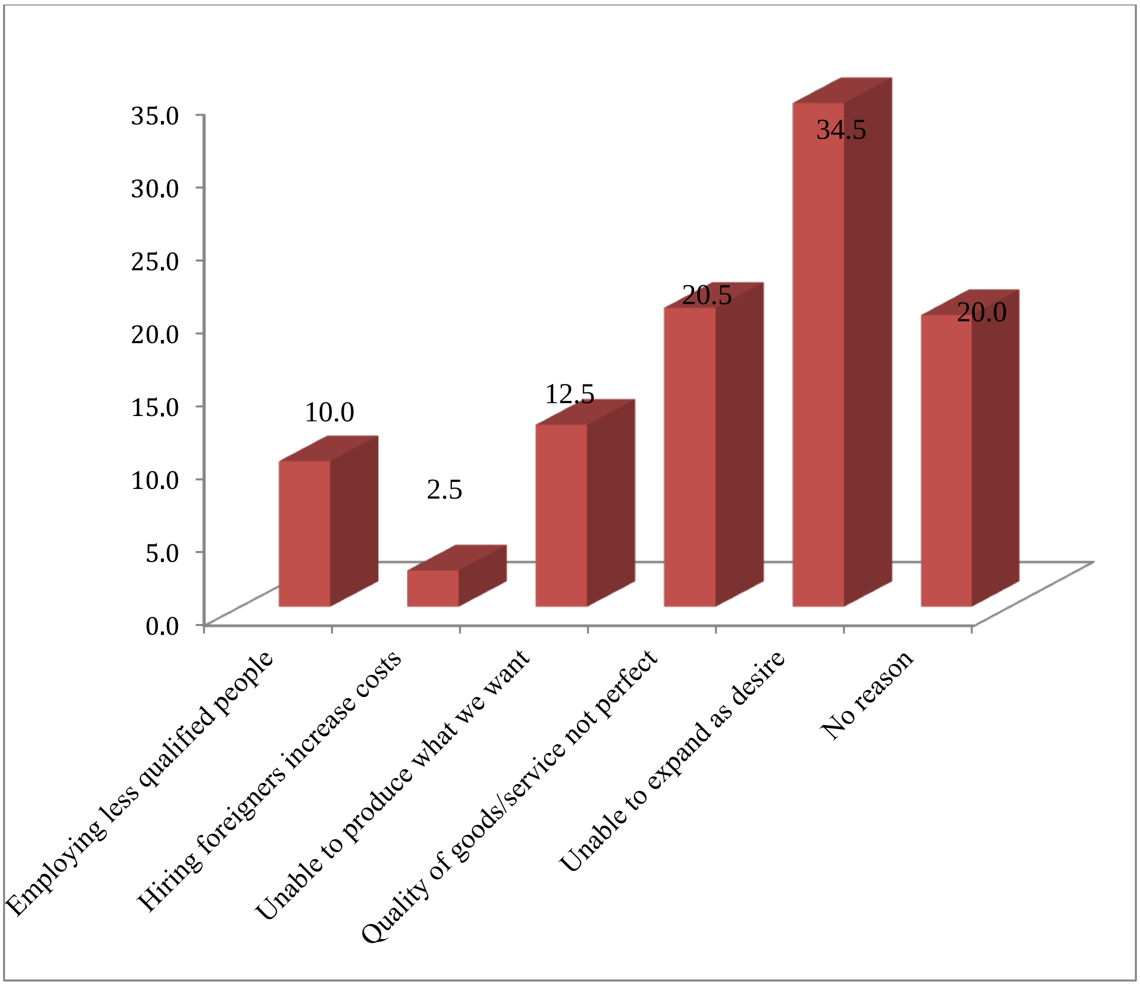
More critical, there is a mismatch between supply and demand of skills for the agriculture sector in the labor market. While training institutions in Rwanda are concentrating in producing graduates (managers and professionals), the establishments in the private sector in the local market needs technicians and trained artisans.

Lack of skills negatively affects the production (output) in the industry including export-oriented activities. Table 45 and Figure 19 indicate the employers' responses when asked how shortage of skills affects their businesses. The common effect is that "establishments cannot expand as quickly as desired" (34.5%) and "the quality of services/goods offered is not of the required quality (20.5%) and "have to employ less qualified people thus operating at maximum" (10%).

Table 45: Effect of Lack of Core Skills on Operations Establishments

Effect of Lack of Core Skills	No. Establishment	%
Have to employ less qualified people thus not operating to the optimum	20	10.0
Increasing the cost of production by hiring foreigners	5	2.5
Have not been able to offer/produce variety of good/products that we intended	25	12.5
The quality of services/goods we offer are not 100% as we would like;	41	20.5
We cannot expand as quickly as we would like to	69	34.5
None committal/No response	40	20.0
Total	**200**	**100.0**

Figure 19: Effect of Lack of Core Skills on Operations Establishments



Discussion with stakeholders in the industry also indicates that there are establishments in the sector that close down after one year. This is not because of lack of capital but due to lack of managerial and professional skills to manage and run the companies. People, mostly relatives, with limited education and skills usually manage and work in such establishments.

To achieve the objective of promoting and increasing the production of traditionally exports oriented crops (coffee and tea), horticulture and new emerging crops like Macadamia and promote agribusiness in Rwanda demands three approaches:

- Increasing the supply of relevant skills for the industry – technical and artisans in particular;
- Upgrading the existing skills of employees, who are not fully proficiency and not competent in soft (qualitative skills);
- Tackling the mind-sets of farmers and livestock keepers to move away from traditional/subsistence farming and crops, to modern way of farming, crops and embrace agribusiness; and

- To promote training institution-industry linkage through research, teaching and effective internship programme.

There are four critical implications, if there are no comprehensive interventions in in capacity building and training, for the agriculture sector.

i. Most establishments will continue employing poorly educated and untrained labor force, thus affecting negatively the quality, level and competitiveness of the sector's outputs.
ii. The pace of promoting agribusiness across the country and enhancing the growth of incomes through sustainable farming (thus reducing poverty among households) is likely to be slower than anticipated by stakeholders.
iii. The established establishments will continue importing skilled labor (professionals and technician, and even artisans) from the region thus increasing the cost of operation and making the country loose the much-needed foreign currency.
iv. There will be little diversification, innovations and branding/rebranding in the industry, thus exposing the sector to stiff competition from the region. This will make the establishments less profitable. And in the long run could lead to closure.

5.2 Recommendations

The findings of the skills survey indicate that there is need for concerted, coordinated and practical efforts, strategy and investment to enhance skills development for the agriculture sector. The starting point, though, is a clear and strategic partnership between public and private sector players while enhancing the linkages between training institutions and the industry in the agriculture sector.

The following specific recommendations need to be implemented:

1) **Establishment of Sectors Skills Councils (SSC's)** – The Sector Skill Councils are national partnership organizations that will bring together all the stakeholders – industry, labour and the training providers, for the common purpose of workforce development within the industry sectors. The sectors will be key in developing qualifications standards to ensure that the quality of trainees in technical schools, higher learning institutions and professional development stages is relevant and globally competitive. The SSC's will also be the center mechanism for coordinating school to industry linkages that provide work based experiential learning for skills development.
2) **Establishment of Skills Development Fund**: - Skills development needs specific and adequate resource. In order to encourage investment in skill development especially where there are severe skill gaps, the government can initiate a skill development levy where employers have

to contribute. The levy collected is channeled into the Skills Development Fund (SDF), which provide grants to companies that send their workers for training.

3) **Promoting PPP for internships and attachment programs**: - Public-Private Partnership should be enhanced in Rwanda to promote attachment, apprenticeship and internship opportunity for trainees and graduates. The strategies for this include following options:

    - Development of a national Internship Policy, starting with an assessment of the existing programs to establish priority skills areas to be developed.
    - The Government should consider motivating private companies to participate in internship through industrial levies managed by WDA and/or tax rebates as it happens in Kenya.
    - Establish and mobilize partners to establish Internship Fund and establishments should apply for such funds on the basis of trainees they have offered internship.
    - Identify top innovative and hardworking graduates in agriculture courses and take them abroad for 4-6 months attachment in well-established agribusiness industries in the region.

4) **Invest in Mentorship programs for Agribusiness.** There is need to implement a national mentorship programme for Agribusiness. Such a programme should target young and innovative investors in the subsector by identifying and placing such investors, for 3-6 months, in identified establishments in Rwanda and the region. The selection of youths should be through a competition across the country. The programme should be popularized through the media.

5) **Increasing supply Agriculture Extension Officers**: There is need to work with agriculture oriented training institutions to train and develop more Agriculture Education & Extension technicians especially in farming, livestock, and fisheries. Some selected officers should also be trained in Agribusiness. Target training Extension Officers for Export oriented crops like Coffee/Tea; Horticulture, and new emerging crops with potential for export like Macadamia, and Sugar cane alternative. Such workers will be distributed to the Districts in the country based on regional needs.

6) **Investing in research and Demonstration Farms**: There is need to invest in research and demonstration farm at the district level to provide a practical community training based on the priority cluster products. Training institutions need to study the best practices in such investment in Kenya, S. Africa, Israel and Egypt, and adopt the same according to Rwanda needs. These should be used as research and development facilities and to demonstrate effective utilization of skills in the value chain:

Production, Processing, and Marketing of Horticulture, Fruits; Livestock and milk, Processing; and Marketing which includes branding, market research and export. The R&D facilities should target practicing farmers, private investors in agriculture and agro-processing, students and researchers.

7) **Increasing the supply of Artisan level skills** - In the medium to long term there is need for greater investment in middle-level agriculture training colleges for 3 – 24 months practical and hand-on oriented programs. This is a model for training technicians and artisans have worked well in Kenya, South Africa and Egypt. At least one Agricultural training institute should be established in the within the next 2 years with a target of having at least on one agriculture collage in every Province/Zone specializing on specific agricultural needs and environment of each region.

   The target groups for training (upgrading of skills) should include: practicing farmers and livestock keepers across the country, graduates of HLIs, and youth interested in agriculture and agribusiness.

   The following programs should be part of the curriculum targeting training of urgent needed technicians and artisans in the country:

   - Agriculture Education & Extension
   - Horticulture
   - Food Safety and Security
   - Irrigation & Water Engineering
   - Plant Pathology
   - Veterinary Public Health & Meet Technology
   - Comprehensive Veterinary Medicine
   - Fisheries and Aquaculture Management
   - Leather Science & Technology
   - Agricultural Resource Management
   - Animal Nutrition & Feed Sciences
   - Poultry Science
   - Clinical Pathology & Laboratory Diagnostics
   - Veterinary Surgery
   - Animal Genetics & Breeding
   - Applied Veterinary Parasitology
   - Dry-land Resource Management
   - Agricultural Information & Technology and Management
   - Marketing and business management
   - Agro-processing and packaging

8) **Promotion of Agricultural and Innovation Exhibitions:** - Enhance the profile and participation in national agricultural shows and exhibitions. These

should be conducted in s systematic way at the provincial level leading up to agricultural awards at the national level while encouraging participation from regional agriculture networks. This fosters collaboration knowledge sharing, promoting innovations and makes the outputs competitive for local and international consumption. Such show should be used to mobilize Rwanda winners to participate in regional and international shows/exhibitions like: Fresh Fruit & Vegetable Business, International Flower Trade Expo, Dairy Conference and Exhibitions, Agribusiness Financing fairs.