AGRICULTURE, FORESTRY AND FISHERIES OF RWANDA

Fact-finding Survey for the Support of Aid to Developing Countries
(Fiscal Year 2011 Research Project)
Supported by the Ministry of Agriculture, Forestry and Fisheries

March 30, 2012

Prepared by Promar Consulting
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PREFACE

This report documents the results of Promar Consulting’s investigation of current trends and issues in Rwanda’s agricultural sectors, as part of a study supported by the Japanese Ministry of Agriculture, Forestry and Fisheries (MAFF). The other part of this study focuses on issues in Tanzania and has been published separately.

The purpose of these studies was to provide background for designing aid and technical assistance projects in agricultural development in sub-Saharan Africa, as well as inform private sector investment and business ventures. Because each country and region in sub-Saharan Africa has significant differences in natural environment as well as in socio-economics, politics and culture, in order to provide effective and efficient assistance, MAFF recognized that it is absolutely essential to have the most current information on the agricultural conditions and the major challenges facing the individual countries and the regions within them. Therefore MAFF has been supporting the collection and analysis of information related to the overall agricultural sectors in various sub-Saharan African countries.

Rwanda was chosen as a focus of this year’s research because of the political clout it wields in East Africa despite its small size and the recent reputation for action and innovation among its government and leadership. Our aim was to document and analyze trends in Rwanda’s agricultural sector in a useful and straightforward way that could be beneficial to private sector investors as well as development assistance donors and implementers.

Within the Rwandan agricultural sector we looked at several key sectors in detail: the rice value chain, the banana industry and its value chain, coffee production and value chain as well as tea production and its value chain. We look at the production trends in these sectors as well as their role in food security and income generation.

Because of the limited time frame for a project that aimed to gain an overall understanding of an extremely broad sector and complex policies, we are aware that there may be insufficient explanations or even errors in our understanding of some aspects of Rwandan agricultural policy and its agricultural sectors. We would be grateful for feedback from knowledgeable readers and welcome the opportunity to deepen our understanding of the issues.

The full research team was led by Rie Yoshida, Director of Promar Consulting. Field research in Rwanda was conducted by Promar consultants Chisa Ogura and Shinichi Kawae, who also prepared this final report. Additional feedback and support for the research as well as for preparation of both the English and Japanese-language reports and the public seminar presenting our results was supplied by consultants Lucia Vancura and Ayako Kuroki, analysts Jessica Yang and Andrew Lambert and logistics coordinator Naoko Watanabe.

In Rwanda we were supported by agriculture consultant Mr. B. Patient Maganya who provided valuable insights and suggestions on how to assess the various value chains. We were also joined by Mr. Satoshi Maruo, an expert on the banana farming culture of the Great Lakes region.

Finally, we are grateful for the insight, critiques and field research support we were able to gain from the project’s advisory panel in Japan: Professor Koichi Ikegami from Kinki University’s Department of Agriculture,
Professor Jun Ikeno from Kyoto University’s Graduate School of Asian and African Area Studies (ASAFAS), Tanzanian fisheries expert Professor Tetsu Sato of Nagano University, Mr. Shinichi Takeuchi of the JICA Research Institute and Mr. Ichiro Tambo, Director of JICA’s Africa Department.

While too numerous to name, we thank the many agriculture, trade and fisheries experts both in Japan and overseas who took time to provide information and insights, as well as the farmers, trade associations, government officials and businesspeople who agreed to discussions and interviews with us in Rwanda.

We hope that this report will help provide readers with a deeper understanding of the current issues in Rwandan agriculture and agricultural policy.

We also hope that it may help in strengthening a smooth relationship between Rwanda and Japan as well as with the global community, fostering both effective development assistance as well as increased investment and inclusive business development.

Promar Consulting
March 2012
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**Exchange rate**

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Source: National Bank of Rwanda, Ministry of Finance of Japan

**Notes of caution on Rwandan agricultural statistics**

**Census and agriculture statistics**

In Rwanda, no agricultural census survey has been conducted yet. NISR (National Institute of Statistics of Rwanda) is planning to conduct an agricultural survey in 2012 or 2013 after the completion of the population census in 2012.

Rwanda’s current agricultural production estimates are based on the National Agricultural Survey 2008 (NAS 2008) which is a sample survey based on 10,080 agricultural households. NISR is planning to do an agricultural survey every 5 years.

In addition to NAS, there was another relatively large-scale sample survey on food security and nutrition in 2009, called the Comprehensive Food Security and Vulnerability Analysis and Nutrition Survey.

**Trade statistics**

Rwandan trade statistics are different to some extent depending on the source. Promar basically used the one reported to the UN from the ITC data base to see the details by product. Regarding coffee and tea, we used the data provided by National Agriculture Export Development Board (NAEB) during our interview which is more accurate than other public sources.

**Informal trade statistic**

NISR, National Bank of Rwanda, and MINICOM (Ministry of Trade and Industry) started to release informal trade statistic from 2009. Informal trade contains trade recorded at customs, but exempted from tariff due to small-scale of business.

**Maps of Rwanda**

The next page shows Rwanda’s current and past political maps.
Figure 1  New political map of Rwanda (Provinces and districts, created within last decade)

Figure 2  Previous Political Map (These older names for major cities & provinces are still commonly used)
1 INTRODUCTION

Background and objectives

The majority of the population in Sub-Saharan Africa is engaged in agriculture, and this reality, along with the importance of ensuring food security, means that development assistance in agriculture, forestry and fisheries is a critical focus. 1 out of 3 sub-Saharan Africans is malnourished and supporting increased production of Africa’s subsistence crops, such as rice, potatoes and beans is a concrete measure that can contribute to increased food security in the world. In 2011, East Africa suffered from severe food shortages due to the worst drought in 60 years – and these climate change-related threats to food supply have become an issue of global scale. In addition, in sub-Saharan countries such as Sudan and Rwanda, civil wars have finally ended, and the countries are in the process of reconstruction; within the post-conflict reconstruction of economies, the agriculture, forestry and fisheries industries play an extremely important role. Moreover, destabilization of international grain production and prices in recent years, caused by unusual weather, plus the increased global demand for grain linked to the world’s increased use of biofuels, can have particularly adverse affects on the relatively poor sub-Saharan African countries’ economies and food security, making support for the region’s agricultural sector increasingly important.

However, because the natural environment as well as the socio-economic, political and cultural environment can vary significantly between the countries and regions in sub-Saharan Africa, comprehensive, up-to-date information about the current state of agriculture and its key issues is critical for planning efficient and effective development aid and cooperation in agriculture, fisheries and forestry. For this reason, as part of the Japanese Ministry of Agriculture, Forestry and Fisheries’ official development assistance (ODA) program for Africa, research and analysis projects are being conducted to determine each country’s agricultural situation, systems and challenges as well as the current trends in development assistance. The aim of the project is to share this information widely with both private sector and governments around the world and thereby make a valuable contribution to the improvement of foreign aid and assistance and the expansion of international trade and investment.

Over a five-year period starting in FY 2011, 10 sub-Saharan Africa countries (Mozambique, Tanzania, Madagascar, Senegal, Cameroon, Benin, Rwanda, Burkina Faso, Togo and Gambia) will be researched.

Survey on Tanzania and Rwanda

In this year's project, Tanzania and Rwanda were selected as the target research countries. Within
sub-Saharan Africa, Tanzania is relatively politically stable with a growing economy. Tanzania is the recipient of a significant amount of ODA from Japan, second only to Nigeria among Africa recipients of Japanese aid. The agricultural sector has been considered a priority area for Japanese ODA which suggests an important need for more extensive information about the current state of the sector. There is also growing amount of private investment as well as significant examples of new businesses in the agriculture and food sector, using inclusive business models that benefit the rural and poor. In addition, the Nile perch fishing industry on Lake Victoria, Africa’s largest lake, has attracted attention and controversy.

In contrast to Tanzania’s stability, Rwanda had been ravaged by a civil war between the rival Hutu and Tutsi ethnic groups. However, the economic recovery witnessed since 2000 when stability was restored has been referred to as the “African miracle”. Rwanda has been designated as a member of the JICA-led Group Two under the Coalition for African Rice Development (CARD)’s rice development program. Under this program, it is expected that development assistance for rice will increase and that Japanese will become increasingly important.

Because both Tanzania and Rwanda are located in East Africa, we believed that concurrent research in the two nearby countries could provide some useful comparisons and contrasts.

This year’s survey looked at the condition of agriculture-related industries such as agro-processing and distribution, as well as policies and systems, government and private sector institutions, each country’s foreign aid and assistance situation and current challenges in the agriculture sector.

In addition, there was a focus on certain industries in each country. In Tanzania, there was a focus on banana as a staple and possible cash crop, as well as the freshwater fisheries of Lake Victoria. Rwanda focused on the staple crops banana and rice, and the export crops coffee and tea. We have looked at each of these products individually to document production, storage, processing, sales, distribution, consumption and export and identify the issues at each stage of the value chain. Likewise, in Tanzania, the team also explored the potential of development of inclusive business models (“BOP businesses”) in the agriculture and agro-processing sectors. Finally, we summarized our conclusions and recommendations for how assistance to the agriculture sector can increase food security, how producers’ incomes can rise through support for trade and how encouragement of private sector investment can help develop industries linked to the agriculture sector.

The structure of the report Rwanda

This report summarizes the findings of the Rwanda research. Chapter 2 provides an overview of the Rwandan agriculture and livestock industries; Chapter 3 discussed the rice value chain and Chapter 4 focuses on bananas. Chapter 5 and 6 outline coffee and tea, respectively. Chapter 7 gives an overview of the forestry industry and Chapter 8 profiles the fisheries industries. Chapter 9 is a summary of our conclusions and recommendations. Finally Appendix 1 outlines the field research in Rwanda.
2 OVERVIEW OF RWANDA’S AGRICULTURE SECTOR

2.1 Rwanda’s Agriculture, Forestry, and Fishery Sectors

2.1.1 Rwandan Society and Developments in the Agriculture, Forestry and Fishery Sectors Since Independence

Rwanda is a country with numerous lakes, located in Eastern Africa. Elevated at 800-4500m above sea level, the country is also known as ‘country with a thousand hills’, due to its dramatic undulating landscape. Rwanda has a total area of 26,338 km². In 2010, it had an estimated population of 10,410,000, and an estimated population density of 395 per square kilometer, denser than Japan. Even if we include arable land on hillsides, 60% of farmers own farmland no larger than 0.5 ha. Banana is one of Rwanda’s staple foods, and it has very high productivity; thus it is the foundation supporting the densely populated country. The lack of cultivatable land is said to be one of the major sources of conflict in Rwanda.

Rwanda became a German colony in 1889, and after World War I, it was put under Belgian control. In 1961, Rwanda was finally able to declare its independence. However in 1959, the ethnic Hutu majority (roughly 85% of total population) gained control of the country, at the expense of Rwanda’s minority ethnic group, the Tutsi (15% of total population) who had essentially formed the ruling elite and been favored by colonial authorities during the colonial era. This period of Hutu rule is known as the Social Revolution (1959 to 1962). During the three-year period of the Social Revolution, fear of Hutu persecution drove many Tutsi to flee to neighboring countries. The Tutsi were an ethnic group that mainly raised cattle and many owned large-scale ranches. However, when they fled as refugees, the grazing land that was left behind was redistributed and used for small-scale farming. Then in 1973, there was a coup d’état by Hutu leader Habyarimana and two years later, France signed a military cooperation agreement with Rwanda. Habyarimana was born in the northwestern part of Gizenyi province, and he gave preferential treatment to people from the northwestern provinces. Infrastructure development during this time centered on the northwestern areas (esp. Gizenyi and Ruhengeri) (see figure 3). However, although attention was paid to agricultural development under President Habyarimana, because of poor weather as well as structural problems in the agricultural sector, including population growth which hindered subdivision of arable fields and development of agriculture technology, and continuing decline in soil fertility, from the 1980s, food shortages worsened. Added to these problems were the dropping prices of tea and coffee, two of Rwanda’s main exports, and the impact of the worsening civil war in the early 1990s. Rwanda’s agricultural sector plunged into catastrophe.
In 1987 during the Habyarimana administration, the Rwandan Patriotic Front (RPF) was formed by Tutsis in Uganda. From the very start RPF received military support from the British and American governments. The conflict between the RPF and the government army entangled neighboring countries, and the assassination of President Habyarimana in 1994 was a pretext for government supporters to start the Rwandan genocide, killing as many as 500,000 people, mainly Tutsi and politically moderate Hutus. Later that same year, the RPF took control of Rwanda through military force, declaring victory in the civil war and the genocide ended. With this, Hutu followers of the previous regime fled the country in fear of retaliation, while at the same time great numbers of Tutsis living in exile in neighboring countries returned to Rwanda. This was Rwanda’s second mass refugee exodus since the Social Revolution period. Tutsi refugees returned mainly to the areas bordering from neighboring Tanzania and Uganda in Rwanda’s eastern regions such as Umutara and Kibungo (figure 3); and the new RFP administration conducted land redistribution. ¹

RPF is now the ruling political party and under current President Kagame’s authoritative rule, Rwanda has seen a rapid recovery of public security and a return to economic growth. According to an estimate from the Rwandan government, the country is enjoying a sustained GDP growth rate of 5-10%. Many refer to this as one of the biggest success stories in Africa and it is known as “The African Miracle”. Not only did public security, business and the investment environment improve, infrastructure development in the capital Kigali has also been progressing. In 2003, a new constitution was established, both the legal system and the government were thoroughly overhauled, and there is relatively steady progress towards the Millennium Development Goals (MDGs). In 2007, Rwanda joined the East African Community (EAC), a further step towards regional economic integration among Eastern African countries. Then in 2008 Rwanda joined the British Commonwealth, and English was added as an official language, substituted for French as the language of education. In 2009, Rwanda restored its diplomatic relations with France, and also improved the relationship with its neighboring country, Democratic Republic of the Congo (DRC).

However, Rwanda is still far from having a democratic political environment. Restrictions on free speech are widely imposed and any criticism aimed at the current administration is not tolerated. The current administration also does not accept the idea of its having any involvement in the 1994 genocide. Rwanda is also reported to be engaged in the mining and exports of metals including tin and coltan from Democratic Republic of Congo. In addition to these mineral resources, the other major sources of foreign currency are limited to coffee and tea exports, and tourism programs like ecotourism. Rwanda depends on foreign aid for around half of its national finances, in particular from the US, the UK, the World Bank, and the EU.

In the agriculture sector, the government has been implementing numerous new policies in rapid succession, including land tenure policy, agricultural development policy, cooperative policy and policy on the privatization of government-owned corporations. Promotion of soil fertilization, increase in livestock breeding, the development of irrigated marshlands, and the privatization of state-owned enterprises in both the coffee and tea industry are all part of the government’s attempt to increase Rwanda’s agricultural production level to self-sufficiency.

The current administration is thoroughly focused on results on both the central and local levels. Once a government policy starts, for better or worse, the government acts quite quickly to implement it, a characteristic which has brought about significant changes to Rwanda’s landscape. Some of the policies which are bringing huge changes to rural landscapes and agricultural systems include the promotion of Imidugudu which expects people living in scattered villages to relocate to clustered settlements along main roads and crop intensification programs which promote planting a single crop in one segregated area.

Still, poverty rate remains high at 56.9%. While urban and rural areas have seen the rise of both middle class and the wealthy, the gap between the rich and poor is expanding. As for education, some Tutsis who were educated abroad speak exceptionally good English and French with the ability to engage well in international negotiations and often hold key posts in both the government and business sector. On the other hand, education at the village level remains insufficient. In rural areas an estimated 32% of men and 14% of women have completed primary education, and 73% of men and 43% of women population have a basic level of writing and reading skill.\(^2\) The literacy gap between male and female is significant. Moreover, due to the genocide and the effects of a prolonged life as a refugee, few Rwandans are capable of taking up mid-level positions in the government. In addition, with the high work pressure on a limited number of civil servants, the turnover rate for civil servants is high. This means that the agricultural extension activities and agricultural surveys that are so essential to the overall improvement of agricultural technology remain difficult to conduct.

\(^2\) (The National Institute of Statistics of Rwanda 2009)
2.1.2 Climate, topography, land condition and irrigation

*Weather conditions and cropping season*

Although Rwanda lies close to the equator, because it is located at 800m to 4500m over sea level, average temperatures are around 20 degrees Celsius with minimal annual fluctuation.

There are two rainy seasons: Long wet (February-May) and Short wet (September-November) and three cropping seasons, A, B and C, as shown in the figure below. Grain is mostly produced in season A, planting during early short wet (September-October) and in season B, planting during early long wet (February-April). In most cases, double cropping is feasible. Season C is the cropping season for vegetables, planting in the lower wetland areas or irrigated areas during the long dry season.

*Figure 6  Kigali’s precipitation and temperature trend (altitude 1,400~1,600m)*

<table>
<thead>
<tr>
<th>Season</th>
<th>A</th>
<th>B</th>
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<td>Harvesting</td>
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</table>
| Source: (The National Institute of Statistics of Rwanda 2009)
Land usage—Hillside and marshlands

Rwanda’s landscape is almost entirely made of hills, especially in the western part of the country where landscape is characterized by high mountains. Rwanda’s land area is 2.63 million hectares, 76% of which is agricultural land. As shown in figure 4, most land is already cultivated except for a few marshlands and the national forests.

Hillside agriculture

The 2008 agricultural statistics show that 24.3% of farmland is located near the top of hills; 45.8% on hillsides; 12.0% near the bottom of hillsides; 15.8% on plains; and 2.2% on marshlands. In total, 82.1% of Rwanda’s total arable land lies on hillsides. On hillsides, banana, corn, cassava, potato, climbing bean, coffee, tea and avocado can be cultivated.

Hillside areas have little or no irrigation systems. However, the key to improving agriculture in this area is to maintain high levels of soil moisture during the long dry season (May-August) when there is low precipitation. Thus, the Rwandan government has set a goal to establish irrigation systems on 60,000 hectares of hillside land by 2020.

Marshland development

Marshland forms in the areas surrounded by hills. This is due to the difficulties in managing water systems and the existence of schistosome fluke and malaria which has delayed the spread of farming into these parts of Rwanda. Marshland development started during the colonial era, especially tea farming development along with the construction of drainage channels. The Habyarimana administration then introduced rice farming on a large scale with the technical cooperation of China.

Presently, all marshlands have been nationalized by the Rwandan government for development of the land. Since the marshlands are the only remaining areas for expanding agriculture in Rwanda, the government is putting great effort into their development. Programs such as the Rural Sector Support Program (RSSP) are building large-scale irrigation and drainage systems. These systems are then lent to farmer’s associations. The government identified 66,000 hectares of marshland and 13,500 hectares are already developed. The government aims to open-up another 40,000 hectares of marshland by 2020.

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3 (The National Institute of Statistics of Rwanda 2008)
4 According to (Ansoms 2011) during civil wars marshlands were used as hiding places for guerrilla activities. Initially, RPF focused on marshland developments to eliminating anti-government activities as well as increasing food production.
Soil erosion

Soil erosion on hills, in particular, is one of the most serious problems in Rwandan agriculture. Since most hillside land has already been developed as crop land, soil is easily eroded by rain, which causes very poor land fertility. (Figure 9, figure 10)

In order to prevent soil erosion, terraced fields are encouraged and more advanced farms dig channels, or grow elephant grass around their terraces to conserve the soil.

Rwanda’s land law requires land owners to implement soil erosion prevention measures.

In marshland irrigation development too, it is necessary to implement soil erosion prevention measures for surrounding hillside areas to avoid sediment from collecting in farmland or irrigation equipment.

Flood and drought

The Eastern region of Rwanda is the area most prone to droughts. For instance, during 2003, production decreased significantly when droughts followed both cropping seasons.

Furthermore, the lack of drainage systems means certain areas suffer from floods after the rainy seasons. This is especially true in coastal areas. (see diagram below)
2.1.3 Agriculture within Rwanda’s Economy

**Agriculture, Forestry, and Fishery Sector in GDP**

The agriculture, forestry, and fishery sector is a sector of utmost importance, accounting for 32% of Rwanda’s GDP. The manufacturing industry is still under-developed, accounting for a mere 7% of Rwanda’s GDP. Other industries such as distribution, real estate services, and transportation account for a total of 47% of Rwanda’s GDP.

According to estimates from Rwanda’s National Institute of Statistics, GDP has grown at 5-10% per year since 2004, and the economy is expected to continue to expand. The area surrounding the capital Kigali is experiencing steady urban development. A medium scale construction projects have risen in number; fruit and vegetables are seen in abundance at markets.

In terms of agriculture, with an exception to the disastrous harvest during the two cropping seasons in 2003 which resulted in severe food shortages, production since then has experienced stable growth. During the late 2000s, coffee and tea production revived, and so did Rwanda’s exports as world prices increased.

![Figure 13 Percentage of Rwanda's GDP by Sector (2010)](source)

![Figure 14 Rwanda's Real GDP Growth Rate and Agriculture Sector Growth Rate](source)
Foreign trade

With economic growth, Rwanda is importing more cars, electrical products, and machinery. However, while imports are increasing, the trade deficit is also worsening year by year. Solving this problem has been a top priority for the government.

The data below shows that export of coffee, tea and other agriculture products account for roughly half of Rwanda's foreign income. Minerals such as tin and tantalum are other major sources of foreign income.

As for imports, in addition to cars, electronics, machinery, pharmaceuticals, oil, and fiber imports, agriculture products such as grain, oil & fats, and sugar accounts for approximately 20% of Rwanda’s total imports.
Major Traded Agricultural and Fisheries Products

Imports of agricultural goods alone greatly exceed agricultural exports, with import levels at $183 million and export level at just $108 million.

Export of agricultural and fisheries products

Coffee and tea are the two major exported agricultural goods, accounting for 84% of total exports. In 2010, the total export value of coffee was at $57 million (roughly 5 billion JPY); export value of tea was at $34 million (roughly 3 billion JPY). Other exported products include live animals (cattle and goats) and alcoholic and other beverages. Pyrethrum extract is an important export product, with an export value of $1.6 million. Rwanda has 5% of the world’s market share of pyrethrum.

![Figure 17 The major exported agricultural products (2010)](image)

Source: ITC

Import of agricultural and fisheries products

The main imported agricultural goods are grains, oil, and sugar.

Rwanda imports grains from Tanzania, rice from Pakistan and wheat from Argentina and the United Arab Emirates. Corn is imported from neighboring countries such as Uganda. As for palm oil, other oil and fats, and sugar, Rwanda relies on its neighboring countries for supply. To support the domestic beer industry, malt from Belgium, France and Kenya is imported. Processed food and dairy products are also imported from neighboring countries.

It is difficult to conceive of import substitution for palm oil, sugar, and malt because of the unsuitable climate conditions and lack of available land among other reasons. However, domestic production of grains such as rice, corn and wheat is encouraged. To reduce the trade deficit, export of coffee, tea, and other agriculture products will also need to be expanded.

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How we made it in Africa, 30 January 2012: Pyrethrum: a white flower with significant business potential for Rwanda
Fertilizer imports

Another major imported good related to agriculture is fertilizer. $20 million was spent on fertilizer imports in 2010, which ranks fertilizer as one of Rwanda’s important imported products.

Source: ITC
Informal Trade

Informal trade which takes place between Rwanda and neighboring DRC, Uganda, and Tanzania is also very important to the economy. According to the supplemental informal trade data\(^6\) from the government, most informal trade is exports to the DRC; overall, the volume of informal exports tends to be larger than informal imports. However, even when informal trade is taken into account, there is still a trade deficit for both the agriculture and fisheries sectors.

Export of agricultural and fisheries food products

In 2010, Rwanda’s informal export value was at $51.7 million, with around $40 million or 75% of exported products coming from agriculture and fisheries. Compared to the $108 million agricultural export value recorded in the official trade statistics, we can see that the informal agricultural trade of around $ 40 million is equal to roughly 40% of formal agricultural exports.

Goods exported to the DRC make up 80% of Rwanda’s total informal trade. Official trade data shows that coffee beans and tea make up most of Rwanda’s export to Congo, whereas informal trade shows that live cattle, goats, pigs, corn flour, potatoes, milk, peanuts, and meat are also being exported to DRC. As for informal trade with Uganda, live animals, beans, potatoes, peanuts are among the main exported goods.

Import of agricultural and fisheries food products

On the other hand, informal imports totaling $20.7 million consists of over 75% agricultural and fisheries products. Compared to the $183 million agriculture import value of official trade, informal imports of agricultural products equal about 10% of total official imports.

Around 50% of informal trade imports come from Uganda; the main imported products are sorghum, alcoholic beverages, corn flour, and bananas used for cooking. Other products include sorghum, onions, rice, and coffee beans from Burundi, coffee beans and cooking bananas from the DRC and rice from Tanzania.

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Jan-Mar</td>
<td>Apr-Jun</td>
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<tr>
<td>Export</td>
<td>46.59</td>
<td>12.56</td>
<td>12.09</td>
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<tr>
<td>Import</td>
<td>23.52</td>
<td>4.70</td>
<td>4.80</td>
</tr>
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</table>

Source: National Bank of Rwanda, 2011 3rd Quarter, Quality Bulletin

\(^6\) Please note that although it is known that Rwanda is taking mineral resources from Congo and exporting them as Rwandan goods, the Rwandan government’s data does not capture this. For more details please refer to the section on statistics at the start of this report.
Acquiring foreign currency through ecotourism

Besides minerals, coffee and tea, Rwanda’s ecotourism sector has become another major source of foreign currency. In 2010, Rwanda received roughly $27 million from its ecotourism industry (compared with coffee and tea exports at $57 million and $34 million respectively in the same year).

Rwanda attracts tourists mainly from Europe. Its ecotourism not only generates a significant amount of foreign currency, but it also creates job opportunities in the local area.

There are three main tourist attractions: Volcanoes National Park where one can catch a glimpse of wild gorillas in their natural habitat, Nyungwe Forest National Park which is home to chimpanzees and other species of monkeys, and the Akagera National Park which offers safari tours.

Promotion of tourism and resource conservation comes hand in hand. To minimize the interference humans may have on the natural environment, the number of tourists visiting per day is tightly controlled. Also, except under special circumstances, it is not permitted to enter these areas unaccompanied by rangers and guards. The strict restrictions apply to locals as well, who must obtain permission before entering to gather herbal medicine.

Gorillas are by far the most popular wild animal among tourists. They are also the most protected. For this reason, guards and rangers allow in a mere 30 tourists per day. In 2007, the fee for a visitor to participate in the gorilla tour increased from 250 USD to 500 USD, and it is expected to further increase in the near future.

In 2010, national parks welcomed 45,359 visitors. 21,388 visitors took part in activities offered at Volcanoes National Park, generating $10,690,000 from gorilla tours alone. While currently, tourists are mainly from Europe and North America. In the future Rwanda is hoping to attract tourists from Asia as well.

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7 (The National Institute of Statistics of Rwanda 2011)
2.1.4 Food supply and demand, and nutrition situation in farm households

**Food supply and calorie intake**

Although Rwanda is mostly importing grain, sugar, oil & fat, and other food products, the government reports that as of 2011, rapid expansion of grain production since 2003 has allowed the country to achieve self-sufficiency in staple foods. Based on the most recent FAO food balance statistics of 2007, Rwanda’s daily calorie consumption per capita is 2,085 kcal, which is lower than the 2,200 kcal/day threshold used to indicate that a population has poor food security. In addition, these calories are mainly supplied by vegetable products, including cooking bananas, potatoes, cassava, grains, and beans. The consumption of animal protein is only 4.5 grams per day.

**Table 4  Rwanda food balance (2007)**

<table>
<thead>
<tr>
<th>Supply</th>
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<tr>
<td>Product</td>
<td>Import</td>
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<tr>
<td>000mt</td>
<td>000mt</td>
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<tr>
<td>Total Vegetable products</td>
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<td>Animal products</td>
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<tr>
<td>Sorghum</td>
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<td>Corn</td>
<td>41</td>
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<tr>
<td>Rice</td>
<td>20</td>
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<tr>
<td>Wheat</td>
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<td>Sugarcane, etc</td>
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<tr>
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<td>Dairy products</td>
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<tr>
<td>Fishery products</td>
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</table>

Source: FAOSTAT
Population increase

The Rwandan government has estimated that total population as of 2011 was 10.7 million. Population growth stands at a rate of 2.9% per year, although the government is campaigning for family planning programs in order to control the size of the population. The UN predicts that Rwanda’s population will exceed 15 million by 2025, which is 1.5 times the current population size. It will be necessary to expand agricultural production to deal with this population increase.
Nutrition level of Rwandan farm households

The FAO states that during the period of 2006-2008, the yearly number of malnourished people in Rwanda was estimated at 3 million on average, which is 32% of the entire population. According to 2009 data from NISR, excluding the population of the capital Kigali, 4.2% of the population was malnourished; and 17.3% fell into the borderline category. The malnourished households are concentrated in the northwestern and southern part of Rwanda where the average size of agricultural land per farm household is particularly limited. Nevertheless, the situation in 2009 is an enormous improvement compared to 2006. (See figure on the right).

Food expenses of Rwandan farm households

Of the food consumed by rural households, 45% is produced by household members, and 52% is purchased from markets. This illustrates how important markets are even in rural areas.

The average monthly expenditure of rural households in Rwanda is 27,500 RWF, of which 45% is spent on food, and the remaining 55% is expenditure non-food products. The poorer farm households engaging mainly in agriculture spend 53% of their income on food. The better-off and rich farm households engaging mainly in agriculture are spending 44% of their income on food. As for the households that engage mostly in agricultural labor, food expenditure accounts for 62% of their income.

The breakdown of expenditure on food looks something like this: 24% on grain; 24% on banana, tubers and roots; 20% on beans and vegetables; 10% on oil and fat, 9% on sugar and salt; and merely 9% is spent on meat and other animal products.

WFP and refugee camp, school meals

Rwanda has accepted roughly 55,000 refugees from the DRC and Burundi and refugee camps have been established in several parts of the country. The World Food Program (WFP) provides food for these refugee camps. In addition to food aid in the form of corn from the US, local programs such as P4P (Purchase for Progress) are providing help, which in turn stimulates developments of the domestic agricultural sector. However, WFP has unfortunately been providing less and less support to the refugee camps.

Aside from refugee camp assistance, WFP is also supplying food to Rwanda for school meals in roughly 300 schools for 300,000 children.

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8 FAO website http://www.fao.org/hunger/hunger-home/jp/
9 (The National Institute of Statistics of Rwanda 2009) Food consumption score (FCS) of under 21 means food shortage, this is calculated by dividing weight of grains, beans, vegetables, meat and fish. A score of below 35 is borderline; above 35 is acceptable. Please refer to the article for calculation method.
10 3% on fishing, hunting, gifts etc
11 (The National Institute of Statistics of Rwanda 2009)
2.1.5 Major agricultural production

Agriculture

Rwanda’s traditional staple food products are banana, cassava, potato, sweet potato, sorghum and common bean. In addition corn, wheat and rice production have been increasing recently with support from the government.

Although most staple products are grown throughout the country, there are some differences by area. For example, potatoes are mainly grown in the high-altitude area of the northwest, and cassava is grown in the southeastern area where soil conditions are poor. (Figure 21)

In addition to supplying food for home consumption, subsistence crops are widely sold in rural and urban markets. Subsistence crops are not only a source of food, but also important as cash crops.

Rwanda’s traditional cash crops are coffee, tea, and pyrethrum. Horticultural crops such as vegetables and apples are also playing increasingly larger roles as cash crops.

Table 5 Agricultural production development in Rwanda

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<td>1,592</td>
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</tbody>
</table>

Other

| Coffee | na   | na   | na   | na   | na   | na   | na   | 33   | 39   | 32   | 43   | *29  | *29  |
| Tea    | na   | na   | na   | na   | 10   | 10   | 10   | 10   | 12   | 12   | 12   | 13   | *13  | *14  |
| Pyrethrum | na   | na   | na   | na   | 2    | 3    | 3    | 3    | na   | na   | na   | na   | na   | na   |
| Sugarcane | na   | na   | na   | na   | na   | na   | na   | na   | na   | na   | na   | 4    | 4    | *4   | *4   |

Source: MINAGRI, *Rwanda Statistical Year Book 201; Note: * total of grains, beans, tubers, banana, fruit and vegetables
Figure 25  Major crop production by area

Table 6  Rwanda agricultural production (2011)

<table>
<thead>
<tr>
<th>Crop</th>
<th>South</th>
<th>West</th>
<th>North</th>
<th>East</th>
<th>Kigali</th>
<th>Total</th>
<th>As of Season A</th>
<th>Season B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>62</td>
<td>143</td>
<td>121</td>
<td>188</td>
<td>11</td>
<td>526</td>
<td>341</td>
<td>184</td>
</tr>
<tr>
<td>Sorghum</td>
<td>52</td>
<td>19</td>
<td>24</td>
<td>54</td>
<td>3</td>
<td>152</td>
<td>8</td>
<td>144</td>
</tr>
<tr>
<td>Wheat</td>
<td>21</td>
<td>25</td>
<td>45</td>
<td>0</td>
<td>0</td>
<td>91</td>
<td>27</td>
<td>64</td>
</tr>
<tr>
<td>Rice</td>
<td>27</td>
<td>20</td>
<td>0</td>
<td>32</td>
<td>1</td>
<td>81</td>
<td>32</td>
<td>49</td>
</tr>
<tr>
<td>Common bean</td>
<td>62</td>
<td>102</td>
<td>96</td>
<td>66</td>
<td>6</td>
<td>331</td>
<td>179</td>
<td>152</td>
</tr>
<tr>
<td>Other bean</td>
<td>8</td>
<td>13</td>
<td>9</td>
<td>7</td>
<td>0</td>
<td>38</td>
<td>12</td>
<td>26</td>
</tr>
<tr>
<td>Soybean</td>
<td>14</td>
<td>15</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>37</td>
<td>13</td>
<td>24</td>
</tr>
<tr>
<td>Peanut</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>15</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Banana</td>
<td>514</td>
<td>831</td>
<td>496</td>
<td>1,166</td>
<td>29</td>
<td>3,036</td>
<td>1,484</td>
<td>1,553</td>
</tr>
<tr>
<td>Cassava</td>
<td>1,186</td>
<td>474</td>
<td>193</td>
<td>712</td>
<td>15</td>
<td>2,579</td>
<td>1,124</td>
<td>1,455</td>
</tr>
<tr>
<td>Potato</td>
<td>168</td>
<td>1,084</td>
<td>805</td>
<td>107</td>
<td>7</td>
<td>2,172</td>
<td>1,325</td>
<td>846</td>
</tr>
<tr>
<td>Sweet potato</td>
<td>256</td>
<td>231</td>
<td>202</td>
<td>153</td>
<td>4</td>
<td>845</td>
<td>283</td>
<td>562</td>
</tr>
<tr>
<td>Yam</td>
<td>57</td>
<td>72</td>
<td>36</td>
<td>19</td>
<td>2</td>
<td>187</td>
<td>67</td>
<td>120</td>
</tr>
<tr>
<td>Vegetable</td>
<td>116</td>
<td>173</td>
<td>146</td>
<td>95</td>
<td>6</td>
<td>535</td>
<td>290</td>
<td>245</td>
</tr>
<tr>
<td>Fruit</td>
<td>142</td>
<td>148</td>
<td>226</td>
<td>67</td>
<td>5</td>
<td>588</td>
<td>262</td>
<td>326</td>
</tr>
</tbody>
</table>

Source: MINAGRI
Traditional staple food crops (banana, cassava, potatoes, sorghum, common beans)

Traditionally cultivated subsistence crops in Rwanda have been banana (330,000 ha cultivated), common beans (320,000 ha), cassava (200,000), potatoes (150,000), sorghum (130,000), and sweet potatoes (110,000).

Banana is a food crop characteristic of the East African Great Lake region, where it is widely grown for cooking and brewing. Through consumption of both food and alcoholic beverages, banana is an important source of caloric intake in this region. Section 4 will describe banana production and distribution in detail.

The common bean, which is called the climbing bean in Rwanda because farmers grow them around tall poles (as shown in the right figure), is the most important source of vegetable protein.

Cassava is also one of the traditional staple foods, and consumed as Ugali (a stiff, sticky porridge made from dried and fermented cassava powder mixed with hot water). The leaves are also crushed and stewed, providing an important source of nutrition. Among staple crops, the Rwandan government is putting particular focus on cassava as an important crop within Rwanda’s food security strategy. The government has encouraged cassava’s cultivation through provision of seed, fertilizer and other services. The production area has almost doubled within the past 5 years.

Potatoes are a crop that was introduced to Rwanda during the colonial period. The climate of the northwestern highlands makes the region ideal for potato cultivation. High yield varieties are being planted, and the total cultivation area is expanding. Yam and sweet potatoes are also grown in Rwanda.

In addition to being a staple crop, sorghum is used in sorghum beer production, just as bananas are for banana beer. Nevertheless, the government is not placing much emphasis on sorghum production, thus its cultivation area is shrinking.
New staple food crops—Corn, wheat and rice

In addition to the traditional staple crops, corn (190,000 ha cultivated), wheat (50,000 ha) and rice (13,000 ha) are strategically important crops from the perspective of food security and production is increasing.

Corn production in particular is increasing rapidly through the government’s strong support for corn within the Crop Intensification Program (CIP) and in 2011 production reached 530,000 MT. Though land suitable for wheat production is limited to Northern areas, its production is still being promoted by the government. Corn and wheat are not traditional food crops for Rwandan farmers, and thus they producing these as cash crops to sell at markets. However, the challenge they are facing now is that due to the rapid increases in production, prices are declining, and it is becoming more difficult for farmers to find buyers for their products.

Rice is the preferred food of high-income urban households. Government is promoting its production in order to substitute for imports from Tanzania and to expand marshland agriculture. Rice production is growing year by year. Section 3 will discuss rice production and distribution in more detail.

Traditional cash crops – Coffee, tea and pyrethrum

Traditional cash crops are coffee (30,000 ha) and tea (14,000 ha). They will be discussed in detail in sections 5 and 6. In addition to coffee and tea, pyrethrum is another key export crop: its production covers 3,000 hectares. Sopyrwa is a pyrethrum processing company that exports pyrethrum extract.

Sugarcane

The sugarcane sector is reported in detail in section 2.1.7. Currently, 4,000 hectares of sugarcane production is being grown primarily for Rwanda’s formerly state-owned sugar factory.
Some sugarcane is sold raw at markets for direct consumption. Sugar cane is a low priority on the policy agenda, and future expansion of production is unlikely.

_Horticulture crops – vegetable, fruit, nut and flower_

It is estimated that vegetable and fruit production area is around 90,000 hectares.

The main vegetables grown are tomatoes, carrots, cucumbers, egg plants, chili peppers, onions and leafy vegetables. The variety of vegetables produced in Rwanda is expanding.

Tropical fruits are the major fruit crops, which include avocado, passion fruit, tamarillo (aka tree tomato), mango, pineapple and some citrus. Avocados were introduced during the colonial period in the 1930s from Latin America, and have adapted well to the climate conditions in Rwanda. They are now widely cultivated.

Horticultural crops are high value-added products, and there are high hopes of them becoming new export products for Rwanda. Along with encouraging of production of existing crops, experiments with new horticultural products are being conducted in various regions. Our interviews indicated that macadamia nuts, stevia, rose, herbs, and essential oils are considered some of the promising crops. In addition to tropical fruits, temperate fruits, like apples and grapes, would be possible to grow in the cooler highland areas and there are several experimental sites for temperate fruit.

However, although exports of some fresh and processed products are underway, the transportation costs and problems managing cultivation make it difficult to easily expand develop exports of horticultural products. For example, the company Rwanda Flora, which was established in 2004 to produce roses in a 6-hectare plastic greenhouse for export to Europe, failed to become profitable due to high air freight costs and low skill in cultivation In the end rose production was stopped.
Livestock production

Livestock production is promoted by the Rwandan government from two perspectives, one is the increase in supply of animal protein from a nutrition perspective and the other is the improvement of soil condition through animal manure from an environmental sustainability perspective.

In the 2009 agricultural survey, 62% of rural households were raising some sort of livestock.\(^\text{12}\)

Among livestock, cattle are the most important and are raised for both milk and for meat.

The government has developed a project that aims to ensure each rural household has one dairy cow and the number of cows is increasing. In addition to the traditional cow breeds, in recent years the government has been introducing improved breeds with higher milk production. These cows are not used as work animals.

The number of goats is also rapidly increasing due to how easy they are to raise. They are raised by rural households for both meat and milk.

The broiler (meat chicken) industry is not developed yet, and the number of swine being raised is currently extremely limited. However, with the increasing demand for meat, raising chickens, swine and rabbits is all on the rise.

<table>
<thead>
<tr>
<th>Year</th>
<th>Cow/cattle</th>
<th>Goat</th>
<th>Chicken</th>
<th>Sheep</th>
<th>Pig</th>
<th>Rabbit</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>755</td>
<td>757</td>
<td>2,043</td>
<td>233</td>
<td>177</td>
<td>339</td>
</tr>
<tr>
<td>2001</td>
<td>814</td>
<td>917</td>
<td>1,278</td>
<td>267</td>
<td>197</td>
<td>495</td>
</tr>
<tr>
<td>2002</td>
<td>960</td>
<td>920</td>
<td>1,056</td>
<td>301</td>
<td>208</td>
<td>489</td>
</tr>
<tr>
<td>2003</td>
<td>992</td>
<td>1,271</td>
<td>2,432</td>
<td>372</td>
<td>212</td>
<td>498</td>
</tr>
<tr>
<td>2004</td>
<td>1,007</td>
<td>1,264</td>
<td>2,482</td>
<td>687</td>
<td>327</td>
<td>520</td>
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<tr>
<td>2005</td>
<td>1,077</td>
<td>2,664</td>
<td>2,109</td>
<td>690</td>
<td>456</td>
<td>427</td>
</tr>
<tr>
<td>2006</td>
<td>1,122</td>
<td>2,688</td>
<td>1,776</td>
<td>695</td>
<td>527</td>
<td>418</td>
</tr>
<tr>
<td>2007</td>
<td>1,147</td>
<td>2,738</td>
<td>1,868</td>
<td>704</td>
<td>571</td>
<td>423</td>
</tr>
<tr>
<td>2008</td>
<td>1,195</td>
<td>2,520</td>
<td>2,218</td>
<td>718</td>
<td>587</td>
<td>451</td>
</tr>
<tr>
<td>2009</td>
<td>1,335</td>
<td>2,468</td>
<td>2,551</td>
<td>746</td>
<td>642</td>
<td>748</td>
</tr>
</tbody>
</table>

Source: MINAGRI

\(^\text{12}\) (The National Institute of Statistics of Rwanda 2009)
2.1.6 Farm Households and Cooperatives

**Farm households and its farming size**

According to the government’s 2008 Agricultural Statistics\(^{13}\), approximately 1.7 million households were engaged in farming, or 85% of the total number of households. Among those households, 90% were working on family farms.

**Size of land per farm household**

Average land holding per farm household is 4 plots totaling 0.76 hectares, but 56.8% of households own less than half a hectare of land. Only 6.2% of households today have more than 2 hectares of land, compared to 16.4% in 1984.\(^{14}\) How to prevent such fragmentation of farmland is one of the key issues for Rwanda’s agriculture sector. (see figure below)

![Figure 38 Percentage of households by the size of land they own](image)

Source: (The National Institute of Statistics of Rwanda 2008)

In regions such as Huye and Bugesera in the south, and Nyabihu in the north, more than a third of households have less than 0.1 ha of land. (See figure on the right).\(^{15}\)

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\(^{13}\) (The National Institute of Statistics of Rwanda 2008)  
\(^{14}\) (Pottier 2006)  
\(^{15}\) (The National Institute of Statistics of Rwanda 2009)
Heads of household and education levels

73% of heads of household were male, while 27% were female. The large number of female heads of households is a reflection of number of women who were widowed during the genocide and wars.

In addition, the number of people farming is 8.3 million people, 84% of the total population. Those above the age of 6 account for 6.7 million and of these 21.7% have received no formal education at all, 53.5% have not completed primary school and 16.9% completed as far as primary school. The number of people from rural farming families who have received education beyond middle school accounts for a mere 7.9%.

Agricultural cooperatives

In 2007, the Cooperative Law was enacted. Under the Rwanda Cooperative Agency (RCA), which is under MINICOM, workers in various sectors including agriculture began become organized into cooperatives. MINAGRI is also promoting establishment of cooperatives and in 2010 about 60% of cooperatives established were in the agricultural sector.

Agricultural cooperatives are mostly organized by crop. There are many cooperatives for corn, rice, banana, wheat, vegetables, fruit, coffee, tea, livestock and aquaculture, and there are also examples of cooperatives for agro-processing such as banana beer processing.

Those cooperatives are generally formed on the initiative of producers. Although they are considered private sector entities, not public organizations, they receive preferential treatment in a variety of ways.

In tea production, as the tea plantations owned by the former state-run tea became privatized, a unique type of cooperative was created. These will be discussed in Section 6.

Cooperatives are also important actors in marshland development. For rice production it is necessary to form a cooperative in order to access the marshland, which are rented from the government. Thus, 100% of the rice industry is organized into cooperatives. For more information on this, see Section 3.

A national grain reserve was established in 2007 under the guidance of the government. Farmers are required to provide 100 kg of their harvest to the reserve. This is an attempt to prevent the sale of unfairly priced rice, as well as to raise food security.  

<table>
<thead>
<tr>
<th>Year</th>
<th>Agriculture</th>
<th>Livestock</th>
<th>Agriculture &amp; livestock</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>13</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>2006</td>
<td>61</td>
<td>21</td>
<td>5</td>
</tr>
<tr>
<td>2007</td>
<td>147</td>
<td>40</td>
<td>9</td>
</tr>
<tr>
<td>2008</td>
<td>32</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>2009</td>
<td>482</td>
<td>243</td>
<td>51</td>
</tr>
<tr>
<td>2010</td>
<td>366</td>
<td>152</td>
<td>41</td>
</tr>
</tbody>
</table>

Source: Rwanda Statistical Year Book 2011

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(JICA 2010)
**Agricultural finance**

According to a 2009 survey, on average around 3% of rural household spending is financed through borrowing. 29% of households answered that they have access to some sort of credit. The main lenders are banks and micro-credit institutions (38%) and friends and family members (24%). Reasons for borrowing are: reconstructing/renovating home (27%), purchasing food (18%); agriculture related business investment (16%); purchasing land (12%); purchasing agricultural inputs (12%), and medical treatment (11%).

Rwanda’s micro-finance and agricultural financial systems are still underdeveloped and not yet universal throughout the country, but the government recognizes that in order for the agricultural industry to develop it is necessary to strengthen credit programs. The importance of increasing savings rates is also recognized and for this purpose several organizations were created. In 2006, the Ministry of Finance and Economic Planning (MINECOFIN) announced their microfinance policy, which came into effect the following year and in 2008, the Association of Microfinance Institutions in Rwanda (AMIR) was established, and as an umbrella organization overseeing microfinance. In the private sector, financial cooperatives formed for the mutual assistance of their members, such as Umurenge Savings and Credit Cooperative (SACCO) were encouraged and by September 2009, 87 SACCOs had already been established. In addition, the Urwego Opportunity Bank was established as a bank specializing in microfinance.

For financing fertilizer purchases, some cooperatives including some coffee, maize and tea cooperatives, purchase fertilizer with loans and then deduct the cost of fertilizers from the producers’ sales after harvest.

The banana producers and fish farmers visited during the field research had relatively advanced businesses and they reported that they can receive loans from banks, as long as they provide a business plan.

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17 (The National Institute of Statistics of Rwanda 2009)
18 (Association of Microfinance Institutions of Rwanda 2010)
2.1.7 Large-scale farming

**Tea plantation**

Large-scale plantations established under the colonial era in Rwanda are limited to tea production. Coffee is cultivated by small-scale farmers. The tea plantations were formerly state-owned, and now still some are owned by the tea factories while some are owned jointly by the members of cooperatives. The large scale tea plantation is still the dominant form of tea production. Please refer to Section 6 for more details on tea plantations.

**Grazing**

Other existing large-scale agribusiness includes livestock grazing areas owned by the political elites, especially Umutara in the northeastern part of the country. This area used to be part of the Akagera National Park and was developed for the benefit of refugee returning after the genocide.

The Tutsis were traditionally heavily engaged in livestock farming and upon returning from exile after the genocide and civil war, they secured large-scale farmlands (often with military backing). Later, according to government policy, some low productivity grazing land was redistributed as farming land, which meant that the land held by many of the livestock farmers in the northeast shrank. Nevertheless, today these livestock farmers have on average over 100 animals. Regions in the northwest, such as the Gishwati forest, were also developed for the benefit of accommodating returning refugees. Here the land is divided into six grazing areas with 10 livestock for every 5 hectares of land, used by livestock farmers who have received permission to graze here. 19

However, given that land is scarce, the Rwandan government is promoting rearing livestock on feed rather than grazing.

**Marshland development**

In other regions, it is reported that political elites have become “entrepreneurs” and lease farmland in the range of 10-100 hectares mainly in the marshland development areas, where they grow maize and other crops. All marshland for development is leased by the government to an agricultural organization such as a cooperative and not to individuals. However, those who are able to form cooperatives which have the financial recourses to be able to rent marshlands are usually the local elites who have enough personal capital, or are able to borrow loans from banks.

There is deep concern that the nationalization and large-scale development programs for the marshlands may displace small-scale farmers who cultivate some crops in the marshlands as a safety net to hedge risk in their other crops, as well as the Twa ethnic minority group of traditional hunters (aka Batwa or Pygmy) who collect clay from the marshlands. 20

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20 (Ansoms 2011) (Pottier 2006)
Large-scale marshland development through foreign investment (biofuel & sugarcane)

In Africa, large-scale land investment projects by foreign companies are increasingly becoming a focus of attention. In 2009 the massive land investment proposal in Madagascar by a private Korean company became a factor for an overthrow of the Madagascar government and was a widely reported drama. The 2011 FAO HLPE report ‘Land Tenure and International Investments in Agriculture’ documented numerous other cases of land purchases by foreign companies.

In Rwanda there have been few proposals for such large-scale farmland investments, due to the limited availability of land that can be used for extensive agriculture. However there have been several cases of large scale development focused on the marshlands which are coming under state control. Among these, a large scale project is a contract signed in December 2009 by the Rwandan government, Eco-Fuel Global (US) and Eco Positive (UK), for the cultivation of jatropha (Jatropha curcas) for biofuel production, covering 10,000 hectares of marshland rented from the government in the Eastern province. By September 2011, 4,000 hectares of jatropha cultivation was completed; the annual production target is set at 36 million litres. 21

Another example of large-scale development supported by foreign investment is that of sugar cane production. In 1997, the previously state-owned sugar factory Kabuye Sugar Works became privatized and was bought by the Madhivani Group, an Indian company. A total of 3,150 hectares of marshland in Nybarongo (southeast of Rwanda) was provided to the Madhivani Group through a 50-year lease, and sugarcane is currently being cultivated to supply the sugar factory. 22

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2.2 Government agencies related to agriculture and land policies

2.2.1 Central Government and Related Agencies

Government organizations related to agriculture are listed below.

Under the Cabinet Office, the Ministry of Agriculture and Animal Resources (MINAGRI), the Ministry of Trade and Industry (MINICOM), the Ministry of Finance and Economic Planning (MINECOFIN), the Ministry of Natural Resources (MINIRENA), and the Ministry of Local Government (MINALOC) are the ministries primarily involved in agriculture-related projects.

The Rwanda Development Board (RDB) was established in 2008 directly under the President for the promotion of industrial development and foreign investment. The board members are important members of the Cabinet Office and the RDB also has influence over industrial development in agriculture and agribusiness.

In addition to the city of Kigali, provincial administration is divided into four provinces (Eastern, Northern, Southern and Western), but there are no administrative agencies at this level. Instead local authority is held by District-level, under the Provinces. Below the District, are smaller units: Sector and then Cells. The government recognizes Districts as the key partners of decentralization and rural development, and those districts are directly connected to the president.

Figure 41 Government Organizations Related to Agriculture

Source: Based documents provided by the ministries, Promar Consulting
Ministry of Agriculture and Animal Resources (MINAGRI)

The present organization of the Ministry of Agriculture and Animal Resources (MINAGRI) is the result of a 2006 restructuring. Under the minister and vice minister, there are 38 other government officials, holding posts responsible for areas such as policy drafting, grains, livestock, export marketing, extension services. For each major project, there is one person put in charge.

MINAGRI oversees the Rwanda Agriculture Board (RAB) and the Rwanda Agriculture Export Board (NAEB)

Rwanda Agriculture Board (RAB)

Rwanda Agriculture Board (RAB) was established in July 2011, after the merger of the Rwanda Agricultural Development Authority (RADA), Rwanda Animal Resources Development Authority (RARDA), and Rwanda Agriculture Research Institute (ISAR). RAB is responsible for agriculture-related research and development as well as extension services.

RAB’s responsibility is divided into four sections: research, livestock, agricultural extension and infrastructure/mechanization. The research and extension sections have nine research departments for crops including rice, banana, and coffee. In order to carry out research in rural areas more effectively, RAB has local branches (called ‘zones’) in the northern, southern, eastern and western areas of Rwanda. At each zone branch there are three teams under the branch director: research, agricultural extension, and livestock teams.

According to discussions with RAB, there are about 50 staff at the headquarters and approximately 100 staff working at local zones.

National Agricultural Export Board (NAEB)

National Agricultural Export Board (NAEB), established in 2011, is a merger of the Rwanda Horticulture Development Authority (RHODA), the Rwanda Tea Board (OCIR-The), and the Rwanda Coffee Board (OCIR-Café). There are roughly 150 staff working for NAEB. NAEB has 3 divisions: coffee, tea, and horticultural crops. Please refer to Chapter 5 for more details on coffee, and Chapter 6 for tea.
Rwanda Development Board (RDB)

The Rwanda Development Board (RDB) was established in 2008, under the direct control of the president, for the purpose of promoting industrial development and attracting investment. It focused on activities that can contribute directly to increasing GDP, and decreasing the trade deficit. RDB offers a one-stop service to foreign firms wanting to invest in Rwanda including getting investment permission, registering a company, applying for visas and supplying market information. RDB also responds to enquiries. This one-stop service is offered as a package to firms who have received investment permission from Rwanda.

There are five economic clusters under the RDB: agriculture, service, tourism & conservation, ICT, trade & manufacturing. The agriculture cluster includes the agri-food processing sector. The agricultural cluster is headed by a cluster chief, supported by a chief operating officer and chief financial officer.

Given that the government wants to reduce subsidies spent on the agricultural sector, private investment in agriculture and the food processing industry is strongly encouraged. RDB started their agriculture activities in 2011, based on three pillars: a) promotion of agribusiness investment, b) policy development for the promotion of agribusiness, c) providing business support for high-potential private sector business. Under b), for example, if transport costs are high, RDB can provide support for road infrastructure or trucks. Or to improve access to farmlands for investors, a ‘special agriculture zone’ is conferred upon certain areas so that it is easier for investors to acquire land. For pillar c), 10-15 companies or cooperatives with high potential will be given priority in receiving support.

RDB also has 3 cross-cutting divisions: investment promotion, business asset management, and human resources & organizational development. The business asset management division is in charge of privatization of government assets, such as tea factories. As for privatization of agriculture and agribusiness, the agriculture cluster (described above) is responsible for providing the necessary support. All privatization must be approved by the Cabinet Office, and then go through various steps including undergoing RDB’s asset evaluation, collect proposal bids, have a proposal evaluation, and then decide on successful bidder.

Ministry of Finance and Economic Planning (MINECOFIN)

The Ministry of Finance and Economic Planning (MINECOFIN) came to existence in 1997, after the merger of the Ministry of Finance and the Ministry of Planning. In 1999, the Economic Cooperation Department of the Ministry of Foreign Affairs was transferred to MINECOFIN. There are 6 bureaus under the Director General’s control: Bureau of National Development Planning, Chief Economist Bureau, Corporate Service Bureau, Bureau of Accounting, Bureau of State Budget, and finally the Government Internal Audit Bureau. The Bureau of National Development Planning, in addition to policy planning and public investment, deals with coordination within the Economic Development and Poverty Reduction Strategy (EDPRS), especially the economic coordination between countries and international organizations. Additionally, MINECOFIN oversees 8 institutions, including the National Institute of Statistics Rwanda (NISR) which is responsible for agricultural statistics.
**Ministry of Trade and Industry (MINICOM)**

In 2004, Rwanda implemented the Integrated Framework for Trade-related Technical Assistance to Least Developed Countries (IF), drafted by the United Nations and other international organizations. In order to oversee the set of activities proscribed by the IF, in 2006 the Ministry of Trade and Industry (MINICOM) was established. There are 5 divisions under MINICOM: Finance, Private Sector Development Plan, Special Unit for Petroleum, Industrial Development, and Trade. In addition there is responsibility for investment & intellectual property and for major projects. Under MINICOM, the Rwanda Bureau of Standards (RBS) dealing with food production and standards, and the Rwanda Cooperative Agency (RCA) responsible for licensing and promotion of cooperatives have been established.

**Ministry of Natural Resources (MINIRENA)**

The Ministry of Natural Resources (MINIRENA) was newly established in 2011. MINIRENA is in charge of: land planning, environmental, water resources, forestry, and mining. The Rwanda Environment Management Authority (REMA) and Rwanda Natural Resources Authority (RNRA) institutions are under MINIRENA.

REMA is an institution established in 2006, to be in charge of the implementation of Rwanda’s national environmental strategies and coordinating the related agencies.

RNRA was just established in 2011 to be the implementing agency for MINIRENA policies related to land, water resources, forestry, and mining. The Authority also deals with *imidugudu* policy (described in later sections), land registration, and the development of a master plan for land usage. There are 4 departments under RNRA: National Land Centre (NLC), Integrated Water Resources Management (IWRM), Geology and Mines Authority (OGM) and the National Forestry Authority (NAFA).

**Ministry of Local Government (MINALOC)**

The Ministry of Local Government (MINALOC) manages social security, the transfer of authority and responsibility from central government to local governments, as well as controlling settlements and communities.

The Rural Settlement Task Force under MINALOC is responsible for *imidugudu* policy (described in later sections) and sectors such as rebuilding houses that have thatched roofs into stronger structures.
2.2.2 Local Administration

Rwanda is divided into the following administrative areas: country (Rwanda), Kigali city/provinces, 30 districts, 416 sectors, and 2146 cells. Provincial level administrative agencies do not exist and the district level has the main development agencies.

Each district has representatives from each sector within their district, and this group of representatives form the District Council. District Councils choose representatives who monitor the daily administration activities. These representatives also form the Executive Committee. Finally there is also a Security Committee in place. The chairperson of the Executive Committee doubles as the district Mayor.

Decentralization with authority moving to the District level administration is underway. Mayors have direct communication with the President on issues such as targets to be reached and mayors report their districts’ performance directly to the President. However there tends to be a high turn-over rate among mayors due to the enormous responsibilities and pressure of the position.

Each District employs 3 agricultural and livestock specialists: an agronomist, an environmentalist, and a veterinarian. The agronomist manages crop farming as well as wider issues such as irrigation, farmer residences, forestry and fisheries. In each Sector, there are 2 specialists: an agronomist and a veterinarian. Cells employ one person in charge of social welfare and development who specialises in either agriculture or animal husbandry.

The specialists employed in local areas working together with RAB researchers and extension specialists to carry out activities. They are primarily very young graduates from universities where they studied agriculture-related subjects. Since it is difficult to reach every farmer individually, their extension services tend to target only farmers who are well organized into cooperatives or powerful farmers with the capital to invest in agriculture.

Figure 43 Local Administration mechanism – Rwanda’s agricultural and livestock sector

Source: Promar Consulting
2.2.3 Agriculture Policy Framework

Rwanda’s long-term policy framework is shaped by the national development plan, ‘Vision 2020’ set in 2000. 2020 has become an extremely important milestone year in terms of development policy targets.

Mid-term targets were set by the Poverty Reduction Strategy Paper (PRSP) for 2002-2007, and by the Economic Development and Poverty Reduction Strategy (EDPRS) for 2008-2012. Currently, economic, social and other policies are being formulated and implemented under the 2008-2012 EDPRS, which are in line with Vision 2020.

Agriculture policy has been formulated under three plans: the National Agricultural Policy (NAP) and the Strategic Plan for Agricultural Transformation (PSTA) which were adopted in 2004 based on the guidelines of ‘Vision 2020’. Following the first PSTA, in 2009 PSTA II was adopted for a second term (2009-2012).

Features of Rwandan government policy development and its implementations

In terms of policy implementation, as a recipient of donor aid, the Rwandan government is notable for taking the lead in coordinating the effectiveness of donor programs in priority sectors, and promoting activities which will push Rwanda towards its Vision 2020 goals. Government policies can constantly be seen to have a significant impact on EDPRS goals, GDP indicators and the reductions in the trade deficits, and related government agencies have been given responsibility for the achievement of certain goals. The Rwandan government moves extremely quickly from planning stage to implementation.

Since government budget is limited, in addition to foreign donor assistance programs, there are high hopes for private investment. In the agricultural sector, the government wants to reduce financial support measures such as subsidies for fertilizers at the earliest stage possible. In addition, with the privatization of many former state enterprises, private investment is being activity sought to contribute to agro-processing, value added agriculture and commercialization of agriculture.

In addition anti-corruption measures are being undertaken, Rwanda been praised by the World Bank and IMF as a model of good governance practices.

When discussing the fast pace of Rwanda’s policy implementation, it is also interesting to note, that Rwanda has abolished the death penalty and for its prisoners, including many convicted of genocide-related crimes, Rwanda implemented a public service work program (which is called TIG) in 2005. The “TIGistes” are used as free labor for public work projects, which supports the government in rapid implementation of agricultural infrastructure development projects.

Figure 44 Convicts under TIG (wearing orange or pink shirt)
Source: Promar Consulting
Economic Development and Poverty Reduction Strategy (EDPRS)

When looking at Rwandan agriculture policy a key issue is the ongoing need to increase staple food crops for purposes of food security, and how to stabilize food supply through import substitution. Rwanda’s main staple crops are the 6 strategic food crops, rice, wheat, corn, beans, potatoes and cassava. Cooking banana is also considered important.

Furthermore, in a country like Rwanda where resources are limited and production costs are high, the idea that “high value-added” products are important for economic development is already being applied, with a focus on production of high value-added export crops. In addition to the traditional export crops (coffee, tea, pyrethrum), now development of high-value horticultural crops and processed products is being stressed.

In addition, in order to increase production of these subsistence crops as well as the export crops, the three most important goals are: protecting soil from erosion, increasing the amount of manure or compost for fertilization, and increasing irrigation on hillside areas and marshlands.

In the livestock sector, it is hoped that with the dissemination of improved breeds of dairy cows there will be an increase in income as well as increased protein supply and manure production.

Vision 2020

Under Vision 2020, a variety of agricultural targets have been set. The number of people involved in agriculture is targeted to be decreased from 90% to 50% by 2020, fertilizer use up to 15 kg/ha per year, supply of calories from agriculture production at 2,200 kcal/day/person and 90% of soil protected from erosion.

<table>
<thead>
<tr>
<th>Vision 2020 Indicators</th>
<th>2000</th>
<th>2010</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural GDP Growth</td>
<td>%</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Agricultural Population</td>
<td>%</td>
<td>90</td>
<td>75</td>
</tr>
<tr>
<td>Modernized Farmland</td>
<td>%</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Fertilizer Use</td>
<td>kg/ha/year</td>
<td>0.5</td>
<td>8</td>
</tr>
<tr>
<td>Credit for Agriculture Sector</td>
<td>%</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Calorie supply from ag production</td>
<td>kcal/day/person</td>
<td>1,612</td>
<td>2,000</td>
</tr>
<tr>
<td>Protein supply</td>
<td>% of required</td>
<td>35</td>
<td>55</td>
</tr>
<tr>
<td>Land protected from erosion</td>
<td>%</td>
<td>20</td>
<td>80</td>
</tr>
</tbody>
</table>

Source: VISION 2020
**Economic Development and Poverty Reduction Strategy (EDPRS)**

The EDPRS has set 4 main goals related to agriculture: 1) soil erosion protection; 2) expansion of irrigation on hillside and development of marshlands; 3) increase and improvement of inputs (e.g. seeds, fertilizers); and 4) increase in number of households with livestock. (See tables below)

<table>
<thead>
<tr>
<th>EDPRS</th>
<th>2006</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ag. Land protected against erosion %</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>Area under irrigation ha</td>
<td>15,000</td>
<td>34,000</td>
</tr>
<tr>
<td>Of which hillside irrigation ha</td>
<td>130</td>
<td>10,000</td>
</tr>
<tr>
<td>Reclaimed marshland ha</td>
<td>11,105</td>
<td>31,105</td>
</tr>
<tr>
<td>Fertiliser application kg/ha</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Inorganic fertilizer use % households</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>Improved seed use % households</td>
<td>24</td>
<td>37</td>
</tr>
<tr>
<td>Rural households with livestock % total</td>
<td>71</td>
<td>85</td>
</tr>
</tbody>
</table>

Source: PSTA II

So far, progress towards the EDPRS goals has been relatively high, as shown in the table below, with some indicators exceeding the targets.

<table>
<thead>
<tr>
<th>No</th>
<th>Title</th>
<th>Unit</th>
<th>2006(Base)</th>
<th>2008(Target)</th>
<th>(Actual)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4.1</td>
<td>Strategic agricultural exports including coffee and tea</td>
<td>Million US$</td>
<td>121</td>
<td>163.1</td>
<td>185</td>
</tr>
<tr>
<td>1.4.2</td>
<td>Income from tourism</td>
<td>Million US$</td>
<td>42</td>
<td>56</td>
<td>208</td>
</tr>
<tr>
<td>1.5.1</td>
<td>Prevention from soil erosion</td>
<td>%</td>
<td>40</td>
<td>45</td>
<td>44.5</td>
</tr>
<tr>
<td>1.5.2</td>
<td>Marshland development for agriculture</td>
<td>ha</td>
<td>11,000</td>
<td>12,000</td>
<td>12,092</td>
</tr>
<tr>
<td>1.5.4</td>
<td>Number of extension workers 1:households</td>
<td>corn 91,813</td>
<td>1:3,000</td>
<td>1:2,900</td>
<td>1:2,218</td>
</tr>
<tr>
<td>1.5.5</td>
<td>Major crop production</td>
<td>rice 62,932</td>
<td>wheat 19,549</td>
<td>tea 73,008</td>
<td>corn 101,700</td>
</tr>
</tbody>
</table>

Source: IMF  Rwanda EDPRS A summary implementation report 2008-2010
Strategic Plan for Agricultural Transformation II (PSTA II)

The National Agricultural Policy (NAP) and Strategic Plan for Agricultural Transformation (PSTA) were adopted in 2004, based on the guidelines of ‘Vision 2020’. Following the first PSTA, in 2009 PSTA II was adopted for 2009-2012.

Rwanda was one of the first countries to be incorporated into the Comprehensive Africa Agriculture Development Programme (CAADP) adopted at the African Union Summit in 2003. In 2007, with the help of CAADP, PSTA II was planned.

For PSTA II, the Rwandan government has a total budget of $970 million. The detailed budget allocation is listed in the following table. Section 2.2.5 introduces some of the major projects. Please note that the government’s budget mostly relies on foreign assistance, thus the table does not show definitive budgetary provisions.

<table>
<thead>
<tr>
<th>Program and Sub-Program (SP) and major programs</th>
<th>Budget (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programme 1: Intensification &amp; development of sustainable production systems</td>
<td>741,663,955</td>
</tr>
<tr>
<td>SP 1.1. Sustainable management of natural resources and water and soil preservation</td>
<td>214,571,429</td>
</tr>
<tr>
<td>SP 1.2. Integrated systems of crops and livestock</td>
<td>154,238,626</td>
</tr>
<tr>
<td>One Cow per Poor Household</td>
<td>51,188,900</td>
</tr>
<tr>
<td>SP 1.3. Marshland development</td>
<td>51,188,900</td>
</tr>
<tr>
<td>SP 1.4. Irrigation Development</td>
<td>222,660,000</td>
</tr>
<tr>
<td>RSSP(marshland-hillside) and LWH(hillside)</td>
<td>222,660,000</td>
</tr>
<tr>
<td>SP 1.5. Supply and use of agricultural inputs</td>
<td>56,655,000</td>
</tr>
<tr>
<td>Crop Intensification Program (CIP)</td>
<td>56,655,000</td>
</tr>
<tr>
<td>SP 1.6: Food security and vulnerability management</td>
<td>42,350,000</td>
</tr>
<tr>
<td>Programme 2: Support to the professionalization of the producers</td>
<td>91,950,157</td>
</tr>
<tr>
<td>SP2.1. Promotion of farmers’ organisations and capacity building for producers</td>
<td>12,555,000</td>
</tr>
<tr>
<td>SP2.2 Restructuring proximity services</td>
<td>15,935,000</td>
</tr>
<tr>
<td>SP2.3. Research for transforming agriculture</td>
<td>63,460,157</td>
</tr>
<tr>
<td>Programme 3: Promotion of commodity chains and agribusiness development</td>
<td>114,095,933</td>
</tr>
<tr>
<td>SP3.1 Creating conducive environment for business development and market access</td>
<td>13,177,600</td>
</tr>
<tr>
<td>SP3.2 Development of traditional exports</td>
<td>37,180,647</td>
</tr>
<tr>
<td>Targets: Coffee, Tea, pyrethrum</td>
<td>37,180,647</td>
</tr>
<tr>
<td>SP3.3 Development of non-traditional high-value export products</td>
<td>9,820,000</td>
</tr>
<tr>
<td>SP3.4 Production and value addition for domestic staple products</td>
<td>13,744,686</td>
</tr>
<tr>
<td>Target: corn, rice, cassava, fish</td>
<td>13,744,686</td>
</tr>
<tr>
<td>SP3.5 Market-oriented rural infrastructure</td>
<td>18,573,000</td>
</tr>
<tr>
<td>SP3.6 Strengthening rural financial systems</td>
<td>21,600,000</td>
</tr>
<tr>
<td>Programme 4: Institutional development</td>
<td>19,520,000</td>
</tr>
<tr>
<td>SP4.1 Institutional strengthening and capacity building</td>
<td>11,450,000</td>
</tr>
<tr>
<td>SP4.2 The policy and regulatory framework for the sector</td>
<td>330,000</td>
</tr>
<tr>
<td>SP4.3 Agricultural statistics and ICT</td>
<td>5,190,000</td>
</tr>
<tr>
<td>SP4.4 M&amp;E systems and coordination of the agricultural sector</td>
<td>1,050,000</td>
</tr>
<tr>
<td>SP4.5 The decentralisation programme in agriculture</td>
<td>1,500,000</td>
</tr>
<tr>
<td>TOTAL PROGRAMMES 1-4 OF PSTA II</td>
<td>967,230,045</td>
</tr>
</tbody>
</table>

Source: PSTA II, (JICA 2010)
2.2.4 Agricultural Sector-Related Support from Overseas

The largest donor to the agricultural sector in Rwanda is the USA, followed by the World Bank, IFAD, EU, and the Netherlands. Irrigation-related projects receive the largest amount of aid. Please see Section 2.2.5 for more details.

Table 13 Overview of Support for Rwanda's Agricultural Sector (Since 2000)

<table>
<thead>
<tr>
<th>Donor Country</th>
<th>Major project</th>
<th>Commitment US$</th>
<th>Expenditure US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>Food aid, Local agriculture development, LWH</td>
<td>211,050,807</td>
<td>197,050,807</td>
</tr>
<tr>
<td>World Bank</td>
<td>RSSP I,II, PRSCII, LWH</td>
<td>114,450,000</td>
<td>71,360,657</td>
</tr>
<tr>
<td>United Nations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IFAD</td>
<td>Cash crop exports, Kirehe irrigation, Agricultural development</td>
<td>53,161,257</td>
<td>43,223,024</td>
</tr>
<tr>
<td>One UN Fund</td>
<td>—</td>
<td>2,450,213</td>
<td>1,717,152</td>
</tr>
<tr>
<td>FAO</td>
<td>—</td>
<td>1,831,095</td>
<td>932,449</td>
</tr>
<tr>
<td>UNDP</td>
<td>—</td>
<td>35,000</td>
<td>10,000</td>
</tr>
<tr>
<td>UNIDO</td>
<td>—</td>
<td>384,211</td>
<td>169,866</td>
</tr>
<tr>
<td>EU</td>
<td>Decentralized agricultural development policy implementation,</td>
<td>56,707,384</td>
<td>55,130,484</td>
</tr>
<tr>
<td></td>
<td>support for crop intensification programs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td>HIMO 2nd phase</td>
<td>50,898,665</td>
<td>43,830,259</td>
</tr>
<tr>
<td>African Development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bank/Fund</td>
<td>Bugesera Agricultural Development Support Project (PADAB)</td>
<td>49,739,701</td>
<td>37,489,686</td>
</tr>
<tr>
<td>Belgium</td>
<td>Development of seed, Agricultural extension program</td>
<td>39,901,382</td>
<td>34,168,055</td>
</tr>
<tr>
<td>Canada</td>
<td>HIMO 2nd phase, LWH</td>
<td>16,424,261</td>
<td>12,528,448</td>
</tr>
<tr>
<td>Japan</td>
<td>PADAB, sent an irrigation advisor, etc</td>
<td>10,638,986</td>
<td>5,820,172</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>PADAB</td>
<td>10,470,508</td>
<td>9,745,629</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>—</td>
<td>5,287,798</td>
<td>5,445,601</td>
</tr>
<tr>
<td>Italy</td>
<td>—</td>
<td>2,069,031</td>
<td>1,599,010</td>
</tr>
<tr>
<td>France</td>
<td>—</td>
<td>785,714</td>
<td>254,833</td>
</tr>
<tr>
<td>Germany</td>
<td>—</td>
<td>595,238</td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td>—</td>
<td>417,440</td>
<td>296,768</td>
</tr>
</tbody>
</table>

Source: DAD Rwanda
2.2.5 Major Agricultural Sector Development Programs

Below are some of the major development programs included in the policies of PSTA II.

_Crop Intensification Program (CIP)_

Recognizing that small and scattered agricultural lands and farming by inter-cropping have been a barrier to the introduction of advanced and modernized farming in Rwanda, the Crop Intensification Program (CIP) was introduced in 2007 by MINAGRI.

CIP aims to increase overall productivity by having farmers in a certain area work together to produce a single type of crop well-suited for the climate of that area, and thus the farmers can order seed and fertilizers in bulk, get assistance from extension services, and reduce post-harvest and transportation costs.

The CIP and the _Imidugudu_ Policy work as a set. Because _Imidigudu_ encourages farmers to live in clusters rather than scattered, groups of farmers are then able to work together more easily on their integrated farmland producing one unified crop.

CIP comes with a variety of incentive measures. Wheat and corn producers enjoy services such as having one agronomist per 500 ha. Fertilizer import is subsidized at 50%, transportation costs are also subsidized, at 25%. Moreover, high quality wheat, corn, and cassava seeds are provided directly from each district government. Other government activities include building infrastructure in particularly dry areas, as well as providing irrigation and post-harvest management services to groups of farmers taking part in the CIP.

Section 2.2.6 describes in detail Rwanda’s eastern provinces, where CIP was first introduced, and also where _Imidugudu_ Policy has been most effective. CIP was then introduced to the western and eastern provinces. As for the northern provinces, due to the cool climate and volcanic quality of the soil, it was recommended that these provinces should focus on crops such as potato,
wheat, and corn and CIP was actively implemented in the region, including hillsides. However in the southern provinces, with its higher population density, less farmland per family and the slightly later exposure to the Imidugudu Policy, it has not been easy to introduce the CIP program. In the southern marshlands, cassava production under CIP remains but there has been virtually no progress of CIP in the southern hillsides.

CIP is managed by each district, which commits to fulfilling the CIP plans provided by the central government using the methods it thinks is best for the district. This allows the pace of CIP implementation to be fast and MINAGRI describes this as 'friendly competition between the districts'.

MINAGRI estimates that in 2011 around 550,000 hectares was taking part in the CIP. However, during our field research, although we did sense that CIP has brought significant changes to farmlands, including some hillside land, a large amount of hillside land in those areas has not yet been targeted for CIP. In addition, there are many other areas, including in the South where CIP has not been implemented. Therefore estimate that 40% of Rwanda’s arable land has been targeted by CIP is possibly an exaggeration.

MINAGRI reports that when CIP was introduced in 2007, dissatisfaction was voiced with regard to the enforcement of producing a single crop in one integrated farm area. However with introduction of incentive measures as well as real income growth, CIP now faces much less criticism.
**Marshland Irrigation (Master Plan for Marshland Development, RSSP, and other programs)**

Marshland irrigation is one of the key policy areas of the Rwandan government, since marshland is the only available un-cultivated land for further agricultural development. All marshland has become nationalized and the government is putting effort into its development. Large scale irrigation and waste water facilities are being introduced and marshland is leased as a package to farmer cooperatives. The CIP program has also been implemented in marshlands with rice and maize increasingly being grown.

**Master Plan for Marshland Development**

In the Master Plan for Marshland Development, established in 2003, the Rwandan government recognized 66,094 hectares of marshland. Of this, 13,500 hectares had already been developed by 2010, and the government set a goal of another 40,000 hectares to be developed by 2020.

**RSSP, RSSP II, RSSP III**

Among many marshland irrigation-related programs, the one funded by the World Bank’s Rural Sector Support Projects (RSSPs) is the largest. The RSSP was completed between 2001-2008, the second stage RSSP II was started in 2008 and completed in December 2011 (10 months ahead of the originally planned schedule), and RSSP III is expected to be implemented in 2012.

RSSP built dams at nine separate locations, and redeveloped marshlands by constructing irrigation and drainage systems to support farms producing crops such as corn and rice. In order to reduce the inflow of soil into marshlands due to soil erosion from hillside farms, 14,485 hectares of hillside farmland was constructed into terraces. The program contains various capacity-building activities, like training for agronomists and researchers, as well as extension services for associations/groups of farmers. Maintenance of dry areas was carried out and roads and bridges were constructed to improve harvested crops’ market access. RSSP II built eight more dams, strengthened 3,000 hectares of marshlands to arable land. It also continued with capacity building and infrastructure improvements. As for RSSP III, what it hopes to achieve is improvement to the forestry and fishery sector, in addition to objectives such as improving irrigation and drainage systems.

*Source: Promar Consulting*
Other marshland development programs

Other marshland development schemes include a project funded by the African Development Bank (ADB), which worked on 1,500 hectares of marshland in the Bugesera region (an area which extends to Rwanda’s neighboring country, Burundi) and in Kirehe (located in the eastern province), a project sponsored by the International Fund for Agriculture Development (IFAD) concentrating on irrigation and drainage systems in marshland and hillside farms. Finally water management, dissemination, and technical cooperation carried out through Japanese and Belgian technical cooperation.

Hillside irrigation (LWH, and other programs)

Hillside irrigation systems are especially needed during dry seasons. The government started to put more focus on hillside irrigation recently. Beginning in 2012, MINAGRI aims to set up irrigation systems for 100,000 hectares of arable land to be completed within 7 years. Of this 40,000 hectares will be marshlands, and 60,000 hectares will be hillside farmland.

The ADB project in Bugesera mentioned earlier in this section established small-scale hillside irrigation systems which benefited 1,000 hectares of farmland. It was the first development of hillside irrigation facilities in Rwanda in a sizable area.

With the support of the World Bank, Land Husbandry Water Harvesting and Hillside Irrigation – LHW began in 2011. This project aims to create hillside irrigation systems and started in eastern areas such as Kirehe. In addition to the World Bank, USAID, Canadian International Development Agency (CIDA), IDA, and other organizations also provided funding. For hillside farms, closed canal systems are utilized with sprinklers as a part of the irrigation system. The plan is to have 12,000 hectares of hillside farmlands in 36 locations equipped with irrigation systems. However, it has been pointed out by specialists that due to the high costs of building closed canal systems, hillside irrigation may be more difficult than marshland irrigation. 23

23 (JICA 2010)
One Cow per Poor Household

This program distributes dairy cows to poor households. It also promotes the use of improved species of cattle with high milk-yield. The objective is increase animal protein consumption as well as increase manure usage in soil fertilization. A Japanese specialist worked short-term in Rwanda on this project. He said that, because the improved species of dairy cow requires careful handling and attention, achieving higher milk volumes by encouraging one cow per household will not an easy task.

Project for Rural Income through Exports (PRICE)

PRICE (Project for Rural Income through Exports) is a project aiming to increase farmers’ income through promoting export of fruit, vegetables, and nuts. It is supported by IFAD and several other organizations.

Agricultural Mechanization Program

Agriculture mechanization is not widespread. The Rwandan government is planning to introduce agricultural machinery such as tractors and harvesters, through a mechanization program.

Figure 52  A small-scale tractor made in China owned by a banana farm
Source: Promar Consulting
2.2.6 Land policy reform and land tenure

Rwanda’s land policy reform development has a substantial influence on how the country’s agriculture sector unfolds. In this section, we summarize the refugee history, land redistribution for repatriates, creation of a new constitution and its effects on the progress of the land policy reforms.

After the pre-colonial period, colonial period, the post-independence era, and the post-genocide restoration era, the mixture of customary land use and statutory land law has created a rather complex land ownership scheme; land ownership disputes lie at the heart of Rwanda’s frequent social conflicts. Furthermore, with masses of genocide refugees returning and reclaiming their land, policies of land re-allocations and land ownership have come under the spotlight and give a further level of complexity in land ownership.

Following the establishment of the current RPF regime, the Organic Land Law was enacted in 2005. As of 2008, total land registration rate stood at a mere 1.26%\(^{24}\). With the introduction of the land registration program in 2010, land registration based on statutory land law is expected to be completed nationwide by 2013. Based on this program, all land will be managed and organized according to a modern concept of land ownership. Moreover, in 2010 Rwanda’s National Land Use and Development Master Plan was formulated. With this Master Plan, analysis of land use based on aerial photographs of each district will form the foundation of a land use development plan. Future urban and infrastructure planning and various other development project are also included in the Master Plan.

*Historical background of the land tenure system*\(^{25}\)

Pre-colonial Rwanda was a highly centralized Kingdom. Regions that remained outside of the court’s political power includes Ruhengeri and Gisenyi in the north-western part of the country (see Figure 2). In these regions, what was known as *Ubukonde* was the dominant customary land tenure system. Under this system, the lineage-group of the person who first cleared a plot of land, usually through forest clearing, had total control of that plot of land. For those who wish to exploit a lineage-group’s land, obligations and fees were usually offered in exchange. This sort of exchange rarely included provision of labor. The relationship between lineage-group and those who wished to settle on their land was of a patron-client contract. In regions under the political control of the court, *Igikingi* and *Isambu* land tenure systems governed pastoral lands. *Igikingi* granted rights to a vassal as according to the wishes of the King. *Isambu* was an individual agricultural tenure to which access and occupation were accorded by the king in exchange for fee and duties. Together, they form the *Isambu-Igikingi* system. This system also contained a kind of a patron-client relationship and considered as a transformation from the above *Ubukonde* system.

It was during the German colonial period when the north-western part of the kingdom became under control of the court. Then, during the Belgian colonial period, land reform programs began. Indigenous land fell under the customary tenure system, belonging to the control of the court; non-indigenous land belonged to the colonizing country, operating under written laws of land tenure system. With the policies favoring the Tutsi population, and with the increasing number of governmental administrators dispatched to local areas in the north-western regions where land tenure was previously governed by *Ubukonde* system, conflicts arose. Moreover, new burdens such as tax on land ownership and coffee and tea cultivation were imposed, burdens that fell heavily on farmers.

Meanwhile, with the period of ‘social revolution’ between 1959-61 which eventually brought about Rwanda’s

\(^{24}\) IMF, Rwanda EDPRS A summary implementation report 2008-2010

independence, many Hutu elites from the north-western regions found themselves at the heart of the national system. In 1960, all land became the property of the nation. Nevertheless, in parts of the north-western region, traditional patron-client style of the *Ubukonde* system remained. President Habyarimana was from the north-western region. Unsurprisingly when he gained power, he tended to appoint people from the north-western provinces. Under Habyarimana’s rule, infrastructure development was concentrated in the north-western area, with a focus on Gisenyi and Ruhengeri.

Beginning from 1994, under the RPF regime, land redistribution to returning refugees according to the Arusha Peace Agreement (aka Arusha Accords) was carried out; in the meantime construction of residential areas for the returning refugees was established, provision of equal inheritance of land by women was discussed in 1999, and, after the new constitution was enacted in 2003, the Organic Land Law and land tenure systems were implemented.
Returning refugees and land redistribution

Although Rwanda has always had a high rate of population mobility, land redistribution and ownership confirmation became major issues after experiencing two waves of refugee exodus and their return.

The first wave of refugees was mainly Tutsi, spilling into neighboring countries between 1959-1962, around the 'social revolution' period just before and after Rwanda’s independence. This was because the Hutu population (85%) gained political power through the ‘social revolution’, and thus the previously politically powerful Tutsi population (15%) fled to neighboring countries in fear of the Hutu-dominated government. These refugees are called '59-ers' due to the year many left. The Tutsi population is an ethnic group that traditionally was pastoralist, concentrating on rearing livestock. When the Tutsi fled, they left behind their large grazing fields. These lands were redistributed by the local Hutu-dominated administrations, and used as farmland by small groups of farmers. At the start of the 1970s, due to the coup by Habyarimana, relatively large numbers of Tutsi again became refugees, but it is estimated that it was not as many as during 'social revolution' period. These refugees returned to Rwanda around the time the RPF gained political power in the mid-1990s.

The second wave of refugees fled from Rwanda was just after the genocide in 1994, as the Tutsi-backed Rwanda People’s Front (RPF) took control of the country. One million people were estimated to have been killed in the genocide, primarily at the command of the Hutu-dominated government. With the RPF in power, this time, the refugee exodus was dominated by the Hutu ethnicity who feared RPF’s retaliation. This is known as the Rwanda’s “second wave” of refugees.

After the establishment of the RPF administration in 1994, an influx of Tutsi 59-ers returnees poured into Rwanda. Under the 1993 Arusha Peace Agreement, the RPF regime is required to provide land suitable for the returning refugees. Thus, land was redistributed. For the first wave of returning refugees, the '59-ers', the local authorities recommended that they find land not presently owned rather than waiting to reclaim their original land, since there was much land, as well as many houses, with no owner because of the genocide and the second wave of refugees after the genocide. In addition, authorities also recommended the returnees to go to Kibungo and Umutara in the eastern region, neighboring Tanzania and Uganda, where population density was lower compared to other areas. In addition, some areas in the northeast Akagera National Park and the northwest Gishuwati forest reserve were developed to accommodate the returnees.

The Hutu “second wave” of refugees returned to Rwanda between 1996-1997, after seeing that under the RPF the political and social climate had calmed and become more stable. (See table above) When the “second wave” of Hutu refugees returned to Rwanda, they often found that their original land was occupied


Table 1 Estimated number of returnees and internally displaced people

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Rwanda population</th>
<th>’59-ers’ returnees</th>
<th>Second wave refugee returnees</th>
<th>Internally displaced people</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>5,220</td>
<td>*900</td>
<td>*200</td>
<td>1,000</td>
</tr>
<tr>
<td>1995</td>
<td>5,700</td>
<td>146</td>
<td>79</td>
<td>na</td>
</tr>
<tr>
<td>1996</td>
<td>6,170</td>
<td>29</td>
<td>1,272</td>
<td>na</td>
</tr>
<tr>
<td>1997</td>
<td>7,670</td>
<td>20</td>
<td>199</td>
<td>na</td>
</tr>
<tr>
<td>1998</td>
<td>7,880</td>
<td>8</td>
<td>3</td>
<td>**720</td>
</tr>
<tr>
<td>1999</td>
<td>8,100</td>
<td>1</td>
<td>19</td>
<td>40</td>
</tr>
</tbody>
</table>

Source: (Takeuchi 2003), data originates from Office of United Nations Resident Coordinator of Rwanda, and others
Note: * according to (Takeuchi 2001), it is likely that these numbers are an overestimation; but in any case, hundreds of thousands of refugees did return.
**New refugees created by conflicts in the north-western region.
by ‘59-er’ refugees who had returned soon after the establishment of the RPF government. The local authorities instructed current occupiers of land to split the land and share it with the returning refugees.

The Eastern region’s development is lagging behind as President Habyarimana’s administration had not focused on this area. However, with a large influx of refugees into the eastern region, the current RPF administration is focusing on this region for its initial livelihood and agricultural development programs.
Imidugudu policy

After the RPF administration came into power and the land was redistributed to the Tutsi 59-ers and the Hutu second wave of refugees, there was still the issue that houses cannot be split up between 59-ers and second wave refugees and there was a need to build a new house for one of them, often for the second wave refugee.

Thus, the government built many houses with the support of international organizations in low-cost clustered residential areas, a policy known as Imidugudu\(^{27}\).

Rwanda’s traditional housing style is scattered homesteads as shown in Figure 54. With a need for modern infrastructure such as roads, water supply, and electricity supply, it appeared that Imidugudu residential areas would be preferable, as it would be more efficient to access people living in clusters and provide social or economic services, as well as infrastructure.

Soon, the government ordered that all new residences should be built as Imidugudu settlements, from 1996 onwards.\(^{28}\) This Imidugudu policy was implemented by the Rural Settlement Task Force (RSTF), overseen by the MINALOC.

Since 2008, district Mayors have been producing Master Plans to identify the best places to build Imidugudu settlements, and at the same time to promote the importance of moving people into Imidugudu residential areas.

As we mentioned earlier in the CIP section, the Imidugudu Policy works in combination with the CIP and these two programs are essentially a pair. Farm land can be cultivated as unified crops once villagers move into grouped settlements.

However, many problems and complications have arisen from the Imidugudu Policy. For instance, some farmers live further away from their farmland than before they moved, which means it takes more time and effort to walk to their land to fertilize the soil with household garbage and manure from their livestock.

By 1998, areas with a large influx of villagers into grouped settlements include Umutara and Kibungo where 92.0% moved into Imidugudu, 52.5% in Ruhengeri and 13.0% in Gisenyi. In other areas, however, those who moved into group settlements accounted for less than 5%.\(^{29}\) However by the 2010/11, the

\[^{27}\text{It is also called Umudugudu. Umudugudu is the plural form of imidugudu.}\]
\[^{28}\text{(Takeuchi 2000) (Pottier 2006)}\]
\[^{29}\text{(Takeuchi 2000)}\]
national average achievement ratio had increased to 55% based on the Ministry of Local Government - MINALOC’s data. There are plans to expand Imidugudu implementation, but many experts have pointed out that the current method used to move people into newly built group settlements by letting them purchase the plot is quite difficult to further expand. In areas where inhabitants have lived in their houses for a long time, it is becoming increasingly difficult to convince/coerce them to move into the new residential housing clusters.
National Land Tenure Reform Programme and Organic Land Law

In 2003, the new constitution was adopted, and in the following year the National Land Policy was created. In 2005, with the support of World Bank and FAO, the Organic Land Law 2005 was enacted. The same year, the National Land Tenure Reform Programme started. Phase 1, which was to design a strategic roadmap for building the legal system, lasted from 2005 until 2008. Rwanda’s legal system is said to be heavily influenced by British law. Finally, from 2009, all land-related policies became fully enforced.

Land registration, Rwanda National Land Use and Development Master Plan, and the implementation of other land-related policies are managed by the Rwanda Environment Management Authority (REMA) and its enforcement authority the National Land Centre (NLC). Each District has set up a District Land Bureau, which is responsible for district level planning and implementation of land-related policies. The National Land Commission and District Land Commission oversee the implementation of the policies. There are also land commissions on the Sector and Cell level.

As of 2008, only 1.26% of total land had written land registration, but the registration process has started in 2010 and all land is expected to be registered by the end of 2013. In addition, Rwanda developed a master plan for the national land use in 2010, which will be used on the district level as the basis of economic and agricultural development programs from now on.

The Organic Land Law 2005

The Organic Land Law distinguishes between private land, public land, state land, and the land owned by the sector-cell county. Under the Organic Land Law, land ownership is defined as the right to lease of land for a 3-99 year-period from the state. Extension of the lease is possible.

For farmland, in order to prevent further segmentation of the already small and scattered farmlands through inheritance allocation, splitting plots into less than 1 hectare is prohibited.

For state-owned land, marshland can be leased to cooperatives, not to individuals, under the Ministry of Natural Resources after the appropriate environmental assessment. The lease period can be as long as 20 years.

For all land, the owner of the land must endeavor to prevent soil erosion, as well as use the land in a manner that has high productivity. Owners also need to pay land tax as laid out in the relevant laws. In the case of non-compliance of tax payments, land owners will face tough measures such as fines, property confiscation and a return of the land to the state.

Also, it should be noted that prior to the Organic Land Law, the 1999 Basic Law was established that recognizes women’s right to land. The Basic Law emphasizes equality in land inheritance for both genders.
Land registration and the beginning of land tax collection

As mentioned in the previous section, the land registration program began in 2010. According to RNRA, by November 2011, out of the targeted 9 million people, approximately 7.8 million people had completed the registration. The land registration program hopes to complete nationwide land registration by December 2013. Usually, those working for the land registration program will visit each area in person to conduct necessary surveys. Only after a period for settling possible disputes and a period for making corrections to registration details will land registration be complete in that area.

Registering land that already has an owner is straightforward. Land without an owner automatically becomes the government’s land which is then managed and developed for future cultivation. It should be noted that the government can also purchase land from landowners, which then becomes state-owned land.

After land registration is complete, land tax collection (land lease) begins in each district. Tax rates vary according to the area. For instance, residential land in Kigali has a tax rate of 30-120 RWF/m²; farmland of less than 2 hectares is exempted from taxation; 2-20 ha of farmland has a tax rate of 1000 RWF/ha whereas land larger than 20 hectares must pay 2000 RWF/ha in tax. The land tax rate varies between different areas: locals can be exempt from land tax for residential areas and for farmland of less than 2 hectares; as for farmland with an area between 2-20 ha, the tax rate is set between 100-1000 RWF/ha, and for farmland larger than 20 hectares it is between 1000-2000 RWF/ha.
2.3 Distribution, Infrastructure and the Food Processing Industry

2.3.1 Distribution of Agricultural Products

Over half of the distribution of agricultural products is through markets. There are small-scale stores such as supermarkets where some products such as processed foods are sold. Distribution from producer to market has between one to three stages. (see Figure below).

Agricultural products at the market are usually sold by women. Products such as fresh meat, frozen fish, frozen meat, grains are sold by at shops or by wholesalers who are mostly men. Even in rural areas, there are markets set up in various places. Some markets are permanent, whereas others are set up several times per week.

As described in section 2.1.4, of the food consumed by rural households, 45% is produced by the household, and 52% is purchased from markets. Thus, markets are not only important for city dwellers, they also play an active role in the lives of rural people. With regard to the use of market equipment and facilities, as part of the coherence of urban and rural development policy, many rural market businesses now have modern product displays and concrete stands.

Figure 58 Agriculture distribution channels

![Figure 58 Agriculture distribution channels](Source: Promar consulting)

Figure 56 Woman selling cooking bananas

Source: Promar Consulting

Figure 57 Meat shop in the market

Source: Promar Consulting
Transportation issues

Other than highways, Rwanda’s roads are not paved and thus it continues to be a difficult task to transport products from farms which often have bad road access.

Moreover, due to the high expense of transport by truck, bicycles and wooden transportation vehicles such as two-wheeled carts remain major means of transport.

Currently, refrigerated distribution channels are limited to frozen fish. For this reason, it is estimated that post-harvest loss can reach 15%.

RGCC

The Rwanda Grains and Cereal Corporation (RGCC) came into existence in 2012. It is responsible for improving post-harvest storage and distribution of products such as corn and wheat. Although traditionally not part of Rwandan people’s diet, the government wants to encourage more grains and cereal production. RGCC manages the policies that promote increased sales of grain and cereal products.
2.3.2 Road Infrastructure and Major Routes for External Trade

Road infrastructure

A total of 271 km of roads are paved and the roads extending from Kigali are mostly paved. However, damage can already be seen in parts of these roads and re-pavement of the road running between Butare and Cyangugu is currently underway.

The remaining 780 km of roads are still unpaved. A program that permits genocide prisoners to serve part of their sentences doing public works projects, known as Travail d’Intérêt Général (TIG), provides the physical labor needed for managing the unpaved roads. These unpaved roads are thereby kept in relatively good condition.

Figure 60 Map of Rwanda’s Major Roads

Source: Steve Rwanda, Wikipedia commons

Transportation routes

There are two main routes for exporting Rwanda’s agricultural products. One route goes through Uganda, and on to Kenya’s Mombasa port. Another route leads to Tanzania’s port of Dar es Salaam, by way of Rusumo.

Re-construction of Rusumo International Bridge on the Tanzania border

The Rusumo bridge on the border of Rwanda and Tanzania is aging, but currently, with assistance from Japan, re-construction is underway. Moreover, a one-stop border procedure is also underway. Tanzania’s road system leading in from the Rusumo bridge is improving, and it is expected that this will result in slight improvements for logistics of agricultural products.
Furthermore, railway construction plans between Rwanda and Tanzania are also underway.

**Figure 61**  Major Transportation Routes in Southern Africa

Source: TradeMark SA
2.3.3 Overview of Food and Agriculture Processing Industry

In Rwanda’s food and agriculture processing industry, small-scale operations manufacturing biscuits, juice, and beer processing. Although the industry remains underdeveloped, the number of small-scale processors is increasing little by little. For instance, there are around 14 dairy companies belonging to the Dairy Processors’ Association (RDPA) and the Rwanda Juice and Alcohol Association has around 100 member companies. Some cooperatives are also attempting food processing.

For details on coffee and tea processing, please refer to Chapter 5 and 6, respectively.

As will be discussed in detail in Chapter 4 of the report, homemade banana beer is banned, which is why cooperatives and small-scale processing plants are becoming the main banana beer processors.

The Rwanda Development Board (RDB) has shown interest in advancing Rwanda’s fruit processing industry in particular. Currently, some of the fruit produced in Rwanda is processed in Kenya and other countries. Rwanda is hoping to process fruit domestically in the future. In addition, the Board has indicated that with high production costs due to high electricity bills, it is essential to focus on production of high value-added good that can be sold at high prices.

### Table 15 Rwanda’s Major Food Processing Companies (excluding coffee and tea)

<table>
<thead>
<tr>
<th>Company name</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRALIRWA</td>
<td>The only beer brewing company in Rwanda; having 4 beer brands of Primus, Mutzig, Heineken, Amstel. The company also bottles Coca Cola and other soft drinks.</td>
</tr>
<tr>
<td>INYANGE Industry</td>
<td>Established in 1999. This company produces milk, powder milk, yoghurt, mineral water, juice, etc. Some products are exported.</td>
</tr>
<tr>
<td>KABUYE Sugar Works</td>
<td>Sugar processing company. Privatized in 1997, purchased by the Madhvani Group (India)</td>
</tr>
<tr>
<td>Nyanza Dairy</td>
<td>This company processes drinking milk, powder milk, and yoghurt. Established in 1937 as a national processing factory, now privatized. It is the largest company in the dairy industry.</td>
</tr>
<tr>
<td>Premier Tobacco Company</td>
<td>Tobacco processing company.</td>
</tr>
<tr>
<td>Shema fruit</td>
<td>Fruit jam and juices, etc.</td>
</tr>
<tr>
<td>Sosoma Industries</td>
<td>This company processes wheat, soybean, corn starch, and drinks-related products.</td>
</tr>
<tr>
<td>Sorwatom</td>
<td>Tomato sauce production</td>
</tr>
<tr>
<td>Sopyrwa</td>
<td>Pyrethrum extract processing company.</td>
</tr>
<tr>
<td>Urwibutso Eses</td>
<td>Bakery, banana beer, grape wine, fruit juice, chili pepper extracts, etc. Owned by Sina Gérard. It has its own farms.</td>
</tr>
</tbody>
</table>

Source: Promar Consulting
3 RICE PRODUCTION AND DISTRIBUTION

The following section will describe Rwanda’s rice production and the rice value chain. Rice is one of the staple crops that the Rwandan government is focusing on as it is a crop that is suitable for production on marshlands, the only area available for agriculture expansion.

3.1 Rice Production

3.1.1 Background and History of the Rwandan Rice Industry

Rice introduction from Taiwan and Yunnan

Rwanda’s rice cultivation started in the 1940s. However, it was not until the 1960s, with the help of Taiwan and China, that Rwanda’s rice cultivation started its full-scale expansion.

Taiwan had been testing rice cultivation in Kigali since 1964, just after Rwanda’s independence. In 1965, after receiving support from the Rwandan government, a project initiated to spread the cultivation of Japonica paddy rice throughout Rwanda began. Then between 1972 and 1982 under Juvenal Habyarimana’s rule, support came from the Chinese government for the introduction of the Keng Diao 3 variety of rice, developed in Yunnan, as well as the implementation of irrigation systems. During the 1980s, long-grain rice seeds were introduced to Rwanda from India.

As use of ‘Keng Diao 3 rice expanded, in 1987 for the first time rice blast infected some crops. 2 years later, almost all rice crops were devastated by rice blast. In search of alternative varieties of rice seeds, Rwanda introduced several different varieties from Yunnan which were best suited to grow in Rwanda’s climate and were expected to have higher yield. However, in the 1990s, maintenance of irrigation systems became much more difficult due to the civil war and genocide. This significantly cut down on the number of paddy fields in marshlands.30

After the RPF took control of the government, rice production recovered gradually. According to investigations conducted in 2001-2002 by the West African Rice Development Association (WARDA) and the Institut des Sciences Agronomiques (ISAR), there were around 990 cooperatives, producing on a total of 5,500 hectares of marshland located in Kigali, Kibungo, Butare, Gitamara, Cyangugu, Byunba, and several

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30 (Ise 1998) (Kathiresan 2010)
other places. \(^\text{31}\)

**Rehabilitation of Rice Cultivation After 2000**

In the 2000s, the Rwandan government vigorously carried out its marshland development strategy and improved irrigation systems in marshlands at a fast pace. As described in Section 2.2.4, RSSP lasted from 2001-2008; RSSP II then started in 2008 and ended in 2011. The two programs improved irrigation system for 6,000 hectares of marshland. In Bugesera, an ADB-funded irrigation program enhanced irrigation systems covering 1,500 hectares; and in Kirehe, an IFAD-funded project repaired irrigation systems for 200 hectares of marshland.

The high price of rice was an incentive for farmers to grow rice, and with the combination of industry development policies set by the government to increase rice production, the production level was on the rise. In 2009, production levels reached a record level of 110,000 tons, but this was not sustained. In 2010, production area decreased as did total production level. Although irrigation systems are in place, their effectiveness and the total area they can irrigate heavily depends on the level of rainfall. Rice production volumes are therefore still unstable.

**Figure 63  Rwanda’s total rice production area and production level**

![Graph showing rice production and planting area over time](image)

Source: FAOSTAT, and MINAGRI for 2010 data

In 2003 Rwandan government recognized a total of 66,904 hectares of marshland throughout the country. However as of 2010, only 13,500 hectares had had the irrigation systems restored and it land put to use. The government is hoping for further growth of irrigated marshland, increased productivity, and double cropping in the near future.

The National Rice Production Program (2006-2016) includes the goal of increasing rice production to 170,000 MT by the end of 2016. The Rwanda Rice Development Strategy (2008-2018) aims to increase rice production to 370,000 MT in volume and 28,500 hectares in production area.

\(^{31}\) (Kathiresan 2010)
3.1.2 Main Production Areas

Rice production takes place mainly in the river basin of the Akanyaru River and the Nyabarongo River, upstream of the River Nile. Areas surrounding Kigali in the eastern and southern provinces, as well as marshlands in Bugarama near Cyangugu in the western province, are also main rice production areas. (See figure below)

Bugarama has the lowest elevation (less than 1,200 m above sea level) compared to the other regions where rice is grown. With a relatively high temperature, this area has the potential to grow Basmati rice and the varieties of long-grain rice which are grown in other parts of West Africa.

Eastern and southern provinces are moderately elevated (1,200-1,700 m above sea level), with a temperature that is somewhat low for rice production. (See Figure 33) There are few long-grain rice varieties that are suitable for this area.

Figure 64  Rice production by district (2009, 1000 t)

Source: NISR

(Rwanda Environment Management Authority 2011)
3.1.3 Crop Variety

The Origins of Rwanda’s Rice Varieties

Rice varieties, such as short-grain rice originated from China, and long-grain WAT varieties have been developed by WARDA (now called the Africa Rice Center). In addition, places near Cyangugu in the Western Province are cultivating Basmati rice, as well as other long-grain rice developed in Western Africa.

During the 1970s, Rwanda’s rice sector received significant support from the Chinese government. The Chinese rice variety Keng Diao 3 was introduced and spread throughout the entire country within a decade, but by the end of the 1980s rice blast infected this rice variety and Rwanda suffered dramatic losses in its rice production. Because of this, Rwanda’s agricultural research centers swiftly carried out test cultivations of rice varieties from Madagascar, Cameroon, Korea, Japan, and a vast number of Chinese varieties. As a result, three varieties of rice from China were selected: Xinan (Xinun) 175, YunKeng136, and Yunertian01 for their high yields. Yun Keng 136 and Yunertian 01 are varieties that are derived from from Xinan175. Xinan 175 originates from Japonica varieties developed by Taiwan’s Xinan Agricultural Research Institute during 1950’s. It is not clear which variety Xinan 175 originated from, although this variety of Japonica rice has been widely cultivated in Taiwan. Given that the original Japonica varieties were brought from Japan under the colonial era, there is a high chance that Xinan175 originally came from some native Japanese rice variety. In fact, in the early 1990s a Japan-China team was working on developing rice varieties specifically designed for Rwanda’s environment. Experimental cultivation was planned to test varieties for rice blast resistance and for suitability to Rwanda’s climate. However, this was all brought to a halt in 1994 with the start of the genocide. 33

During the 1980s, Basmati rice and varieties of long-grain rice grown in parts of Western Africa were introduced to Rwanda. Bugarama near Cyangugu has low elevation and high temperature, and thus is deemed to be the most suitable area for growing long-grain rice.

An investigation carried out in 2001-2002 by the ISAR (now known as the Rwanda Agricultural Board) and WARDA shows that as of 2002, there were 24 rice varieties planted in Rwanda. The main varieties are listed on the table below.34

<table>
<thead>
<tr>
<th>Name</th>
<th>Short/Long</th>
<th>Origin of variety</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zhang Gang (Kigori)</td>
<td>Short grain</td>
<td>Unknown</td>
<td>Resistant to rice blast and leaf sheath browning</td>
</tr>
<tr>
<td>Yun Keng 136</td>
<td>Short grain</td>
<td>Natural crossing from Xinun175 (1970)</td>
<td>Resistant to rice blast and leaf sheath browning</td>
</tr>
<tr>
<td>Yun Yine 4</td>
<td>Short grain</td>
<td>Unknown</td>
<td>Not resistant to rice blast and leaf sheath browning</td>
</tr>
<tr>
<td>Yunertian 01</td>
<td>Short grain</td>
<td>Natural crossing from Yun Keng 2 (1974)</td>
<td>Resistant to rice blast and leaf sheath browning</td>
</tr>
<tr>
<td>Xinun 175</td>
<td>Short grain</td>
<td>Japonica introduced from Taiwan (in 1955)</td>
<td>Extremely prone to rice blast and leaf sheath browning</td>
</tr>
<tr>
<td>Fac V046</td>
<td>Short grain</td>
<td>Unknown</td>
<td>Resistant to rice blast and leaf sheath browning</td>
</tr>
<tr>
<td>Basmati 370</td>
<td>Long grain</td>
<td>Basmati introduced from India</td>
<td>Fragrant; low yield; Resistant to rice blast and leaf sheath browning</td>
</tr>
<tr>
<td>IRON 280</td>
<td>Short grain</td>
<td>Unknown</td>
<td>Resistant to rice blast and leaf sheath browning</td>
</tr>
<tr>
<td>BG 400-1</td>
<td>Long grain</td>
<td>Unknown</td>
<td>Resistant to rice blast and leaf sheath browning</td>
</tr>
<tr>
<td>IRAT</td>
<td>Long grain</td>
<td>IRAT (an institute in Niger)</td>
<td>Resistant to rice blast and leaf sheath browning</td>
</tr>
</tbody>
</table>

Source: (J. N. Jagwe, et al 2003)(Ise 1998) Note: Resistance to diseases is rated based on Rwanda’s recognised criteria

33 (Ise 1998)
34 (Kathiresan 2010)
Since 2002, in order to cultivate the popular long-grain rice varieties in Rwanda, WARDA (now the Africa Rice Centre) and the Institut des Sciences Agronomiques du Rwanda (ISAR) tested around 900 rice varieties for their suitability. Rice varieties such as the WAT series developed by WARDA showed considerable resistance towards Rwanda’s cold weather and diseases, yielding 10 tons/ha. Consequently, RAB’s has recommended the following rice varieties depending on elevation above sea-level: IR 64, WAT 54, BASMATI 137 (fragrant rice), and IR 65192 -4B-17-3 (fragrant rice) are recommended for low elevations located around Bugarama; Gakire (Tox 4331 Wat 91-3-1-1-1), Instinzi (Tox 4331 Wat 86-3-4-2-2-1), Instindagirabigega (Wat 1395-24-2), WA B 543-45-2, and some other varieties are recommended for areas with a medium elevation. RAB is working hard to expand cultivation of the recommended rice varieties.

What is interesting is that in an attempt to promote the recommended rice varieties, local names such as Gakire (rich), Instinzi (victory) and Instindagirabigega (full storage) have been given to the successful WAT rice varieties to encourage their cultivation.

**The current situation of Rwanda’s rice varieties**

During field research to Rwanda, two marshland cultivation sites were visited near the provincial city of Butare in the southern province. At the first cooperative, 80% of cultivation was the WAT rice variety, popular due to its high prices and high milling yield. The remaining 20% consists of Yun Keng, Zong Geng (or ‘Kigoli’ as it is called locally) and other Japonica varieties from China. The other cooperative visited, however, cultivates 100% Chinese Japonica rice. The temperature is probably too low for long-grain rice, as the did experiment with cultivation of long-grain varieties but could not produce anything substantial.

According to an investigation by the Japan International Cooperation Agency (JICA), in Rwamagana District (the center for rice mills owned by Australian company ICM) in the Eastern province, experimental cultivation was conducted on 200 varieties. Sadly, none were deemed suitable for the area. Rice varieties currently under cultivation consist of the common WAT varieties and Yun Keng.

The Eastern Zone Rwanda Agricultural Board reported that it is not unusual for long-grain rice varieties to grow for the first 2-3 years after introduction, then suddenly stop producing any yield in the following year.

The domestic market favors long-grain rice, and it is usually more expensive on the market. Yet, Rwanda’s climate, combined with the low availability of long-grain variety seeds has meant that most of the rice cultivated right now is still a Chinese Japonica variety. In addition, there is simply not enough seed for large-scale long-grain rice cultivation. Visits to local markets found that fragrant rice is by far the most popular and expensive variety sold. Basmati rice produced in Pakistan has the highest price. However, because fragrant rice can only be grown and produced in Bugarama, domestic production of this favored rice variety remains low. It has been pointed out that Basmati rice can have 3 cropping seasons. Besides Basmati rice, the second most popular rice variety is fragrant rice from Tanzania. Within rice varieties of the same grade, the more fragrant, the higher the market price. This sort of price setting based on fragrance level is not used on domestically produced rice.

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35 (Africa Rice Center 2006)
36 (Africa Rice Center 2006)
37 (JICA 2010)
**Testing and Research**

Experimental cultivation of rice is conducted constantly by on a variety of demonstration plots throughout Rwanda by various organizations including IRRI and the African Rice Center. South Zone RAB reported that currently, 30 varieties of long grain and 3 varieties of short grain are being cultivated in Rwanda. Some that appear to have potential, such as IRRI28 and IRRI37 are being identified. Paddy NERICA has relatively high productivity and a good flavor, but paddy NERICA production requires sufficient irrigation, and the frequent lack of this is proving to be an obstacle.

Unfortunately, despite Rwanda’s desire to develop new rice varieties, it has not been possible. The main obstacles appear to be the severe shortage of staff and the insufficient experience of those who are available. There are a total of 20-30 staff working at the government’s Rice Program, at the headquarters and the 4 Zones. In the South Zone where interviews were conducted, there were 3 extension workers, and only one researcher. In addition to this small staff, given the lack of experience and skills, developing new varieties of rice is simply beyond staff capability.
3.1.4 Damage from Cold Weather, Disease and Insects

High elevation combined with a drop in temperature overnight means that damage from cold weather poses a significant challenge to Rwanda’s rice cultivation. Rwanda’s climate differs greatly from that of western Africa, making it difficult to apply the extensive rice cultivation research that has been carried out in west Africa.

For most of the year, average temperatures are around 20°C. The climate is damp during the two rice cropping seasons and because agrochemicals are rarely used, most rice crops are exposed to damage from insects and diseases. Major rice diseases are: Rice blast, Sheath brown rot, and Rice Yellow Mottle Virus (RYMV).

In addition to diseases, stalk-eyed borer (*Diopsis thoracica*), birds, and mice also pose a danger to rice crops. Another major issue is that in areas with irrigation systems, many children become infected with Schistosomiasis, a disease caused by parasitic worms.

**Damages from Cold-weather, especially during booting stage**

The climate during Rwanda’s rice planting season is similar to summer in Hokkaido or northern Honshu in Japan. Rice is most sensitive to cold during the early phases of growth through to when the rice sprouts. Because the temperatures can vary more than 10°C between daytime and nighttime, reaching temperatures lower than summer temperatures in Sapporo in northern Japan, cold damage is a particular problem in this phase of rice growth. Not only is developing cold-tolerant seeds critical, but also designing technologies that can help deal with the effects of cold. Thus, it is quite important to get support from specialists who are knowledgeable about cold-tolerant rice varieties and techniques for mitigating the effects of cold. There is potentially a role here for Japan and other cold weather rice producers.

**Rice blast**

Damage to Rwandan rice from rice blast has been severe. Rice plants and weeds in the rice family are carriers of this disease, which has infected rice crops all over Rwanda.

Policies currently in place to mitigate damages from rice blast include cultivating rice blast-resistant varieties such as Yun Keng and Zong Geng, as well as WAT varieties with relatively strong resistance towards rice blast and rotating varieties planted as a method to lower the chance of contracting rice blast. However, Yun Keng was deemed not necessarily rice blast-resistant by a Japan-China team in the 1990s. Developing rice blast resistant varieties that are suitable for Rwanda’s climate is urgent, and countries like Japan who have experience with a variety of disease-resistant rice varieties could contribute to this development.

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38 (Rwanda Environment Management Authority 2011)
39 Could be compared to summer in Heilongjiang in China, northern South Korea, Maine in the US or southeastern Canada
40 (Ise 1998)
41 (Rwanda Environment Management Authority 2011)
**Sheath brown rot**

Sheath brown rot is found in cold regions. In Japan, this disease is often seen in Hokkaido and occasionally Tohoku. In Yunnan, China which has a highland climate similar to Rwanda, sheath brown rot is also found. The cause of the disease is a soil bacteria and the disease will occur if it is cold during the early growth stages of the rice seed, making it impossible to avoid the outbreak of the disease in Rwanda’s marginal rice growing regions. Japanese research has shown that although developing sheath brown rot resistant seeds is difficult, a wettable powder mixture of streptomycin-oxytetracycline can control the spread of the disease.

**Rice Yellow Mottle Virus (RYMV)**

Rice Yellow Mottle Virus (RYMV) has infected rice crops all over Africa. West Africa suffers the most from RYMV, but cases of RYMV have also been found in Uganda. There has been no case of RYMV infection in Asia. According to RAB, long grain varieties are prone to this disease, whereas Chinese Japonica is said to be resistant, although we cannot be certain of this.

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42 (Ise, 1998)
3.1.5 Other Issues in Rice Farming

Agrichemical

Agrichemicals are rarely used, but in the case of rice blast, the fungicide Kitazine/IBP has been used and pesticides are sometimes used.

Fertilizer

The NPK fertilizer recommended by RAB is sold through the cooperatives. In general, fertilizer use is insufficient in Rwanda. Marshland fields are often far from farmers’ homes, and it is too far to carry compost from where they rear their livestock to the marshlands. As a result, compost is hardly ever used.

In each of the North, East, South and West zones, there is one certified private fertilizer distribution company. Farmers purchase this fertilizer through their cooperative by accessing loans. Previously, fertilizer was distributed through MINAGRI and then redistributed by cooperatives to farmers. Cooperatives would subtract fertilizer expenses from the sales of crops before returning the sales returns back to farmers. However, from 2011 onwards, private fertilizer companies have sold fertilizers directly to farmers through cooperatives, and there is concern that this new scheme could potentially reduce the amount of fertilizers used.

Another concern is that the unified standards and volumes of fertilizer recommended by RAB do not take into account the soil quality variation of different areas. This increases the possibility that farmers are not using optimal amounts of fertilizer.

As long as fertilizer use is low, it is important to select and develop seed varieties that produce high yields even with little fertilizer.
3.1.6 Other Rice Production Issues

Yield

The average rice yield in Rwanda is 5-7 MT/ha. The government aims to increase yield to 8 MT/ha, which is relatively high for African rice farming. 43

For example, the Union of Cooperatives of Rice of Bugesera (UCORIBU), a regional union of cooperatives in Bugesera interviewed during field research, has a total area of 3,057 hectares, but only 2,723 hectares is arable land. In 2011, between January-June (Season B harvest) 1,950 hectares of arable land was used; and between July-December (Season A harvest) 1,079 hectares of land was used. Season B produced 10,432 MT of paddy rice, and yield was at 5.35 MT/ha. Season A produced 4,998.5 MT of paddy rice, with a yield of 4.6 MT/ha. However this data only reflects the rice sold through formal channels, i.e. through the cooperative. According to UCORIBU, on average, the best yield was 6.5 MT/ha, and the worst was 4.5 MT/ha. Another cooperative said that their yield is 4.5 MT/ha. However this too only reflects rice sold through formal channels. The cooperative estimates that 30% of the rice produced by members is sold by individuals without going through the cooperative, and thus the cooperative can be estimated to have an actual yield of 6 MT/ha.

Rice as cash crop

Only a limited amount of people’s food expenditure is currently spent on rice. However, urbanization may increase the importance of grains such as rice in Rwandan’s diets and the government is aiming to substitute imported rice with domestically produced rice.

Producers grow rice for household consumption, but as prices rise, there are many farmers who decide to start cultivating rice, suggesting that its role as a cash crop is strong.

Interviews with farmers during field research show that income from rice is around 350,000-600,000 RWF, but the cost of fertilizer and hiring a workforce is around 20,000 RWF/plot × 10 plots. Therefore return on investment is low, which is why the recent low price of rice is particularly troubling for producers.

43 (USAID PHHS 2010)
3.1.7 Cooperatives

Most rice cultivation uses marshlands, which are state-owned lands. This is why rice production is typically carried out by farmer cooperatives, which can afford to lease marshland from the government.

Cooperatives and regional/Nation-wide union

There are 93 rice cooperatives registered by Rwanda Cooperative Agency (RCA) in Rwanda. The number of members range from less than 10 to 1,943 members. Of the rice cooperatives registered, 10 have over 1,000 members.

Furthermore, these rice cooperatives belong to a nation-wide rice union called FUCORIRWA (Fédération des Union des Coopératives Rizicoles au Rwanda). FUCORIRWA was established in 2008, born out of a reorganization of the former Union of Rice Cooperatives (UCORIRWA). Under FUCORIRWA there are 6 district level regional unions and 52 Cooperatives for the Promotion of Rice (COPRORIZ). 62,000 farmers belong to the FUCORIRWA system. 44

Within a district, a regional union must be made up of at least 3 cooperatives, so if there are too few cooperatives in district they will not be organized into regional unions. For instance, Ngoma district does not have a regional union.

Cooperative director and staff members

Rice cooperatives are managed by a board of directors, made up of farmer representatives. This board also has the responsibility of supervision.

For extension services, there is usually an agronomist and cooperatives also have an accountant who is in charge of sales and fertilizer purchases, and has various other financial responsibilities. The agronomist manages marketing, production, and irrigation systems. For example, at the previously mentioned regional union of cooperatives UCORIBU, the chairman of the board of directors and the agronomist of each cooperative gather every month for a meeting.

Other employees can include a manager, store keeper, or other positions.

Allocation of agricultural land

Rice farming land is usually allocated to farmers by plot. One plot is 5 acres and farmers will be allocated from between one to several dozen plots. A farmer visited during field research was cultivating 10 plots for a total of 50 acres.

In reality, agricultural land management varies greatly depending on the cooperative and the area. According to a JICA survey carried out in the Eastern Province, land allocation in Bugesera district is relatively uniform, whereas in Ngoma district, land allocation by newly created cooperatives is heavily influenced by previous traditions, the size of allocated land varies, and scattered allocation can still be seen.

As for cultivation itself, it is up to the farmer to decide what to plant on his allocated land.

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44 (USAID PHHS 2010)
Union Fees and Land cultivation rights & land rent fee

UCORIBU, the regional union in Bugesera, said that farmers must pay from 5,000 to 20,000 RWF to become a member.

In addition, farmers must pay a land lease fee. Marshlands are state-owned lands and rice cooperatives rent land from the government. Renting marshland costs 1,000 RWF/plot (500 RWF × 2 cropping seasons). Money is collected by the Sector administration to be paid to the central government.

Furthermore, farmers must pay an extra 1,000 RWF/plot as an irrigation management fee, and 1,000 RWF/plot as a management fee. The total payment becomes 3,000 RWF/plot/year.

Irrigation

Small-scale dams and water from rivers are used as sources of water for irrigation. Cooperatives under the UCORIBU have organized community work sessions every Friday to maintain the local water paths. These community work sessions are scheduled about 20 days per season. There are also community work sessions in dry areas.

Irrigation systems are traditionally maintained by the cooperatives themselves. However, starting from 2010, the newly established Water Users Association (WUA) took over this responsibility. The WUA concept is new and the association controls water distribution to farmers and maintenance of waterways.

Seeds

Grains intended to be used as seeds are stored by the cooperative. If this grain stock cannot be used as seeds, RAB provides the cooperative with a supply of seeds.

50 kg of short grain rice or 20 kg of long grain from every hectare is reserved as seeds. Less long-grain rice is reserved as seed rice because long-grain rice crops tend to have more rice tillers (grain-bearing branches), and it is not necessary to reserve as much long-grain seed rice.

Drying, collection, and storage

Rice must be dried after harvesting. Most cooperatives have a concrete area near their rice fields, where harvested rice is threshed and dried. Some cooperatives even own simple storage facilities. Threshing and drying after harvest are not usually carried out by machinery; however some unions like UCORIBU have begun projects working to introduce machinery to help with post-harvest processes.

Operational challenges

There are three key issues that have been identified: 1) prices of domestically produced rice are low. Return on investment in rice cultivation is too low. 2) cooperatives lack sufficient funds to provide loans to farmers. 3) cooperatives face high risk. Although fertilizers are generally sold to farmers with loans from cooperatives, not all farmers are purchasing their fertilizer through cooperatives. In other words, cooperatives are not receiving income through fertilizer loans.

45 (USAID PHHS 2010)
3.2 Storage, Milling, Distribution, Consumption, and Prices

3.2.1 Domestic Distribution

*Cooperative Selling Schemes for Rice*

Currently all harvested rice, including rice for household consumption, must be sold collectively through cooperatives. Before, some farmers milled by hand and there were also some small-scale mills, but with the government's rice production revolution, rice quality improvement became a goal, and now milling at small-scale rice mills is completely prohibited.

Cooperatives collect rice and then with help of regional unions they ship it to milling factories, or if an individual cooperative has had an auction for private sector buyers then they will sell the unmilled rice to a wholesaler. Before rice is sent to mills through the regional unions, the union has each cooperative declare their desired price and discussion ensues. Then the desired price is communicated to the milling factory. The mill will either accept the price or, depending on the market price, it may negotiate. Once the price for the cooperatives has been set, farmers can then sell their rice directly to the milling factory at that set price. For rice for household consumption, there is a scheme for farmers to send rice for milling at a cheaper price.

However, in reality many cooperative members keep a portion of their harvested rice and sell it secretly to middlemen. If members do cooperative rice sales to the mills, it takes time before they are finally paid for their rice. When rice farmers need cash more quickly, they will sell individually to agents. According to interviews with cooperatives, farmers are probably selling about 30% outside the cooperative system; according to farmers themselves, they sell more than half their harvest through informal channels.

For these reasons, it has become difficult for cooperatives to collect the money lent for the fertilizer they sold to farmers.

*Milling*

Rwanda’s 5 rice mills were formerly state-owned and were operated with the assistance of various donor partners. The rice mills located in Bugarama, Rwamagana, and Kabuye were supported by China; Canada provided assistance to the mill in Nyagatare; and the mill in Gikonko was supported by France.

The government’s privatization policy took effect between 2005-2007. All 5 rice mills were privatized, 4 of which were acquired by ICM, a multinational Australian company. In the ICM case the mill ownership is 60% ICM and 40% farmers. The other mill was bought by a cooperative.

The capacity of the 5 rice mill is shown in Table 12. Given that capacity is still at the low end, there are

<table>
<thead>
<tr>
<th>Table 17 Rice mill capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice mill</td>
</tr>
<tr>
<td>----------------------------</td>
</tr>
<tr>
<td>ICM Rwamagana</td>
</tr>
<tr>
<td>ICM Kabuye</td>
</tr>
<tr>
<td>ICM Gikonko</td>
</tr>
<tr>
<td>ICM Bugarama</td>
</tr>
<tr>
<td>Codervam – Nyagatare</td>
</tr>
</tbody>
</table>

Source: USAID
projects aiming to increase capacity of rice millers in areas such as Bugarama and Nyagatara. In Bugarama, during the second half of 2010, facilities have been installed that increase capacity to 2 tons/hour. Refined rice yield is only 68% at rice millers in Bugarama due to out-of-date milling facilities. In other areas, yield is 75%\textsuperscript{46}.

**Grading**

The Rwanda Bureau of Standards (RBS) classifies milled rice into 3 grades: Grade 1 contains less than 10% broken grains, Grade 2 rice is less than 25%, and Grade 3 is up to 50% broken grains. \textsuperscript{47}

\textsuperscript{46} (USAID PHHS 2010)
\textsuperscript{47} (Kathiresan 2010)
3.2.2 Producer Price and Consumer Price

**Producer price and production cost**

A meeting is held every harvest season for the rice unions and the rice mills of each region to determine the millers buying price for rice. This process is easily carried out in areas where the unions have established a collaborative and transparent relationship with the milling factory. Unfortunately this is not the case for every region.

In 2010, the price of paddy sold to millers was 240 RWF/kg for short grain rice, and 260 RWF/kg for long grain rice. The average cost of transportation is 20 RWF/kg, which decreases the price producers receive to 220 RWF/kg and 240 RWF/kg for short and long grain rice, respectively. If the millers are located at greater distances, transportation costs can be even higher. 48

In the South Zone RAB, price producers receive ranges from 220-250 RWF/kg.

According to the regional union UCORIBU, returns on rice are not particularly high. The cost of production for 2011 was 129 RWF/kg (Season B harvest), and 151 RWF/kg (Season A harvest); whereas the price producers received in the same year was 240 RWF/kg for long grain, and 220 RWF/kg for short grain for Season B harvest; 180 RWF/kg for long grain, and 160 RWF/kg for short grain.

However, according to a JICA survey conducted in the province, prices are determined through bidding by the union contractors. 49

The cost of labor is relatively high in Rwanda, 700 RWF/day which brings difficulties due to the fact that the current rice farming system requires intensive labor. 50

According to an 30th April 2011 news article, rice farmers in Rwamagana, Kayonza, and Ngoma expressed their dissatisfaction to the Governor of Eastern Province with regard to the low prices of rice. Currently, producers receive 160-200 RWF for 1 kg of rice. Rice farmers receive much less profit than sorghum and millet producers. The main issues with the rice industry is that firstly, it is a labor intensive; and secondly, due to insufficient water supply in certain areas of arable land, there can only be one cropping season. Unless farmers can make higher profits, rice production cannot be sustained. 51

48 (USAID PHHS 2010)
49 (JICA 2010)
50 (USAID PHHS 2010)
51 (Rwembeho 2011)
Trends in market prices

The consumer market price for rice had been increasing till 2008, but stagnated in 2009 and 2010. It began to increase again in 2011.

Figure 66  Rwanda rice market price (RWF/kg)

Source: MINAGRI. Note: graph on the left represents monthly data released between 2006 and 2010, data after 2010 were unpublished. The graph on the right represents weekly data of 2010 and 2011.

Imported rice vs. domestic rice

Imported rice is often more expensive than domestic rice. Almost all imported rice is long-grain rice. A major factor that determines the price difference between imported and domestic rice is how fragrant the rice is. The most expensive rice sold is the Basmati rice variety.

Table 18  Local Market Prices of Rice (November 2011)

<table>
<thead>
<tr>
<th>Kigali Market</th>
<th>Hue Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pakistan Basmati</td>
<td>Seller 1</td>
</tr>
<tr>
<td>Pakistan Grade 2</td>
<td>Tanzania Long grain Grade 1</td>
</tr>
<tr>
<td>Tanzania Grade 2</td>
<td>Tanzania Long grain Grade 2</td>
</tr>
<tr>
<td>Tanzania Grade 2 fragrant</td>
<td>Rwanda Long grain</td>
</tr>
<tr>
<td>Tanzania Grade 2 very fragrant</td>
<td>Rwanda Short grain</td>
</tr>
<tr>
<td>Rwanda Long grain</td>
<td>Pakistan Long grain</td>
</tr>
<tr>
<td>Rwanda Short grain</td>
<td>Seller 2</td>
</tr>
</tbody>
</table>

Source: Promar Consulting
3.2.3 Import and Export

Trade statistics show that 10,000-20,000 MT of rice is imported. Rice is imported from Tanzania, Kenya, Uganda and other neighboring countries as well as from Pakistan and Vietnam. Informal rice importing also takes place, especially from Tanzania. Export level was at a negligible level of 233 MT as of 2010.

Considering the consumer demand, Rwanda wishes to increase domestic production of the preferred varieties of rice. Nevertheless, it is likely that imports of rice from Tanzania and Pakistan will continue to rise in the future.

![Figure 67: Rwanda's Rice Imports](source: ITC)

**Table 19: Rwanda's Rice Imports by Country**

<table>
<thead>
<tr>
<th>Unit: mt</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>26,474</td>
<td>13,360</td>
<td>12,133</td>
<td>1,512</td>
<td>11,694</td>
<td>15,764</td>
<td>22,887</td>
<td>11,803</td>
<td>31,921</td>
<td>44,645</td>
</tr>
<tr>
<td><strong>Tanzania</strong></td>
<td>232</td>
<td>2,542</td>
<td>3,834</td>
<td>176</td>
<td>4,479</td>
<td>299</td>
<td>5,054</td>
<td>884</td>
<td>7,336</td>
<td>25,977</td>
</tr>
<tr>
<td><strong>Pakistan</strong></td>
<td>3,825</td>
<td>5,731</td>
<td>6,716</td>
<td>546</td>
<td>3,069</td>
<td>6,411</td>
<td>11,669</td>
<td>988</td>
<td>11,736</td>
<td>10,080</td>
</tr>
<tr>
<td><strong>Kenya</strong></td>
<td>0</td>
<td>69</td>
<td>8</td>
<td>0</td>
<td>40</td>
<td>75</td>
<td>114</td>
<td>22</td>
<td>1,388</td>
<td>4,230</td>
</tr>
<tr>
<td><strong>UAE</strong></td>
<td>399</td>
<td>12</td>
<td>28</td>
<td>56</td>
<td>510</td>
<td>569</td>
<td>1,408</td>
<td>52</td>
<td>466</td>
<td>1,659</td>
</tr>
<tr>
<td><strong>Japan</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>996</td>
</tr>
<tr>
<td><strong>Uganda</strong></td>
<td>11</td>
<td>25</td>
<td>47</td>
<td>551</td>
<td>975</td>
<td>1,999</td>
<td>1,641</td>
<td>9,489</td>
<td>4,794</td>
<td>702</td>
</tr>
<tr>
<td><strong>US</strong></td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>127</td>
<td>29</td>
<td>0</td>
<td>0</td>
<td>365</td>
</tr>
<tr>
<td><strong>India</strong></td>
<td>1</td>
<td>127</td>
<td>149</td>
<td>15</td>
<td>56</td>
<td>144</td>
<td>540</td>
<td>185</td>
<td>250</td>
<td>327</td>
</tr>
<tr>
<td><strong>Vietnam</strong></td>
<td>20,475</td>
<td>4,851</td>
<td>982</td>
<td>164</td>
<td>2,261</td>
<td>5,549</td>
<td>1,913</td>
<td>0</td>
<td>5,262</td>
<td>21</td>
</tr>
<tr>
<td><strong>Italy</strong></td>
<td>1,196</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>334</td>
<td>3</td>
<td>369</td>
<td>4</td>
<td>302</td>
<td>591</td>
<td>519</td>
<td>183</td>
<td>689</td>
<td>286</td>
</tr>
</tbody>
</table>

Source: ITC
3.3 Rice policy and support

The following summarize Rwanda’s rice policy and support programs, except for the irrigation projects which were discussed in section 2.2.5.

*National Rice Production Program*

National Rice Production Program (2006-2016) was established in 2005 and aims to increase rice production to 170,000 MT by 2016 and make Rwanda self-sufficient in rice production.

*Rwanda Rice Development Strategy and CARD*

Rwanda Rice Development Strategy – RDS (2011~2018) was established in 2011 with support from the Coalition for African Rice Development (CARD). Rwanda belongs to the second group of countries under CARD, a group which is managed by JICA. CARD aims to double the rice production of African countries.

*Africa Rice Center*

Since 2002, the African Rice Center (formerly WARDA) has been helping Rwanda introduce long-grain rice to its rice production and has tried more than 900 varieties. They are also providing technical services including disease prevention, production control, irrigation and master plan development.

*Chinese Agricultural Technical Support Center*

In 2011, a Chinese agricultural technical support center was started which had been agreed on at the Beijing Summit of the Forum on China-Africa Cooperation. Since November 2011, 4 rounds of assistance have been provided to 168 Rwandans. Mushroom planting, rice cultivation, water management, and soil retention are among the many practical training programs offered by the center. The Fujian Agricultural and Forestry University is the Chinese partner. There are 4 staff members from China residing in Rwanda.

*Agro-action allemande*

Agro-action allemande is a German NGO that has provided US$ 950,000 to Rwanda. This supports the installation of marshland irrigation systems in Mwogo, in the Southern Province, as well as technical extension, the use of better quality seeds, and many other projects.
4 BANANAS FOR COOKING AND BREWING

Rwanda is a country with numerous lakes, and is the leading banana producer in Africa. The government puts significant emphasis on banana production when it comes to agriculture policymaking. Advanced banana producers plant high yield hybrid FHIA series cultivars and with simple ponds for irrigation and compost from livestock such as pigs and cattle, farmers are able to build productive banana farms. However, the spread of outbreaks of BXW and the destructive Panama Wilt disease, as well as the constant soil degradation which lowers productivity are the main challenges Rwanda’s banana sector faces today.

4.1 Production of cooking and brewing bananas

4.1.1 Development of banana production in Rwanda

Bananas came to Africa from the Malay Peninsula. In Africa, banana cultivation methods, the varieties planted, and people’s dietary habits are largely grouped into 3 regions: East Coast, West Africa-Central Africa, and the Great Lakes region. Rwanda’s banana cultivation, alongside Uganda, Burundi, and the Northern part of Tanzania all belong to the latter group: the Great Lakes region. This region’s banana cultivation is generally referred to as ‘East African highland banana system’ where banana varieties unique to this region, such as AAA-EA variety, are cultivated. Compared to other regions in East Africa, in the Great Lakes region bananas are indispensable to people’s diet; bananas are used for cooking and for brewing beer. It is believed that bananas varieties cultivated in the Great Lakes region have been handed down from generation to generation dating back to the 10th century.
**Production development**

FAO and NISR statistics show that in 2009 Rwanda produced approximately 3 million tons of bananas. During the 1990s, many farmers shifted their cash crop production to bananas when the price for coffee dipped. 2 years later, banana production reached 3.55 million tons. Nevertheless, around 1994, genocide destabilized the country and banana production dropped dramatically. Since then, banana production has recovered gradually. Although productivity fell during the beginning of the 2000s, from 2002 onwards production has been stable at 2.5-3 million tons per year. Bananas are harvested throughout the year; and as most production is for household consumption, the total production statistics are merely a rough estimate.

**Figure 68  Banana Production Trends**

![Banana Production Trends Chart]

Source: FAO
Uses: Cooking, Brewery, Desserts

Bananas are classified into categories: cooking bananas, beer bananas, and dessert bananas (apple banana). Over half of banana production becomes the main ingredient for banana beer (urwagwa in the local language), the most popular alcoholic beverage in Rwanda.

The next common use of bananas is for cooking. Bananas are a staple food, cooked mainly with tomatoes, onions, and mixed spices in a stew; some are steamed, boiled, grilled, and even fried.

Rwanda also produces dessert bananas. Production of these varieties has been on the rise, but production level is insignificant compared to cooking and beer banana production.

With the exception of the Eastern Province, in most regions cooking bananas are for household consumption, and since beer bananas are a cash crop beer banana production is greater. Although cooking bananas bring a slightly higher price, growing beer bananas has numerous advantages over growing cooking bananas: 1) relaxed standards for size and quality of bananas; 2) less need for crop management; 3) can be harvested throughout the year (little seasonal variation); 4) is value-added when made into beer or juice; 5) once processed into beer/juice, it is much easier to transport than raw bananas.

Moreover, compared to the volatile coffee market, the demand for banana beer is currently very stable. This is why many farmers prefer to plant beer bananas rather than coffee.

On the other hand, viewed from a food security perspective, the Rwandan government encourages the production of cooking bananas. One farmer, belonging to a cooperative in the Southern Province, reported in an interview that members of the cooperative are mainly producing cooking bananas, in accordance with the government policy, whereas the surrounding areas are cultivating beer bananas.
Varieties

As mentioned before, bananas in Rwanda are categorized into cooking, beer, and dessert bananas and the three are generally used for very different purposes. However, for brewing, bananas that contain a large volume of very sweet juice are preferred and therefore some dessert banana varieties can also be used for beer making. Moreover, some varieties of bananas can be both cooking and beer bananas.

East African highland banana (AAA-EA group)

For both cooking and brewing, 80% of bananas used are a AAA-EA variety, one of the East African highland banana varieties. Other cooking banana varieties include Inyamunyo, Injagi, Mujuba, Inkazikamwa and beer banana varieties such as Intuntu, Intokatoke are also East African highland banana varieties.

Gisubi (ABB group)

The ABB variety Gisubi (‘Kayinja’ in the local language), is a beer banana that was introduced from Congo to Rwanda during the colonial period. This variety grows well in poor quality soil, so as Rwanda suffered from oil erosion and soil degradation, Gisubi was widely cultivated across the country. However, Gisubi is susceptible to Fusarium wilt (Panama disease) and by mid 2000 virtually all Gisubi plants had disappeared.

FHIA series

Recent years saw the introduction of Fusarium wilt-resistant banana varieties such as the FHIA series, developed by the FHIA (Fundación Hondureña de Investigación Agrícola). Within the FHIA series, RAB promotes the use of FHIA17 (dessert and beer banana), and FHIA25 (beer banana).

Dessert Banana

As for dessert bananas, varieties that are common in other parts of the world, such as apple banana (‘Kamaramasenge’ in the local language) (AAB group), Cavendish (Poyo in the local language) (AAA group), and Gros Michel (AAA group) are being produced.
Plantain

Plantain (AAB group) is a cooking banana, but very few are grown in Rwanda. It has low yield but can be sold at a high price.

IITA survey results

According to a survey conducted in 2007 by the IITA, the banana varieties are listed on the table below are the most popular.

Table 20 List of the Main Banana Varieties Produced in Rwanda

<table>
<thead>
<tr>
<th>Cooking banana</th>
<th>Beer banana</th>
<th>Dessert banana</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inyamunyo</td>
<td>Intuntu</td>
<td>Kamaramasenge</td>
</tr>
<tr>
<td>Injagi</td>
<td>Inzizi</td>
<td>Gross Michel</td>
</tr>
<tr>
<td>Incakara</td>
<td>Ingame</td>
<td>Poyo (Cavendish)</td>
</tr>
<tr>
<td>Barabeshya</td>
<td>Kayinja/Gisubi</td>
<td>Sindika</td>
</tr>
<tr>
<td>Mbwazirume</td>
<td>Intokatoke</td>
<td>Ibinyangurube</td>
</tr>
<tr>
<td>Inkazikamwa</td>
<td>Amazizi</td>
<td>Imbaragara</td>
</tr>
<tr>
<td>Intokatoki</td>
<td>Imbire/Imbihire</td>
<td>Mbwazirume</td>
</tr>
<tr>
<td>Kiryumukunga</td>
<td>Imizibo</td>
<td>Inzirabahima</td>
</tr>
<tr>
<td>Banabazala</td>
<td>Indaya</td>
<td>Bogoya</td>
</tr>
<tr>
<td>Umushaba</td>
<td>Bakumba</td>
<td></td>
</tr>
</tbody>
</table>

Unit: Percentage of farmers engaged in its production (%)

Source: (IITA et al. 2007)
4.1.2 Banana Farmers and Banana Consumption in Farm Households

Banana Producers

A farmer survey carried out in 2006-2007 by CIALCA\(^{52}\) shows that in Rwanda, 92% of households consume cooking bananas, and 43.6% consume beer bananas. Of the cooking bananas consumed, above 70% of households said they grow cooking bananas themselves; 18% said they rely on purchased bananas; and the remaining 1% said the source of their cooking bananas comes from a mixture of self-produced and purchased bananas. Bananas are produced by small-scale farms, each having an average area of approximately 1.5 hectares.

The importance of bananas in food consumption

FAO statistics show that cooking bananas provide 17% of daily caloric intake. Thus bananas are as important in Rwandan diets as potatoes and grains. The pie chart also illustrates that alcoholic beverages provide 5% daily caloric intake. Banana beer likely accounts for most of the alcoholic beverage segment of the chart.

![Breakdown of caloric intake per capita in Rwanda (2007)](image)

Source: FAO

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\(^{52}\) Consortium for Improving Agriculture-based Livelihoods in Central Africa (Cialca)
4.1.3 Main Production Areas

In Rwanda, banana is grown throughout the country. Beer bananas in particular are widely grown; local banana beer processing sites are seen in the vicinity of beer banana farms.

Any surplus in cooking bananas is transported to markets, primarily in Kigali. Producers in the Eastern Province, in particular those located around Kirehe District in the southeast are the main producers of cooking bananas for Kigali, thanks to their relatively better access to Kigali's markets. In other regions, banana is produced either for household consumption, or for sale at the local markets.

Figure 75 Rwanda’s Banana Producing Areas
4.1.4 Intercropping and Monocropping

**Intercropping**

Banana cultivation often takes the form of intercropping, and this is especially true for farmlands with little space. The Northern Province, with its large amount of rainfall, intercrops banana with yam; whereas in the Southern Province, banana is intercropped with cassava due to the region’s poorer soil quality. In other areas, bananas are planted with maize and beans.

However, in the leading cooking banana producing areas in Eastern Province, banana farmers cultivate on relatively larger pieces of land. It is reported that in the areas around Kibungo, monocropping takes place on approximately 50% of farmland. In later sections, the report will explore the reasons why monocropping is recommended, from the standpoint of fertilization and water management.

Unlike in neighboring countries, in Rwanda the intercropping of bananas with coffee has not been promoted. There are farms where this kind of intercropping exists, but it is not common. Based on experiments conducted in Uganda, the International Institute of Tropical Agriculture (IITA) recommends the intercropping of bananas and coffee, as it would increase productivity by 50%. According to RAB, this may be a good intercropping combination to be encouraged in Rwanda, in order to prevent the coffee sector from shrinking further.

![Intercropping of banana with maize and beans (Southern Province)](image)

Source: Promar Consulting

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**Figure 77 Banana mono cropping & intercropping**

![Source: (Vanhoudt 2009, p.79)](image)
Monocropping of bananas

Hybrid varieties of bananas need more attentive fertilization and water management compared to the native varieties. With sufficient fertilizer and water, hybrid banana varieties produce high yields from the start. However, because the hybrid varieties need considerable fertilizer and water management, intercropping would get in the way of good banana management. For this reason, in the government programs to promote banana production, the Rwandan government is encouraging monocropping.

During field research, we visited 4 technologically advanced banana farms, all of which have moved to monocropping. Not only do these farmers have enough compost from their livestock to enrich their farmlands, they have also built terraces and grown elephant grass to prevent soil erosion. They have created small ponds and water paths to prepare for the rainy seasons. They have planted specific plants that help control diseases, prevented water evaporation through mulching with banana leaves and stalks, as well as taken many other measures to ensure that their banana trees have high yields. Technical training to learn these technologies can be obtained with the support of RAB.

Investments necessary to implement these protective measures can be borrowed from banks/funds, but only farmers who are already wealthy are able to fulfill the criteria to borrow. By implementing protective measures, in combination with having fertile farmland, hybrid bananas can be harvested twice per year. These bananas yield an average of 80kg per bunch (50kg for small bunches, and 100kg for larger bunches). Wealthy farmers consider this to be a relatively large return on their investment.

According to RAB, ‘The scale of farmland is the main obstacle to promoting monocropping, because if the farms are too small, then it is difficult to enforce monocropping. However, with the use of demonstration plots, we hope to educate farmers and help them accept monocropping’.

Source: Promar Consulting
4.1.5 Banana Cultivation Process, Yield, and Seasonal Variation

**Banana cultivation process**

**Figure 81 How bananas are grown**

1) Planting a banana sucker

2) Growth stage

3) Buds starting to appear

4) Controlling the number of buds – mother, daughter & granddaughter

5) The mother tree’s flower blooms, bearing fruit

6) Mother tree is cut down after harvest

It is a one-year cycle between stages 4)-6)

Source: Promar Consulting
Yield

Bananas are harvested throughout the year, which means yield is relatively high. FAO data shows that in recent years, Rwanda’s average banana production has been at 7.0-8.9 tons per hectare (2006-2008). However, due to deterioration of soil quality and pest damage, yield is lower compared to the 1980s.

At household production level, cultivation methods as well as the variety of banana cultivated results in very different yields. A banana yield survey (Vanhoudt 2009) revealed that the average yield of different production areas ranges between roughly 15-36 tons/ha; yield is as low as 1.9 tons/ha in some areas, and can be as high as 84 tons/ha. A survey conducted by CIALCA between 2006-2006 shows that average yield varies between 16-28 tons/ha; yield can be as little as 1.9 tons/ha and as high as 54 tons/ha. 53

Seasonal changes in yield

Although bananas are harvested throughout the year in Rwanda, during the period June-October, yield is at its highest. During the peak season, one household can harvest 110-125 kg per month. During off-peak seasons, monthly harvest is between 60-70 kg. 54

53 (Vanhoudt 2009)
54 (J. Jagwe et al 2008)
4.1.6 Diseases

Currently, the diseases that pose a major challenge to Rwanda’s banana sector are: Banana Xanthomonas Wilt (BXW) and Fusarium wilt. Rwanda produces bananas at an elevation higher than 1,500 m above sea level, which has shielded its banana crops from other pest infections (e.g. nematodes).

Given that pesticide has little effect on BBW and Fusarium wilt, it is hardly used.  

**Banana Xanthomonas Wilt (BXW)**

Cases of Banana Xanthomonas Wilt (BXW), also known as Banana Bacterial Wilt (BBW), were confirmed in Ethiopia during the 1970s. Since 2000, BXW has spread to the Great Lakes region. The first case of BXW infection in Rwanda was confirmed in 2001. In 2005, this disease was officially announced to be affecting crops in the northern region of Rwanda, although farmers point out that symptoms of BXW were around since 2003. BXW is a serious disease with devastating effects. Infected plants’ yield is reduced by 90-100%.  

Effective treatments for BXW have not been found and researchers continue to seek a solution to this disease. Moreover, BXW-resistant banana varieties have not been identified.

For the time being, several measures are being taken to mitigate BXW’s damaging effects: 1) uprooting infected banana trees and burying them to hasten decomposition; 2) avoiding using pieces from infected banana trees for propagation of new trees; 3) getting rid of male flowers on banana trees to prevent bees from transmitting pollen to other trees; 4) sterilizing tools that come into contact with infected banana trees; 5) avoiding transporting bananas from infected trees to areas where trees are not infected; and 6) carefully monitoring and promptly reporting disease symptoms. Additionally, research to develop BXW-resistant varieties is being sped up.

In 2005, ISAR and RADA established the National Task Force and radio, TV, meetings, and community work were called on to combat BXW. However, due to the lack of technical skills, BXW eradication at the community level failed. Then in 2006 a BXW eradication campaign led by CRS, RADA, WFP and BAIR began. At the time, approximately 330 hectares and 1,291 households were affected by BXW. The campaign hoped to eradicate the root of the BXW disease, and aimed to reduce infected area to 278 hectares by June, 2007.

Although the full extent of BXW’s damage is not fully understood, the situation in the Western Province is particularly bad. However, RAB has spent significant effort to spread information about anti-BXW measures, and while completely controlling BXW is still not possible, there has been progress. Compared to before, the situation has greatly improved.
Fusarium wilt

Fusarium wilt, more commonly known as the ‘Panama disease’ or Panama wilt, is a disease that kills the entire banana plant. Fusarium wilt was prevalent in Southeast Asia during the mid-20th century, bringing catastrophic damage to the Gros Michel variety. In 2001, a mutant of Fusarium wilt was found to have infected the Cavendish variety. It was also confirmed that this infection was spreading in Africa. The Gisubi variety, cultivated widely for its ability to produce high yield in soil with poor quality, is also prone to Fusarium wilt.

Plants are infected through the soil, where the fungus can survive for as long as 30 years. This makes the disease easily contagious. Measures taken to prevent the disease from spreading include: 1) removing infected plants; b) maintaining soil and planting material; 3) employing methods to improve soil quality. The most commonly cultivated variety, the East African highland bananas, are resistant to Fusarium wilt, thus replanting this variety is encouraged. Furthermore, RAB is running tests to find out which of the Cavendish varieties are resistant to Fusarium wilt.
4.1.7 Cooperatives

Cooperatives are very active in the banana production sector, mainly for the purposes of extension services and collective selling. There are even cooperatives that have established manufacturing facilities for banana beer production.

**Cooperative Kamara**

Cooperative Kamara is the largest banana producers’ cooperative in Rwanda. Currently, it has 1060 members. The total banana production area of the members adds up to 330 hectares.

The role of the cooperative is to provide technical training at the time of production, and to be the agent between banana producers and wholesalers. One has to make an application to become a member of the cooperative. The cooperative offers technical training to its new members to ensure that they can produce the same quality bananas as existing members.

Technical experts are hired by the cooperative to provide training. The technical expert will choose 30 cooperative members to receive the training. The allowances given to the technical expert are funded by donors, as it is difficult to raise money from cooperative members. The recent purchase of motorcycles is of great benefit to technical experts, who must travel around to visit farmer’s fields.

Organizations that are supporting the cooperative include: IPM, ISAR, RADA, Bureau of Quality Standard, RODA (Horticulture Authorization) and MINAGRI. Trainings offered by universities and producers from other areas and countries are also welcomed by the cooperative.

The 2 months between July and September are the best season for cooking banana production, and harvest reaches approximately 350 MT. During off-peak seasons, usually 3 MT are harvested each week. Bananas are often sold through collective price bargaining. Technical experts travel around to each banana farm and estimate roughly how many bunches of bananas have matured. They report the numbers back to the headquarters, where the number of mature banana bunches are recorded. Then price negotiation takes place between the cooperative and the traders from Kigali.

As for exports, Rwanda used to export apple bananas to Belgium. However, a new system of certification was introduced, and the situation is currently on hold while exporters wait to receive their certificates. Because there is demand from Saudi Arabia for apple bananas as well as cooking bananas, there are presently trucks with refrigeration systems transporting bananas to the airport.
4.2 Distribution of Cooking Bananas

4.2.1 Distribution channels

Fresh cooking bananas are heavy, and do not keep for long, which makes their transportation and storage extremely costly. Usually, either agents come to collect bananas from farmers, or bananas are sold at the local market. According to a survey\(^5^9\) conducted in 2006-2007, 41% of cooking bananas with commercial value are sold to agents, and 59% are sold at local markets.

In the Southern Province, through interviewing, we found out that there is a lack of agents who come to collect bananas from farmers. For this reason, many farmers prefer to grow beer bananas for making homemade banana beer. Some farmers sell banana beer while others specialize in selling quality banana suckers.

As it is an arduous task to transport bananas to distant destinations, bananas destined for Kigali Province are mostly produced in the areas nearby, and in the Eastern Province. Cooking bananas produced in areas around the Lake Kivu are rarely transported to Kigali. Reversely, bananas produced in the Lake Kivu region are sold in Cyangugu in the Western Province, whereas bananas produced in the Eastern Province are not.

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\(^{59}\) (J. Jagwe, et al 2008)
Figure 87  Cooking bananas sold at the market
Source: Promar Consulting

Figure 88  Dessert bananas sold at the market
Source: Promar Consulting

Figure 89  Stalks of bananas on a bicycle; an agent has come to Butare’s market to sell bananas
Source: Promar Consulting
4.2.2 Banana Prices

The transportation of bananas consumes time and effort and is carried out by agents, who come and purchase bananas directly from farmers. Thus, prices vary substantially according to the distance to and accessibility of the markets where bananas are sold.

In the case of Kamara Cooperative (Eastern Province), producer prices for bananas is approximately 50 RWF/kg, whereas the market price is around 150 RWF/kg. The cost of transportation is around 30 RWF/km. Furthermore, it can take up to 3 to 4 intermediate agents to transport bananas from the Eastern Province to markets in Kigali, which means transportation costs accumulate.

According to the survey we conducted in the Southern Province, the price of one bunch of beer bananas is around 80 RWF/kg; cooking bananas 3,000 RWF/kg, and fruit bananas 1,000 RWF/kg. Other surveys (Southern Province) revealed that the price of multipurpose bananas for both beer and cooking are sold for approximately 100-120 RWF/kg.

In Cyangugu (Western Province) market, the producer price was approximately 130 RWF/kg, and the retail price was around 150 RWF/kg.

**Other case studies**

According to a CIAALCA's survey⁶⁰, Rwanda's producer price of cooking bananas has been stable at the 2006 price level of $1.2 per bunch (a bunch of bananas in Rwanda weighs approximately 11.9 kg). Prices are lower when production is at its highest during August and September. In 2007, the producer price was at $1.6 per bunch, and market price was at $2.1 per bunch.

The retail price for cooking bananas is low in the Eastern Province, where large quantities of cooking bananas are produced. In other areas, away from the cooking banana farms, prices are somewhat higher due to transportation costs.

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⁶⁰ (J. Jagwe, et al 2008)
4.2.3 Banana Import and Export

**Import**

Rwandan governmental trade statistics show that every year 3000-6000 MT of banana imports have been recorded. Compared to the domestic production level, the quantity imported is tiny.

Nevertheless, according to a survey conducted in 2002, an estimate 19,000 MT of cooking bananas were imported from Uganda and Congo through informal trade routes. 80% of the imported bananas were consumed in Kigali, which is half of Kigali’s overall cooking banana consumption. Furthermore, it is estimated that 4,000 MT of beer bananas are imported from Congo. There is much informal trade in Rwanda, which means the actual import volumes are much higher than the recorded import statistics.

As reported in a 2007 survey, cooking and dessert bananas from Uganda are transported to Rwanda by trucks and bicycles. Beer bananas from Congo are transported to Rwanda by boat, trucks, bicycles, or simply by hand.

**Export**

Rwanda exports a negligible amount of bananas. Each year, 2-30 MT are exported. Most of them are organic dessert bananas which go to Belgium. In 2007, the Rwandan government set up refrigeration facilities at the Kanombe airport to support the exportation of fruit and vegetables.

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Table 21 Import and export of banana

<table>
<thead>
<tr>
<th>Year</th>
<th>Import</th>
<th>Export</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>2005</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>2006</td>
<td>526</td>
<td>22</td>
</tr>
<tr>
<td>2007</td>
<td>5,847</td>
<td>31</td>
</tr>
<tr>
<td>2008</td>
<td>2,586</td>
<td>15</td>
</tr>
<tr>
<td>2009</td>
<td>3,884</td>
<td>2</td>
</tr>
<tr>
<td>2010</td>
<td>3,244</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: ICT

Figure 90 Import share by country (2010)

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61 (Ferris, et al 2002)
62 (J. Jagwe, et al 2008)
63 (J. E. Austin Associates, Inc. 2009)
64 (J. Jagwe, et al 2008)
4.3 Processing and Distribution of Banana Beer

According to a 2002 survey, the average annual banana beer consumption per person is 800g in Kigali, and 3 kg in rural area. Banana beer is the most popular alcoholic drink in Rwanda.

**Banana beer processing and the prohibition of homemade beer**

Most banana beer used to be homemade. The ingredients for banana beer are: bananas, water, and sorghum. Different areas have different ways of producing banana beer. Moreover, with the diverse choice of raw materials, the degree of alcohol content, taste, color and expiry dates vary to a great extent.

To make banana beer, first, bananas are force-ripened. To do this the bananas are wrapped in banana leaves, then buried in the soil. They are smoked to raise the temperature and promote ripening. Once ripe, bananas are peeled, and their juice is extracted using grass, hands and feet. Then the juice is strained and poured into wooden barrels (umuvure), ceramic pots (ikibindi), or plastic tanks (ikidimoro); and an equivalent amount of water (or up to 3 times the quantity of banana juice) is added. (In some cases sterilization takes place at this stage). In order to speed up fermentation, fried (sometimes unfried) sorghum powder is added. The added sorghum powder is also used for flavoring purposes. The tanks need to be covered by grass or banana leaves for 1-4 days for the fermentation to be complete.

Homemade banana beer is sold in local banana beer bars (by farmers or in small huts, see photo above). This beverage is popular with both men and women. However, the RBS under the umbrella of MINICOM enacted a policy which prohibits all homemade banana beer. Without bottling facilities or a hygiene management certification, producing banana beer is forbidden. Presently, there is no strict ban on banana beer production, though there is already a growing number of small-scale producers obtaining production certificates. With the cooperatives offering bee-making facilities, the main producers of banana beer are likely to change in the coming few years.

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65 (Ferris, et al 2002)
66 (Christine, et al 2008)
**Banana brewery**

The largest commercial producer of banana beer used to be COVIBAR. They used Kamaramasenge bananas, principally a dessert banana, and expanded under the brand name ‘Tarama’. During 2002, they processed approximately 7,000 MT. COVIBAR was closed down in 2011, the reason being perhaps that they were not competitive in terms of prices compared to the small-scale banana beer producers.

According to the beverage company INOZAMISANGO who was interviewed during our field research, there are around 100 beverage businesses who are members of the Rwanda alcoholic drink and soft drink association, and many of them are banana beer producers. There are many competitors in this industry; it is estimated that there are in total of 150-200 businesses engaged in beverage production. With the ban on homemade banana beer production, it is likely that there will be more small-scale factories.

**Manufacturing process for banana beer in a factory**

Below is a flow chart showing the manufacturing process for banana beer produced in a factory.

![Manufacturing Process for Banana Beer](source: INOZAMISANGO)
**Distribution of banana beer**

Homemade banana beer is usually for home consumption. Sometimes, it is sold at the local market, or sold to an agent who will resell the beer. Banana beer that is produced in factories is either sold at the local market, or transported to other places, such as Kigali. It is reported that the products of beer factories located around Lake Kivu are sold in Kigali.  

**Price**

According to INOZAMISANGO, the cost of production is 150 RWF/bottle. Factories sell at 170 RWF/bottle. Each bottle is sold for 250-300 RWF in bars. (One bottle’s worth of Coca Cola costs 250 RWF).

**Distilled liquor**

Bananas can be used to make distilled liquor, though this is prohibited in Rwanda.

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67 (Gaidashova et al 2005)
4.4 Banana industry-related policies and support

Below is a brief summary of the main policies and support related to the banana industry.

*The national banana program promoting banana industry development*

The Rwandan government places significant emphasis on banana, and thus it has set up a banana program to support the development of the country’s banana industry. The program targets increasing cooking banana production by 60%, doubling the production of apple banana, and substituting imported bananas with domestic production. This program also promotes the use of FHIA hybrid varieties developed in Honduras, as well as monoculture production and soil quality improvements. Moreover, measures such as disseminating information about banana plant diseases are also being carried out.

*CIALCA Rwanda Musa Sub-Sector Strategic Plan*

CIALCA is a consortium sponsored by the Belgian government through the framework of DGDC, responsible for implementing the Musa Sub-Sector Strategic Plan for Rwanda. Specific responsibilities include bio-diversity promotion, overseeing Centro Internacional de Agricultura Tropical (CIAT), and leading the International Institute of Tropical Agriculture (IITA).

*BXW projects by Bioversity*

In 2006, International Plant Genetic Research Institute (IPGRI) and International Network for Improvement of Banana and Plantain (INIBAP) combined, forming Bioversity International. Bioversity International is an organization specializing in banana-related research. Starting in 2009, it has been working on projects that help to deal with BXW disease.
5 COFFEE PRODUCTION AND DISTRIBUTION

Coffee beans are produced in many tropical developing countries, as well as Rwanda. The coffee value chain spans a great distance, with the final product often reaching markets in developed countries. Moreover, with developments in the coffee market, in the future producer prices will not necessarily be determined by global supply and demand, nor by the labor costs of the producing country. Thus, this section first outlines the world’s coffee supply and demand and the international price before describing the coffee industry in Rwanda.

5.1 World Supply and Demand for Coffee and International Prices

5.1.1 Varieties of Coffee Beans and Processing Methods

There are two types of coffee produced in the world - Arabica and Robusta. Rwanda predominantly produces Arabica, and very little of Robusta. Arabica is prized for its complex aroma and flavors, and is processed into roasted beans for coffee. Because Robusta has a higher caffeine content and is considered more bitter, it is often used in coffee blends to accentuate the flavors, as well as for instant coffee, and other coffee beverages. The two types of coffee are cultivated in different environments, with Arabica found in highland areas and Robusta produced in lowlands. In general, Arabica is more expensive, as Robusta is a cheaper bean to produce.

Coffee beans are obtained by removing the pulp of the coffee cherry picked from coffee trees. There are two methods of processing the fresh Arabica bean: wet processing and dry processing. The former method is used in Rwanda. Wet processing is divided into two stages: initial processing on the farm and secondary processing at a factory or processing center. In the primary processing phase, on the farm, a pulping machine is used to remove the pulp from the cherry, leaving only the beans. There are two types of pulping machines – the hand-pulping machine and the Central Pulpery Unit (CPU). CPU produces high-quality coffee beans as it uniformly removes the pulp and does not damage the beans. After the pulp is removed, the beans are submerged in water where they are fermented. Coffee cherries’ mucilage is removed through fermentation, and finally the beans are rinsed and dried. The dried beans are referred to as “parchment”. At the processing factory, the parchment and the silver skin covering each bean is removed, producing green beans. In contrast, during dry processing, cherries are left in the sun to dry naturally, and then later a machine is used to remove the skin, pulp, and parchment. Robusta is generally produced using dry processing. Unless the beans are separated from the pulp straight after picking, the beans will absorb the odor of the pulp, damaging its final aroma. Therefore, wet-processed coffee beans are usually of better quality and higher price.

The majority of beans are exported as green coffee beans, roasted in the destination country, and then sold as roasted coffee or instant coffee. Once coffee beans are roasted, the flavor and quality of the beans begin to deteriorate. Therefore, exporting roasted coffee beans requires airtight packaging. However, developing countries lack the technology for airtight packaging, which in turn has led most of them to export green
beans. For this reason, many developing countries continue to export goods as raw materials rather than exporting high value-added (roasted bean) products, and because producing countries are not involved in sales or marketing, the share of the retail prices of coffee bean that producing countries get is limited.

5.1.2 Global Demand for Coffee and International Price

Coffee beans are produced in tropical countries located between the Tropics of Cancer and Capricorn, a region known as the Coffee Belt, and are consumed by developed countries in the North. While Brazil, the largest producer takes up one third of the world’s production and Vietnam takes up 15%, the two countries are producing half of world production of coffee beans. Africa makes up for no more than 10% of the world production, falling behind the coffee production expansion in Latin America and Asia. The key African producers include: Ethiopia, the biggest bean-producing country in Africa where Arabica coffee originates from; followed by Uganda and Côte d’Ivoire. Rwanda ranks the 9th in Africa. As for consumption, the United States continues to be the biggest consuming country, making up 20% of the world consumption, followed by Brazil (17%), Germany (8%), and Japan (6%).

Although global production and consumption have been rising for the past ten years, increases in production levels are not comparable to the increases in overall consumption. As the volume of coffee stocks decrease year by year, the pressure on global supply and demand is intense. Despite the fact that world production hit a ten-year low of 6.6 million tons in 2003/04, in 2010/11 it peaked at a record-high production level, reaching 8.2 million tons. The increased production levels were attributed to production increases in Brazil and Vietnam. At the same time, demand in producing countries such as Brazil and Vietnam expanded. As a result, world consumption levels reached a new peak of 8.1 million tons. While consumption has been increasing every year, coffee production naturally fluctuates on a biannual basis and therefore every second year production levels fall below demand. As a result, production shortages between 2003/04 and 2011/12 have accumulated to approximately 350,000 tons; the coffee stock at the end of the coffee season is half of what it was a decade ago.

Figure 95 Global Green Bean Production, Consumption, and Stocks

![Graph showing global green bean production, consumption, and stocks over the years](image-url)

Source: USDA “Coffee: World Markets and Trade”  Note: 2011/12 is an estimate
Tightening supply and growing demand are leading to an escalation of international coffee prices. As a major international commodity, Arabica futures and options are traded on the Intercontinental Exchange (ICE) in New York. Coffee futures are not only used as a way to hedge risk by importers, but are seen as an attractive target for speculators. Of the various external factors exerting influence on the futures price, the dominant factors are the forces of global supply and supply. Since a record low 57 cents/lb was reported in 2002, New York futures prices have continued to rise. A record high 256 cents was reached in 2011, a striking increase of nearly 100 cents compared to the previous year. However, while tight supply and demand is the fundamental cause of the price increase, price speculation is also a factor in the dramatic price increases.

Although Rwandan coffee is less than 1% of the world market and has no influence on futures prices, its producer price is linked to New York futures price. Although producer prices in Rwanda have not been recorded since 2006, neighboring Burundi, which also produces Arabica, has producer prices about the same as Rwanda’s. Since the New York futures price has been increasing since 2006, it is generally assumed that producer prices in Rwanda have also been rising over the same period, as Burundi’s have. In addition, it is anticipated that with the increase in producer prices in 2011, farmer income also increased. In this way, coffee has brought significant wealth to producing countries and to their coffee farmers over the past few years, reconfirming its role as an important cash crop. Nevertheless, as long as the supply and demand situation does not improve, the threat of a price plunge like the one the world experienced in 2002 still hangs over the industry and speculation continues, the livelihood of coffee farmers remains at risk.

Figure 96  New York Futures Price and Producer Price in Rwanda and Burundi

Source: ICO
5.2 Rwanda’s Coffee Industry

Coffee production in Rwanda does not take place on large-scale plantations like in some other producing countries. Rather, production is carried out by small-scale farmers. It is estimated that around 390,000 farmers earn their income from coffee production. In 2010, coffee was Rwanda’s biggest agricultural export, accounting for 24% of the country’s total exports, and valued at $57 million.

The Rwandan government considers coffee to be an important export industry and thus yearly export targets have been set up to 2015, based on actual export performance in 2009. In 2010, Rwanda’s total coffee exports reached the previously set target of $56 million. However, to meet the following years’ targets of roughly a $15 million increase per year, continuous increase in production volume and improvement in product quality are essential. As a result, the government is imposing a fine of 100 RWF per tree on any farmer who fails to use fertilizers or is failing to cultivate the trees properly. If coffee trees are removed in order to plant a staple food crop, a fine of 500 RWF is imposed on each uprooted coffee tree. According to discussions with local exporters, the government is moving towards getting rid of hand-pulping machines and is strongly pushing adoption of CPUs. During the first two months of the harvest season after a region has installed a CPU, agents are prohibited from purchasing parchment beans from farmers in the region who do not use the new CPU. This is one example of the tough measures taken by the Rwandan government to promote coffee production growth.

![Figure 97](image)

*Figure 97  Coffee's Share in Rwanda's Total Export in 2010*

Source: NATIONAL INSTITUTE OF STATISTICS OF RWANDA “RWANDA EXTERNAL TRADE STATISTICS: 2009-2011”

<table>
<thead>
<tr>
<th>Year (Base Year)</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export Value</td>
<td>37</td>
<td>56</td>
<td>75</td>
<td>89</td>
<td>105</td>
<td>117</td>
<td>130</td>
</tr>
</tbody>
</table>

Source: Government of Rwanda “Rwanda National Export Strategy”

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68 The Citizen 2011 news article “Rwanda coffee output to rise”
The Rwandan government, through Vision 2020, has set a target of a yearly average economic growth rate of 4.6%, and a target of increasing exports by 15%. The coffee industry is considered a priority industry because it brings in foreign currency income. In total six industries have been established as priority industries and the coffee industry is considered the third priority following the tourism and tea industries. Compared to other industries, the coffee industry has the technical capacity to compete and the potential for product differentiation. These strengths reflects the fact that the Rwandan government has used foreign aid to enhance local wet processing facilities, specialty coffee sales, and marketing initiatives. The intention is to use these strengths advance further downstream along the value chain to high-end markets abroad, capturing more of the profits along the chain. However there are still many production and institutional concerns that have not yet been addressed through aid.

<table>
<thead>
<tr>
<th>Table 23</th>
<th>Coffee Industry's Position among the Six Priority Export Sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Potential Export Contribution</td>
</tr>
<tr>
<td>Tourism</td>
<td>5</td>
</tr>
<tr>
<td>Tea</td>
<td>5</td>
</tr>
<tr>
<td>Coffee</td>
<td>5</td>
</tr>
<tr>
<td>Mining</td>
<td>5</td>
</tr>
<tr>
<td>Business Process Outsourcing (BPO)</td>
<td>5</td>
</tr>
<tr>
<td>Horticulture</td>
<td>3.5</td>
</tr>
<tr>
<td>Weighting Levels</td>
<td>x5</td>
</tr>
</tbody>
</table>

Scoring: 1=Very Challenging, 2=Challenging, 3=Neutral, 4=Attractive, 5=Very Attractive

Source: Government of Rwanda, “Rwanda National Export Strategy”
5.3 Coffee Production

5.3.1 Major Production Areas and Production Seasons

Coffee plantations in Rwanda were started in 1904, as a policy initiative to obtain foreign currency during the colonial period, under which every farmer was each responsible for cultivating 70 coffee trees. Even now large-scale plantations do not exist; Rwanda's coffee production is carried out by small-scale farmers. 97% of Rwanda's coffee cultivation is Arabica. The Bourbon variety is cultivated instead of Caturra and Catuai, high-yield, pest-resistant varieties of Arabica coffee, because Caturra and Catuai are too difficult to cultivate in Rwanda. The Bourbon coffee has an excellent aroma and flavor, but every other year it becomes susceptible to pest infections. It is a variety that is rarely cultivated in other parts of the world, and Rwanda is one of the few countries still cultivating the Bourbon variety.

The main cultivation regions in Rwanda are located at 1,500-2,000 meters above sea level in the country’s Western and Southern provinces. These regions are suitable for the cultivation of coffee, because of the rich soil with high volcanic ash content, ample annual rainfall of 2,000 mm, and abundant sunshine. In the Western province, the optimal Arabica cultivation areas stretch in a narrow band from north to south along Lake Kivu, particularly in Nyamasheke and Rusizi districts located at the southernmost part of Lake Kivu. In the Southern province, coffee cultivation is concentrated in Hue district. In addition, large amounts of Arabica is also grown across areas stretching from Muhanga District in Southern Province to Gakenke in Northern Province. Land which cannot be cultivated includes large national parks, such as areas extending from Hue district to Rusizi and Nyamasheke districts where the Nyungwe National Park is located. In these areas, agricultural development is prohibited.

Figure 98  Land Suitable for Arabica in Rwanda

Source: AMIS Rwanda
As described previously, Rwanda has a biannual rainy season. The long rain begins in March and ends in May while the short rainy season lasts from September to November. From September to October during the short rainy season, coffee trees bloom and pollinate. The cherries then grow into maturity during the dry season. Harvesting is carried out in mid-April to early July. After the harvest, pruning is carried out before the next blooming. Additionally, weeding is necessary in rainy season due to the rampant growth of weeds, and pest control is needed in dryer seasons to stop the spread of pests and disease.

### Table 24 Coffee Cultivation Schedule in Rwanda

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pruning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fertilizer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weeding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mulching</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pest Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harvesting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: National University of Rwanda “Planning and costing adaptation of perennial crop systems to climate change: Coffee and banana in Rwanda”

#### 5.3.2 Trend of production output, quality, and price

The volume of coffee production in Rwanda varies dramatically from year to year. While production naturally fluctuates every other year, the overall production trend is a down. In 2009, production stood at 14,000 MT, a drastic drop to half of the 2004 peak level of 28,000 MT. The largest producing areas are located in the Western Province, accounting for half of Rwanda’s total coffee output. The Southern Province produces 30% of the country’s overall coffee output. Together these provinces make up 80% of the total output. Fluctuation in production volume exists for every province but the overall production level is declining. This is a result of aging coffee trees, and the inappropriate use of fertilizers, as well as agrochemicals.

#### Figure 99 Green Coffee Bean Production by Province

![Green Coffee Bean Production by Province](source)

Source: National Agriculture Export Board
In 2008, the Rwandan government set a policy objective of increasing green bean production to 33,000 MT by 2012, including 19,000 MT of high-quality CPU processed coffee. As a result of this objective, the quality of green beans produced in Rwanda has improved since 2002, mainly due to quality enhancement and better handling during the processing stage. In 2002, Rwanda’s 2 CPUs produced 32 MT of high quality beans, which accounted for less than 1% of the total national production. However, by 2007, 120 CPUs had been installed in the major production regions; the proportion of high quality CPU-produced coffee beans had risen to 18% of total production. In 2010, there were 187 CPUs in Rwanda. These machines produced 5,800 MT (29%) of high quality beans. Yet, the majority of the Rwandan industry still relies on hand-pulping, resulting in large quantities of low-quality green coffee bean production. These low-quality beans comprised one third (approx. 10,000 MT) of the total produce in 2007.

With an increasing New York futures price and an overall improvement in green coffee bean quality, the difference in price of hand-pulped and CPU pulped coffee beans is becoming significant. In 2002, the price of high-quality green beans was about the same as the price of the New York futures price; by 2007 the price for green coffee beans was $3.6/kg and was about $1/kg more expensive than New York futures price. The price of low-quality coffee beans is considerably less than that of the New York futures price. In 2002, the price difference between low-quality and high-quality green beans was less than $0.5/kg; however, in 2007, the difference in price rose to approximately $1.5/kg. The main causes of this price fluctuation are the shrinking market for commodity coffee (Arabica) since 2000 and the expansion of the specialty coffee market. 69 This in turn has increased the overall global demand for high-quality beans. Nevertheless, CPU processing is more costly than hand-pulping in terms of electricity bills and labor costs. Unless the price difference of low and high quality coffee beans is significant, CPU is not necessarily more beneficial than hand-pulping.

Figure 101  Green Bean Price in Rwanda by Quality

Source: MINAGRI, Ministry of Trade & Industry
5.3.3 Coffee Production

According to the National Coffee Census, there are approximately 72 million coffee trees planted in Rwanda, on a total of approximately 2,900 hectares of cultivated land. There are roughly 390,000 coffee growers and each grows an average of 183 trees in an average cultivation area of 0.07 hectares. The average cultivation area per grower is less than one-tenth of its neighbor Tanzania. This illustrates once again how Rwanda’s coffee production is characterized by small-scale farming.

The major coffee-producing districts in the Western Province, Nyamasheke and Rusizi, cultivate 15 million trees, accounting for 12% and 9% of Rwanda’s total number of coffee trees, respectively. In the Southern province, the key coffee-producing Hue district cultivates 3.7 million trees, which is 5% of the total number of coffee trees. Furthermore, the combined number of coffee trees planted in Muhanga in the Southern province and Gakenke in the Northern province is 7 million (10% of the national total). These 3 regions together cultivate 25 million coffee trees, and continue to represent 35% of the national total. Small-scale coffee farmers are scattered all throughout the country, and some even resort to land which is marginal for coffee cultivation.

Aging Coffee Trees and Distribution of Seedlings

The peak productivity of coffee trees lasts for a period of 10-15 years, whereas its overall economic life is usually 20-30 years. A quarter of the coffee trees cultivated in Rwanda are over 30 years old, which is why their productivity and bean quality are declining. Especially in the Southern province, where programs for replacement of aging coffee trees do not exist, over 35% of coffee trees are over 30 years old; less than half are in their peak production years. In the Western province, over 16% of coffee trees are over 30 years old, but 65% of coffee trees are still in their peak production years, the highest in the country. The Western province is putting enormous effort into improving tree quality and increasing production level and due to this, 40% of trees are being pruned a result of this. Although the Western province has roughly an equal number of coffee trees as the Southern province, its productivity is 1.7 times the productivity of the Southern province. While the percentage of young coffee trees is increasing due to cultivation of new land in other provinces, the most suitable cultivation land is already under use by existing coffee farmers. Production is being constrained by this cultivation on marginal land and to what level production can expand is unclear.

The National Agriculture Export Development Board (NAEB) has coffee nurseries around the country but because they are small-scale and scattered, managing these coffee nurseries is difficult. Distribution of seedlings, as well as training on replanting coffee trees, are the responsibility of the District. NAEB employs extension workers in each District with duties ranging from distributing fertilizers and pesticides to offering training. However insufficient staff to assist with distribution of seedlings and replacement of old coffee trees is a major obstacle to progress in aging tree replanting.

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70 Hideyuki Tsujimura, 2004, Coffee and the North-South problem – food system of ‘Kilimanjaro’
Table 25  Coffee Trees in Each Province by Age (2009)

<table>
<thead>
<tr>
<th>Province</th>
<th>6 months to 3 years (%)</th>
<th>3 to 30 years (%)</th>
<th>Over 30 years (%)</th>
<th>Pruning for regeneration (%)</th>
<th>Total trees (000 trees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kigali Province</td>
<td>36</td>
<td>37</td>
<td>28</td>
<td>20</td>
<td>1,328</td>
</tr>
<tr>
<td>Eastern Province</td>
<td>36</td>
<td>46</td>
<td>18</td>
<td>18</td>
<td>16,390</td>
</tr>
<tr>
<td>Northern Province</td>
<td>33</td>
<td>40</td>
<td>27</td>
<td>13</td>
<td>8,846</td>
</tr>
<tr>
<td>Southern Province</td>
<td>17</td>
<td>48</td>
<td>35</td>
<td>39</td>
<td>22,425</td>
</tr>
<tr>
<td>Western Province</td>
<td>19</td>
<td>65</td>
<td>16</td>
<td>44</td>
<td>23,073</td>
</tr>
<tr>
<td>National</td>
<td>24</td>
<td>52</td>
<td>24</td>
<td>32</td>
<td>72,064</td>
</tr>
</tbody>
</table>

Note) Percent of pruning for regeneration in 2008
Source: Rwanda Coffee Development Authority

Fertilizer Use and Distribution System

MINAGRI sees the proper use of fertilizers as essential to the improvement in production quality and quantity of Rwandan coffee. It recommends a fertilizer mix of 200 g of nitrogen, 100 g of phosphorus, and 100 g of potassium fertilizers per tree each year. This is equivalent to at least one ton of chemical fertilizer per hectare. However, the average usage across Rwanda remains 200 kg/ha. Farmers in Rwanda tend to believe that coffee trees are strong, which in turn is hindering the effort to promote sufficient use of fertilizers.

In order to encourage farmers to use fertilizers more actively, various stakeholders have been responsible for distributing fertilizers. Between 1994 and 1998, the government conducted a fertilizer distribution program which was supported by European aid money; then from 1998 to 2005, fertilizer importation was conducted entirely through private sector, but fertilizer prices soared and farmers could no longer afford to use fertilizer. As a consequence of this, from 2006 the government has been importing fertilizer using tax money collected from exporters, and each district then distributed the fertilizers free of charge. However, the timing of fertilizer distribution was not usually ideal, resulting in farmers using fertilizers for coffee trees on other crops instead, and thus limiting the effectiveness of fertilizer distribution to increase coffee productivity. Furthermore, according to local exporters, it was impossible to distribute fertilizers to all farmers as their coffee cultivation areas were scattered and in fact fertilizer was only distributed to around half of the coffee farmers. In 2011, national fertilizer usage has increased, and a distribution system for fertilizer has again been fully privatized under the guidance of the United States Agency for International Development (USAID) and the International Fertilizer Development Center (IFDC).

Under the new distribution system, fertilizers are distributed to coffee farmers by exporters who import the fertilizer. After harvest, farmers pay back 50% of the fertilizer price, and the government subsidizes the other 50%. This new fertilizer distribution system has just begun and its effectiveness is not yet clear, though many stakeholders feel that because farmers are not fully aware of the importance of using fertilizers, the usage has decreased compared to when fertilizers were distributed free of charge. Moreover, to avoid situations where farmers refuse to pay for fertilizers after harvesting on the basis that they did not know that fertilizer is no longer free, some exporters have held meetings to explain the new distribution system. Some other exporters reported that farmers are using fertilizers more effectively now that they must pay for fertilizer.

Table 26  Mineral Fertilizer Application in Each Province (2008) (Unit: kg/ha)

<table>
<thead>
<tr>
<th>Province</th>
<th>Kigali</th>
<th>Eastern</th>
<th>Northern</th>
<th>Southern</th>
<th>Western</th>
<th>National</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>73</td>
<td>206</td>
<td>237</td>
<td>248</td>
<td>134</td>
<td>198</td>
</tr>
</tbody>
</table>

Source: Rwanda Coffee Development Authority
Pests and the use of agricultural chemicals

The three most serious pests and diseases in Rwanda are Antestia bugs, coffee berry borer, and Coffee Leaf Rust. Antestia bugs live only in the Great Lake Region of Africa and are responsible for causing the problematic ‘potato taste’ in coffee beans, which has become a huge issue for the industry. Mixing a small amount of the defective “potato taste” beans with an export lot will affect the aroma of the whole batch, making export to specialty coffee markets, such as Japan, impossible. Although the degree of damage to the industry by Antestia bugs is unknown, according to exporters, 10-20% of export beans are rejected due to the ‘potato taste’ problem. In addition, major factors in the outbreak of another major disease, coffee leaf rust, are tree weakness owing to malnourished soil and lack of fertilizer.

In order to prevent these pests and diseases, 52% of the coffee trees have been sprayed with pesticides. The government has reported that due to the three main pests and diseases, half of the original output could not be harvested. Currently pesticides are purchased with tax revenue from exporters, and are distributed for free to farmers, under the surveillance of agricultural extension workers. If privatization of fertilizer sales is successful, the same type of privatization model will be applied to pesticide distribution. Due to the fact that the standards for minimum agrochemical residue level is particularly strict in the specialty coffee market, the government intends to use organic pesticide or Integrated Pest Management (IPM) to deal with pests and diseases. For example, in preventing and exterminating Antestia bugs, development of pesticides containing local-grown raw materials, such as pyrethrum, has recently been tested. Also, campaigns for farmers for prevention of pests and diseases are held in May and October each year.

According to researchers at the RAB, although disease-resistant coffee varieties have been successfully developed, nationwide distribution is not planned for another three years, as flavour and aroma tests are still being conducted. However, some of the disease-resistant varieties are non-Bourbon varieties of coffee from India and when developing such disease-resistant varieties for commercial production, caution must be taken so that the unique Bourbon flavor of Rwandan coffee is not lost.

Table 27  Coffee Trees Sprayed with Pesticide in each Province (2008) (Unit: %)

<table>
<thead>
<tr>
<th>Province</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kigali City</td>
<td>59</td>
</tr>
<tr>
<td>North</td>
<td>58</td>
</tr>
<tr>
<td>West</td>
<td>55</td>
</tr>
<tr>
<td>East</td>
<td>52</td>
</tr>
<tr>
<td>South</td>
<td>47</td>
</tr>
<tr>
<td>National</td>
<td>52</td>
</tr>
</tbody>
</table>

Source: Rwanda Coffee Development Authority

5.4 Coffee Distribution and Processing

5.4.1 Coffee Distribution System

The distribution system of coffee in Rwanda was completely privatized in 1995. Cooperatives, private CPU facilities and exporters are currently responsible for processing and distribution. Before 1995, all processing facilities, as well as the majority of the capital of the two domestic exporters were owned by the government. Moreover, a price stabilization fund had been established, and prices such as the producer price and exporters profit margins were entirely determined by the government, regardless of the international price. While the system guaranteed farmers a certain level of profit despite fluctuations of international prices, no additional payments were made to farmers when international prices increased, nor was there a price difference according to quality differences. Additionally, because of the government’s inefficient administration of the system, tax increases were seen in some case. In 2005 the distribution system was liberalized and all state-owned processing facilities and export companies were sold to the private sector.

Through privatization, new stakeholders (private processors and exporters) found their way into the industry. Presently, there are more than 200 CPU facilities in Rwanda, of which 60% are owned by cooperatives and the remaining 40% are owned by private companies. The three major exporting companies, Coffee Business Center (CBC), RWACOF, and Rwanda Trading Company together take up 80% of the export market. Additionally, cooperatives such as COOPAC and RWASHOSCCO are exporting on their own. The government’s current direct role in coffee distribution is limited to quality inspections and issuance of export permits. The government also holds conferences with cooperatives and exporters in order to decide the minimum cost to pay farmers for their product (taking into account factors such as New York futures price and production cost). According to NAEB Secretary General Alex Kanyankole, the establishment of a Rwandan Commodity Exchange is scheduled for the next one to two years and research is currently being conducted on possible implementation models.

Distribution channels for coffee differ whether the beans have been processed through hand-pulping or CPU processing. Since 80% of the output in Rwanda is still processed through hand-pulping, the hand-pulping channel is the major distribution channel. In hand-pulping wet processing, each farmer picks the cherries, processes them into parchment beans, and then sells them to cooperatives and agents. Then, the beans are processed into green beans in secondary processing facilities owned by cooperatives and exporters. The end product is exported. For CPU processing, farmers sell cherries to CPU facilities owned by cooperatives and privates companies. The cherries are then transformed into parchment beans and green beans, and then exported.

Over the years, due to inefficient management of cooperatives, many farmers have withdrawn from them; private companies now have greater distribution power. According to the coffee census\footnote{72} of 2009, among coffee-producing farmers, no more than 20% of them are members of cooperative.

\footnote{72} Rwanda Coffee Development Authority 2009 “National Coffee Census”
**Figure 102** Distribution Routes for Coffee Beans Processed by Hand-pulping

Smallholders

- Parchment Bean

Cooperatives (Secondary Processing and Export)

- Parchment Bean
  - Collectors
    - Parchment Bean
    - Suppliers
      - Parchment Bean
      - Collectors
        - Parchment Bean
          - Collectors
            - Parchment Bean
              - Collectors
                - Parchment Bean
                  - Collectors
                    - Parchment Bean
                      - Collectors
                        - Parchment Bean
                          - Collectors
                            - Parchment Bean
                              - Collectors
                                - Parchment Bean
                                  - Collectors
                                    - Parchment Bean
                                      - Collectors
                                        - Parchment Bean
                                          - Collectors
                                            - Parchment Bean
                                              - Collectors
                                                - Parchment Bean
                                                  - Collectors
                                                    - Parchment Bean
                                                      - Collectors
                                                        - Parchment Bean
                                                          - Collectors
                                                            - Parchment Bean
                                                              - Collectors
                                                                - Parchment Bean
                                                                  - Collectors
                                                                    - Parchment Bean
                                                                      - Collectors
                                                                        - Parchment Bean

Green Bean

Secondary Processor and Exporter

- Green Bean
  - Overseas Importer

Source: Promar Consulting

**Figure 103** Distribution Routes for Coffee Beans Processed by CPU

Smallholder

- Cherry
  - Collectors
    - Cooper’s WS
      - (Secondary Processing and Export)
        - Green Bean
          - Secondary Processor and Exporter
            - Green Bean
              - Overseas Importer

Cooper’s WS

- Parchment Bean
  - Exporter’s WS
    - Other Private WS
      - Suppliers

Source: Promar Consulting

**Table 28** Percentage of coffee farmers who are cooperative members by province (2009) (Unit: %)

<table>
<thead>
<tr>
<th>Province</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kigali City</td>
<td>12</td>
</tr>
<tr>
<td>North</td>
<td>37</td>
</tr>
<tr>
<td>West</td>
<td>20</td>
</tr>
<tr>
<td>East</td>
<td>25</td>
</tr>
<tr>
<td>South</td>
<td>13</td>
</tr>
<tr>
<td>National</td>
<td>20</td>
</tr>
</tbody>
</table>

Source: Rwanda Coffee Development Authority
5.4.2 From Purchase in Rural Communities to Primary Processing

Methods of payment for purchasing coffee in rural areas differ by processing method and purchaser. According to interviews conducted in rural areas, few buyers and cooperatives would set price according to quality. Instead, coffee cherries and parchment beans are sold at separated fixed prices.

Generally, exporters and cooperatives measure the quality of the coffee cherries based on the following standards: 1) perfectly ripe red cherries (not under ripe and green or over ripe and black); 2) adequate weight and density (have they been soaked in water). Based on these two standards, cherries fulfilling the requirements are purchased at the uniform price. The rest are purchased at a discounted price or taken back home to be processed into parchment beans by the producers themselves. When cooperatives or exporters purchase parchment beans, quality is evaluated according to the following three standards: 1) that the beans been dried properly; 2) that the loss rate will not be high during processing into green beans; 3) that it passes a bean aroma test and a cupping test. Because exporters purchase parchment beans through multiple agents, even if the international prices increase afterwards, getting second payments back to individual farmers can be very difficult. On the other hand, cooperatives purchase beans directly from individual farmers and immediately record weight and quality. Therefore in cases where the export is handled by the cooperatives themselves, some cooperatives make secondary payments to farmers when the export price increases, according to quantity and quality.

At other cooperatives, if there are profits at the end of the season, it is invested in local initiatives such as school construction and road maintenance, or the construction of new premium CPU facilities approved as fair trade. Nevertheless, due to rising international prices in recent years and fierce competition between CPU facilities to buy beans, the purchase price to farmers is high even without a second payment. One cooperative reports that actual purchase prices have increased to a maximum of 350 RWF/kg, in comparison to the minimum purchase price of 150 RWF/kg set by the government in 2011.

*Increase in CPU processing facilities and inefficient operation*

The Rwandan government aims to increase specialty coffee production in order to reach export targets. To do this, it has been exceptionally proactive in setting up CPU facilities across country. During the past decade, the number of CPU processing facilities has increased from 2 in 2002 to over 200. While rapid increase in the number of CPUs does contribute to increases in the output of high-quality coffee, it has also stirred up competition between agents and CPU facilities regarding rural purchasing. This is causing a shortage of raw material supply at many processing facilities. By the end of 2007, although national CPU processing capacity stood at 60,000 MT, a mere 17,500 MT were processed by CPU facilities. The average operation rate of CPUs was less than 30%, and 70% of processing facilities were not profitable. Due to a lack of buying experience and funding, newly established processing facilities cannot afford to pay farmers the full price for their beans all at once, and it becomes difficult for them to purchase coffee cherries from far away areas when they are out of raw materials. Such purchaser competition is especially noticeable during the low harvest years in the coffee trees biennial cycle, making operation of processing facilities even more difficult. According to interviews, the operation rate of the CPU processing facilities at one cooperative was 19% in the abundant harvest year of 2011, and 6% in the low harvest year in 2010, which reflects the severe situation facing CPU operators.

In addition, many CPU-processing facilities have become unprofitable, as a result of inefficient operations due to a lack of appropriate management knowledge. Although the price of coffee cherries was $1.82/kg in
abundant harvest year of 2006, which is a relatively cheap price for raw material, inefficient CPU processing facilities still made a loss of $0.22/kg in green bean production. In 2007, which was a low harvest year, the price of coffee cherries climbed to $2.38/kg, leading to a loss of $1/kg. Labor cost in Rwanda is especially high due to long working hours under inefficient management. Consequently, processing coffee in Rwanda is 5 times more expensive than it is in Kenya. While 6 kg of coffee cherries are required to produce 1 kg or green beans in Kenya, 7.7 kg is needed in Rwanda. This shows that CPU facilities are still lacking adequate technical skills. On top of operational inefficiencies, corruption as well as dishonest practices such as bill-padding between farmers and cooperatives staff in transactions and operations are not uncommon.

**Figure 104  CPU Facilities’ Breakdown of the Costs of Processing Green Beans (2007)**

Although the government has increased processing facilities in order to achieve an increase in output of high-quality beans processed by CPU, under such inefficient operating conditions, ironically, the trade of manually-processed parchment beans has become more profitable in terms of domestic distribution. As a result, it has become increasingly difficult to increase production of high-quality beans. According to government estimations, the difference between the costs of CPU processing and hand-pulping is $0.75/kg. Therefore, if the price of CPU-processed, high-quality beans is $0.75 more than that of hand-pulped beans, output of CPU processors will increase. Nevertheless, when the price difference reached $1.5 in 2007, because the operational costs of CPU facilities were higher than expected, profits were still not made. It remains a challenge to shift processing away from hand-pulping processing to CPU facilities.

**Insufficient Infrastructure**

Coffee cherries must be processed into parchment beans within 12 hours after being picked, in order to prevent deterioration of the bean quality, as the odor of the pulp will affect the aroma of the beans. However, because coffee trees are cultivated in mountain ranges at high elevation, where road maintenance is not usually being carried out, small-scale farmers with no means of transportation cannot deliver their coffee cherries to CPU processing facilities soon after harvesting. According to the Rwandan government, for
small-scale businesses, transportation cost may takes up as much as 25% of the total cost.  

High transportation costs are another factor that continues to put pressure on increasing the number of CPU processing facilities. The World Bank estimates that a cut of 50% in rural transportation costs will increase producer price by 25%. Funded by USAID, the Rwandan government has distributed special bikes (known as coffee bikes) that can transport up to 300 pounds (approx. 136kg) of coffee. If transportation time to CPU processing facilities can be reduced to 2-4 hours, the price of green beans can be expected to increase by $0.15-$0.20/pound.

Moreover, some of the CPU facilities cannot ensure the quality and quantity of water necessary for processing, especially during the second half of the harvest season when the dry season begins, a period when securing water is essential. Furthermore, sewage systems have not been fully constructed to deal with the waste water of CPU processing. Taking into consideration both the domestic use of water by local residents, and the conditions of the local environment, development of sewage systems at the same time as CPU facility implementation is essential. In addition, because operating a CPU requires electricity, it is desirable to ensure a cheap and stable supply of electricity is available.

73 Government of Rwanda 2011 “Rwanda National Export Strategy”
75 MINIAGRI, MINICOM 2008 “Rwanda National Coffee Strategy 2009-2012”
Primary Processing by CPU

(L)Storage tank for water to be used in processing;

(R )Tanks for holding water and coffee cherries. The processor will not buy more coffee cherries than the capacity of these tanks

(L)Table for recording the weight and time of purchase

(R )Coffee cherries are placed into the chute of the CPU after being recorded

(L)CPU separates the beans (seeds) from the cherry

(R )The beans go through sieves and are separated according to their sizes
CPU discharges beans to three troughs, by size

Beans processed by CPU are left to ferment in these tanks, immersed in water

(L) Tanks for secondary fermentation
(C ) Parchment beans are forced down these lanes with water and washed after secondary fermentation
(R ) Racks for drying parchment beans

The discarded cherry pulp is mixed with lime and EM fungi to make organic fertilizer
5.4.3 From secondary processing to export

Secondary processing and grading

In secondary processing facilities, impurities such as pebbles and dust are removed by heavy machines before parchment processing begins. The beans are then graded according size and weight (density) using mesh screens with various sizes of holes, vibration and wind pressure. At this point, green beans are divided into the following grades: green beans of screen 18 (i.e., 7.14 mm diameter mesh holes) to screen 16 (6.35 mm diameter) are mainly Grade 1; green beans of screen 16-14 (5.56 mm diameter) are Grade 2; green beans below screen 14 are the Grade 3. Color selection is then performed by machine on Grade 1 beans. Grade 1 beans are mainly exported as specialty coffee or as raw materials for roasting beans. Second and third grade green beans are sent to the local market or exported to low-end markets such for instant coffee production.

Prior to export, a cupping test of each lot is carried out for exporters to judge the taste. Samples are also sent to NAEB for cupping. At this point, the quality of coffee is rated according to the standards of the Specialty Coffee Association of America. Criteria includes: aroma, aftertaste, sourness, body, balance, and sweetness. Green beans with 80 points or above, which are mainly CPU-processed beans, are exported as specialty coffee; beans with less than 80 points are exported, but are not considered specialty coffee.

Coffee Exports

Domestic consumption of coffee in Rwanda is less than 1% of its output. Almost all coffee is exported. The major export destinations are Switzerland and Belgium which together make up 70% of the country’s international export destinations. However, the majority of exports to the two countries goes through specialized coffee distributors. Since these distributors import green beans from all over the world and then supply made-to-order blends to roasters in Europe and North America, it is highly possible that the majority of Rwandan coffee beans exported to Switzerland and Belgium are re-exported to other countries in Europe and North America. Green beans that are re-exported and blended in a third country like this tend to be commodity coffee processed by hand pulpers.

Rwanda’s CPU-processed specialty coffee is exported through independent channels and has received increasing international praise and recognition as of late. USAID is actively supporting the coffee industry in Rwanda because the growth of the specialty coffee market is especially rapid in North America, and thus, American recognition of the quality of Rwandan coffee is quite high. Some specialized cooperatives that only handle specialty coffee have been established with USAID funding, and 90% of the exports from these specialty cooperatives is sold to the United States. Moreover, cooperatives certified for fair trade are exporting certified beans directly to companies handling fair trade products in Europe, North America and Japan. One of these cooperatives even owns a roasting machine and is trying to produce high-value added coffee, rather than just green beans. It imports special packaging and sells roasted beans to domestic hotels and cafes.

Poor contract compliance by Rwanda exporters is an issue troubling buyers in overseas markets. Purchasers in foreign markets are often unhappy with the inconsistency between sample products and the actual exported product. Other complaints from international buyers have been that Rwandan shipments are often late; some cases even cited delays of up to six months. These issues are not limited to contracts with foreign parties. An American export company felt that noncompliance with contracts within the domestic market is actually the biggest problem for the coffee industry in Rwanda.
Note) According to these statistics, the export to the neighboring countries of Kenya, Tanzania, and Congo-Kinshasa accounted for 80% in 2001 but the export share to those three countries declined to less than 1% by 2005. Because Rwanda exports green beans through the ports of neighboring countries and most of the beans are then re-exported to other countries, the rapid change in export destinations from 2001 to 2005 is probably due to a change in statistical methodology.

Source: National Agriculture Export Board
Secondary Processing by an Exporter

Large-scale secondary processing machine
After processing, green beans are graded by sifting through a vibrating screen (center, right)

Low-quality green beans mixed with defective beans
High-quality large-size green beans
Exporter’s cupping test

Roasting machine owned by the cooperative
Package of roasted beans ready for sale
### 5.5 Rwanda’s Coffee Policy

In order to increase production to 33,000 MT and CPU-processed green beans from 19,000 MT by 2012, the Government of Rwanda is implementing an action plan with a budget of $52 million, starting in 2009 and lasting for 4 years. Based on the current problems and obstacles in the market, the action plan has the following 5 priorities: 1) enhancement in coffee cherry production; 2) improvement of operation of CPU processing facilities; 3) strengthen abilities of exporters; 4) construction of local infrastructure, and 5) improvement of research and development in the coffee industry.

In addition to the five priorities, “cooperation for toll roasting and development of distribution channel” is also an objective. It has two unique aspects: creation of new value chains to replace current distribution channels, and development of new export destination countries. Up until now, distribution channels have been limited to one where the coffee-producing country exports green beans and these beans are then roasted in the importing country before the roasted beans are sold to consumers. If toll roasting (or contract roasting) takes place in the producing country, it will allow the producing country to be integrated into the value chain up until the sales stage and it could also have great benefit to the commodity coffee market. Moreover, having an alternative channel strengthens producers bargaining power over price. Moreover, if the producing country could manage all sales and promotion from their own country, selection and development of new markets would become much easier.

Nevertheless, although construction of new CPU facilities is not included in the 5 priority objectives, CPU construction has been assigned the largest portion of the budget. In order to achieve the goal of increasing production by 2012, over 300 CPU facilities must be constructed. Without successful strengthening of coffee cherry production and improvement in operation of CPU processing facilities, the fierce competition in cherry purchasing in rural areas may drive CPU-processing facilities into bankruptcy.

An overview of the five priority action plans are as follow

**Moving towards the realization of Integrated Pest Management (IPM) and emphasise development of agricultural programs.**

The biggest obstacles for expansion of high-quality bean exports are the shortage of coffee cherries and the delay in improving their quality. In order to reduce these problems, improvement in distribution and the usage of seedlings, fertilizers and pesticides is essential. In addition to instructing individual farmers, as well as districts, on the use and distribution of agricultural inputs, the introduction of Integrated Pest Management (IPM) is important as overseas buyers are demanding more organically grown coffee.

**Developing a program for CPU-processing facilities on becoming profitable.**

In order for CPU processing facilities to be profitable and efficient, it is necessary to reduce costs such as labor and transportation costs. Moreover, in order to realize high selling prices, secondary payments to farmers in response to high quality or international price adjustments are important. As for the processing facilities that are operating at a loss, they should be purchased by more efficient processing facilities or a new manager should be appointed and the government would provide management guidance and training.

**Providing capacity building to exporters.**

The leading donors supporting Rwanda’s overseas trade and marketing has been USAID and a few other organizations. Since 2006, their support has been decreasing, which is why the Rwandan government is
currently providing a significant amount of support. In the short term, training on quality control and contract compliance will be provided to exporters; in the long term, through launching marketing organizations formed by exporters and cooperatives, the government hopes that the industry will be capable to of solving export barriers by itself.

Development of sales channels for contract (toll) roasting of coffee beans

As a way to increase value-addition, Rwandan green beans are roasted on a commission basis by roasters in China and in the Middle East. The roasted beans are then sold in the roasting country. Due to the fact that coffee bean start to deteriorate after roasting, export of roasted beans to distant markets in a short period of time is difficult for developing countries, and exporting by air is exceedingly expensive. To achieve domestic production of roasted coffee for export, initial investments in roasting machines as well as packaging facilities are required. On the other hand, toll roasting of coffee beans does not require the initial investments, and it also keeps transportation costs low. Although the international price of green beans is highly volatile, the price of roasted beans is stable. If producing countries could manage sales in the consuming country, they are more likely to be sheltered from the negative effects of international price volatility. Moreover, by directly managing the consuming market, it will be much easier for production to respond in a timely way to the changes in the market. So far, in 2008 the UK’s leading retail chain Marks & Spencer visited Rwanda, and is exploring possibilities of a toll roasting partnership with the Rwandan exporters. According to the National Agriculture and Export Board Director General Mr. Kanyankole, pilot toll roasting is already being conducted in China, and the roasted beans are used in a promotion of Rwandan coffee.

![Cost Breakdown for Contract Roasting and Domestic Roasting for Export](source: MINAGRI, MINICOM)

Putting coffee production-related census and GIS study into practice

Given the insufficient up-to-date data on Rwanda’s coffee production and processing, to help formulate future policies, the current situation of the national value chain needs to be clarified.
### Government Action Plan and Budget for 2009–2012

<table>
<thead>
<tr>
<th>Action Plan</th>
<th>Budget ($1,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Invest in cherry production</strong></td>
<td>13,220</td>
</tr>
<tr>
<td>Encourage consolidation of coffee farms &amp; distribute seedlings with careful monitoring</td>
<td>3,660</td>
</tr>
<tr>
<td>Train OCIR-Café agronomists in integrated pest management</td>
<td>250</td>
</tr>
<tr>
<td><strong>Develop agronomy program with focal farmers to demonstrate Integrated Pest Management</strong></td>
<td>3,000</td>
</tr>
<tr>
<td>Develop soil testing capabilities and enable application of tailored fertilizer blends</td>
<td>550</td>
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<tr>
<td>Coffee washing stations should employ their own agronomists to spread best practices</td>
<td>5,760</td>
</tr>
<tr>
<td>Improve management of coffee washing stations</td>
<td>3,875</td>
</tr>
<tr>
<td><strong>Develop coffee washing station turnaround program</strong></td>
<td>3,800</td>
</tr>
<tr>
<td>Ensure sufficient funding by local banks to provide working capital for CWSs</td>
<td>-</td>
</tr>
<tr>
<td>Provide briefing to bank analysts on coffee washing station needs</td>
<td>50</td>
</tr>
<tr>
<td>Develop best practice guidelines for coffee washing stations</td>
<td>25</td>
</tr>
<tr>
<td>Remove decree and facilitate open competition to ensure farmers receive high prices</td>
<td>-</td>
</tr>
<tr>
<td><strong>Build the capacity of exporters</strong></td>
<td>3,140</td>
</tr>
<tr>
<td><strong>Provide capacity building support to existing private exporters</strong></td>
<td>825</td>
</tr>
<tr>
<td>Develop specific coffee export financing tools and facilitate arbitration for exporters</td>
<td>170</td>
</tr>
<tr>
<td>Develop Rwanda brand and promote Rwanda’s coffee internationally</td>
<td>865</td>
</tr>
<tr>
<td>Organize national coffee contests and coffee buyer visits</td>
<td>780</td>
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<tr>
<td>Provide quality control services and support certification for exporters</td>
<td>100</td>
</tr>
<tr>
<td><strong>Develop partnerships and sales channels for toll roasting Rwandan coffee</strong></td>
<td>400</td>
</tr>
<tr>
<td>Ensure necessary infrastructure is in place</td>
<td>28,705</td>
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<tr>
<td>Undertake outreach campaign to encourage districts to invest in relevant infrastructure</td>
<td>12,075</td>
</tr>
<tr>
<td>Invest in new washing stations</td>
<td>16,000</td>
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<tr>
<td>Facilitate private investments in local roasting by providing market info &amp; incentives</td>
<td>320</td>
</tr>
<tr>
<td>Encourage the use of coffee bikes to transport cherries to CWSs</td>
<td>160</td>
</tr>
<tr>
<td>Develop business plan and bring in investments in a coffee packaging plant</td>
<td>150</td>
</tr>
<tr>
<td>Improve research and development within the coffee sector</td>
<td>3,288</td>
</tr>
<tr>
<td><strong>Undertake census &amp; GIS study of coffee production</strong></td>
<td>1,113</td>
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<tr>
<td>Develop sensitization program to provide farmers with best practices in associations</td>
<td>75</td>
</tr>
<tr>
<td>Develop research program into pests and diseases</td>
<td>750</td>
</tr>
<tr>
<td>Develop research program into high performing and high quality clones</td>
<td>750</td>
</tr>
<tr>
<td>Build OCIR-Café’s capacity to regulate and coordinate the sector effectively</td>
<td>600</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>52,228</td>
</tr>
</tbody>
</table>

Note: Bold text represents priority action plan

Source: MINAGRI, Ministry of Trade & Industry
6 TEA PRODUCTION AND DISTRIBUTION

The teas we know come in different varieties: black tea, green tea, and others. In fact, all tea originates from the same raw material; it is the use of different processes that creates the range of tea varieties. Tea leaves produced in Rwanda are mostly processed into black tea; therefore the focus of this chapter will be on the production of black tea. Like coffee, tea is produced in many developing countries such as India and Sri Lanka and is consumed by developed countries in the Northern hemisphere; thus the value chain spans long distances. In the main production regions, prices set at the auction are reflective of producer price. This chapter outlines the international price of tea, after a discussion of world trends in demand and supply of tea, followed by detailed description of Rwanda’s tea industry.

6.1 World Tea Production and International Prices

6.1.1 Types of Tea and Different Processing Methods

*Camellia Sinensis* is the scientific name of an evergreen, belonging to the Theaceae specie. Teas currently grown in the world can be largely divided into 2 groups: the Chinese plant (*Camellia Sinensis Var Sinensis*), and the Assam plant (*Camellia Sinensis Var Assamica*). The Chinese variety is low in height, reaching 1-2 m in general, with small leaves. The Assam variety can reach 8-15 m in height, with large leaves. The Chinese variety is heavily cultivated in China and Japan; it is cold-resistant and contains low levels of tannin. The Chinese variety is generally used for green tea production. On the other hand, the Assam variety is primarily grown in India and Sri Lanka, and is not resistant to cold. The Assam variety contains high level of tannin, and thus is generally used for black tea production. Presently, crossbreeding of the above 2 varieties, as well as of other different varieties, is being conducted with the aim of improving the quality of the crop. Tea varieties appropriate for the climates of different regions, or for producing green tea, oolong tea and black tea are currently being cultivated around the world.

For both green tea and black tea, the raw tea leaves come from the same plant: *Camellia Sinensis*. Different ways of processing the green leaves allows the creation of the tea varieties that we know. The teas we know are largely divided into the following 3 categories: non-oxidized, semi-oxidized, and oxidized. Green tea is a non-oxidized tea; Oolong tea is semi-oxidized; and black tea is classified as oxidized tea. Green leaves contain oxidase and this enzyme starts the oxidization process as soon as the tea leaves are plucked. However, for green tea, the green leaves undergo steaming and some sort of drying, thereby preventing oxidization. The final stages are rolling and final drying before green tea is produced. As for black tea, the first stage of processing is withering to remove water content. Next, tea leaves are rolled, which breaks down their cell structure and releases the natural juices and enzymes. This starts the oxidizing process. Following rolling, shredded tea leaves are left to oxidize for 2-3 hours, in an environment with controlled temperature and humidity. The final stage known as firing dries the shredded tea leaves and this ends the black tea manufacturing process. For black tea processing, there are mainly 2 methods: orthodox and unorthodox. The former is time consuming, though the leaf shapes remain intact, which is why this method is employed for making leaf tea. Within unorthodox processing, the typical method used is called CTC. Tea leaves are shredded to speed up the oxidization process; shredded tea leaves usually end up in tea bags.
Currently, the CTC process is the mainstream method. While production through orthodox process was at 950 thousand tons in 2010, production through CTC process was at 1,560 thousand tons. The main orthodox process users are Sri Lanka and Turkey, while the main CTC users are India and Kenya.

6.1.2 World Tea Trade and International Tea Prices

Although world tea production has increased from 3.06 million tons in 2001 to 4.16 million tons in 2010, consumption has also increased, especially in large producing countries such as India, where consumption has been rising at 30-35 thousand tons per year. Due to this increase in domestic consumption, the percentage of production that is exported has been reduced to 40% during the 2000s. The world’s leading tea consuming country, Britain, has had a one third reduction in its stock level. In particular, during 2009, while world consumption remained steady, droughts in India, Sri Lanka, and Kenya significantly reduced supply, and the international price of tea soared.

According to projections of the Food and Agriculture Organization (FAO) of the United Nations, by 2017, world production of black tea will increase by 1.9% to reach 3.1 million tons. However, FAO also estimates that consumption will reach 2.8 million tons, indicating an oversupply of about 300,000 MT. Given this likelihood of an oversupply, the international price of tea is predicted to drop. Thus, FAO advises the promotion of black tea consumption in tea producing countries’ domestic markets, where the demand for black tea has the largest potential to grow. As for green tea, production is predicted to increase by 4.5%, reaching 1.57 million tons by 2017 and its export market is also expected to grow steadily.

Figure 107 World Production of Tea and the Export Percentage

Source: International Tea Committee

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76 International Trade 2010 news article “The Price of Tea: Crops at Record Levels but Prices are Steady”
77 FAO Newsroom 2008 “Tea prices to maintain upward trend in 2008”
78 FAO Media Centre 2010 “A cup of tea for food security”
The international price of black tea is determined at the major auctions, located in the main tea producing countries. The world’s largest tea auctions are located in: Mombasa in Kenya; Colombo in Sri Lanka; Kolkata and Guwahati in India. 70% of the total traded volume of tea is sold in these 4 cities.

Teas produced in Rwanda are traded in the auction in Mombasa, Kenya. The Mombasa tea auction handles transactions of tea produced in Uganda, South Africa, and Kenya. The average prices set at the Mombasa auction during the second half of 2000s have been on an upward trend, reflecting the tight international supply. Rwanda’s tea production prices rose accordingly. However, because 75% of tea transaction at the Mombasa auction is Kenyan tea, the production level of Kenyan tea exerts a large influence on the overall price level. Rwandan tea has limited influence on the price setting. When Kenya experiences a boost in its tea production, prices drop for Rwandan tea. Similarly, when Kenya’s tea production drops, the price of Rwandan tea also rises.

Rwandan tea is widely recognized in the world to be of good quality, trading at prices just below that of Kenyan tea. While tea is traded for 150-200 cents per kg for most of the teas produced in African countries, Rwandan tea is traded at 261 cents per kg. Rwanda is the only country besides Kenya to enjoy higher prices than the average.
Figure 109  Total Average Tea Price and the Average Price of Rwandan Tea at Mombasa Auction

Source: International Tea Committee, African Tea Brokers Ltd, FAO STAT
6.2 Rwanda’s Tea Industry

In Rwanda, tea is cultivated by cooperatives, or factory-owned tea plantations. Roughly 60,000 farmers are engaged in the tea industry. In 2010, the export value of tea was $34 million, the second largest agricultural product following coffee, and accounted for 14% of the national export. Like coffee, an export target by 2015 has also been set for tea. The target for 2010 was $56 million but the actual exports were far below the targeted level. The revised tea strategy released in 2008 set the export target at $80 million by 2012 and the national export strategy in 2011 raised the target to $150 million. The tea industry has been designated as the second priority industry as a foreign exchange earner and must reach an export value above that of the coffee industry. Thus, NAEB promotes quality and quantity improvement in tea.

<table>
<thead>
<tr>
<th>Year</th>
<th>2009 (base year)</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export value</td>
<td>52</td>
<td>56</td>
<td>91</td>
<td>105</td>
<td>120</td>
<td>138</td>
<td>159</td>
</tr>
</tbody>
</table>

Source: Government of Rwanda “Rwanda National Export Strategy”

There are 11 tea factories in Rwanda, and other than Sorwathe, which is jointly established by a US enterprise and the Rwandan government. 10 used to be state-owned factories. Privatization of the factories has been in progress since 2000 and only 3 factories remain state-owned as of 2010, and these plan to be privatized. When privatizing, it is required that there be an allocation of shares of the capital to smallholders and their cooperative which sells green leaves to the factory, such as 10% to the smallholders and 15~35% to the cooperative. According to Mr. Alex Kanyankole, director general of NAEB, 4 new factories are being constructed and the construction will begin on 2 other factories in 2011; the remaining 2 will be in operation within 2013 to 2014.

Along with privatization, NAEB’s role has shifted from production and export of tea to coordination and support of the tea industry. As research and development of tea is delayed because RAB does not have specimen varieties of tea to work with, the establishment of a research institute specializing in tea is under consideration.

<table>
<thead>
<tr>
<th>Factory</th>
<th>Year of privatization</th>
<th>Factory</th>
<th>Year of privatization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mulindi</td>
<td>State-owned</td>
<td>Rubaya</td>
<td>2006/07</td>
</tr>
<tr>
<td>Shagasha</td>
<td>State-owned</td>
<td>Nyabihu</td>
<td>2006/07</td>
</tr>
<tr>
<td>Gisovu</td>
<td>State-owned</td>
<td>Nshili-Kivu</td>
<td>2006/07</td>
</tr>
<tr>
<td>Mata</td>
<td>2010</td>
<td>Pfunda</td>
<td>2004/05</td>
</tr>
<tr>
<td>Gisakura</td>
<td>2010</td>
<td>Sorwathé</td>
<td>1975</td>
</tr>
<tr>
<td>Kitabi</td>
<td>2009/10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Promar Consulting
6.3 Tea Production

6.3.1 Summary of the Main Tea Production Areas

Tea cultivation began in the Changugu district during the 1950s, and soon afterward in the 1960s, under European development funding, tea plantations and factories were established in Mulindi and Shagasha, and eventually tea cultivation became nationwide.

The entire regions in the Western, Southern, Northern provinces are suitable for tea cultivation, where there is abundant rainfall, cool climate, and an average elevation of 1,800-2,000 m. However, tea farms are not scattered all over the region; rather, their locations are concentrated around the tea factories, since green leaves must be processed immediately after plucking. The tea factories of Mulindi and Sorwathe in the north produce tea on improved marshland which used to be unsuitable for tea cultivation. The two factories have an abundant water supply even in dry seasons. Although the yield is higher, the quality is lower than in other areas. On the other hand, tea factories in the Western and Southern provinces are located on hillsides, lands which are suitable for tea cultivation. Nevertheless, the irrigation systems are not yet developed and consequently the yield is lower, but the quality is better.

Tea leaves are plucked throughout the year in Rwanda and production is stable, although during the long dry season, from July to September, production declines by 30%. Tea plucking is a 10-day cycle: 10 days after plucking a tree, the same tree is ready to be plucked again.

Table 32  Overview of Individual Factories

<table>
<thead>
<tr>
<th>Factory</th>
<th>Location</th>
<th>Productivity (kg/ha)</th>
<th>Production area (ha)</th>
<th>Factory</th>
<th>Location</th>
<th>Productivity (kg/ha)</th>
<th>Production area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sorwathé</td>
<td>Improved marshland</td>
<td>14,060</td>
<td>1,159</td>
<td>Gisakura</td>
<td>Hillside</td>
<td>8,718</td>
<td>1,418</td>
</tr>
<tr>
<td>Pfunda</td>
<td>Hillside</td>
<td>12,782</td>
<td>884</td>
<td>Nyabihu</td>
<td>Hillside</td>
<td>7,978</td>
<td>659</td>
</tr>
<tr>
<td>Rubaya</td>
<td>Hillside</td>
<td>11,844</td>
<td>1,052</td>
<td>Shagasha</td>
<td>Hillside</td>
<td>7,933</td>
<td>1,509</td>
</tr>
<tr>
<td>Mulindi</td>
<td>Improved marshland</td>
<td>11,553</td>
<td>1,660</td>
<td>Gisovu</td>
<td>Hillside</td>
<td>5,754</td>
<td>1,186</td>
</tr>
<tr>
<td>Kitabi</td>
<td>Hillside</td>
<td>10,323</td>
<td>1,050</td>
<td>Nshili-Kivu</td>
<td>Hillside</td>
<td>4,489</td>
<td>1,178</td>
</tr>
<tr>
<td>Mata</td>
<td>Hillside</td>
<td>9,031</td>
<td>1,075</td>
<td>Whole country</td>
<td>-</td>
<td>9,497</td>
<td>12,829</td>
</tr>
</tbody>
</table>

Source: National Agriculture Export Board, International Development Center of Japan
Figure 110  Rwanda’s Tea Cultivation Areas

Source: AMIS Rwanda

Figure 111  Rwanda’s Tea Cultivation Areas and Factory Distribution

Source: Rwanda Tea Authority
6.3.2 Trends in production, quality, and price

Tea production has been increasing since 2003, especially in 2007 when it increased by more than 40% thanks to the government’s intensification of fertilizer distribution and application. The factories which produce the most tea are Mulindi and Sorwathe, with tea plantations located on improved marshland. Together they account for 30% of the national production.

![Figure 112: Rwanda's Tea Production of Different Manufacturing Plants](image)

When a factory buys green leaves from farmers, there are 8 categories, from P+1 to FCA. The categories P+1, P+2, P+3 Doux, and B+1 are regarded as good quality, and in general the requirement for purchasing is that green leaves with these quality categories must represent over 65% of the total green leaves plucked. If they represent over 70% of the total green leaves plucked, the tea farmer receives even more pay. The price paid to the farmer in 2011 was 100 RWF/kg for 65-69% and 105 RWF/kg for more than 70%. According to the interviews conducted, when there is less than 65% high-quality leaves, the factories can reject the whole lot. However, many of them instruct the farmers to remove low-quality leaves and the rest is bought. In 2003, the government set a target to raise the standard to 80% good quality content by 2010 in order to improve the quality. However, given that it is difficult for farmers to conduct time-consuming, careful plucking while they are at the same time required to increase harvest, the rate of good-quality leaves of the national production has remained around 66%.

<table>
<thead>
<tr>
<th>P+1</th>
<th>P+2</th>
<th>P+3 Doux</th>
<th>P+3 Dur</th>
<th>B+1</th>
<th>B+2</th>
<th>FCO</th>
<th>FCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminal</td>
<td>Terminal</td>
<td>Terminal</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Damaged</td>
<td></td>
</tr>
<tr>
<td>bud with</td>
<td>bud with</td>
<td>bud with</td>
<td>terminal</td>
<td>terminal</td>
<td>terminal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 leaf</td>
<td>2 leaves</td>
<td>3 tender</td>
<td>bud with</td>
<td>bud with</td>
<td>bud with</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>leaves</td>
<td>1 leaf</td>
<td>2 leaves</td>
<td>tough leaves</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Promar Consulting
Along with the rise in price of Rwandan tea at the Mombasa auction, the producer price went up from 8.4 cents/kg in 2001 to 15 cents/kg in 2009. However, the ratio of the producer price to the auction price was kept around 6%, which means tea factories obtain a larger margin when the auction price rises. The annual income of an average tea farmer was $220 in 2007.
6.3.3 Current State of Tea Production

Tea farmers cultivate on incredibly small areas of farmland, an average of 0.25 hectare per farmer. 1 hectare of tea plantation produces 1,800 kg of processed tea; which is 25% lower than the productivity of 1 hectare of tea plantation in Kenya, where yield is at 2,400 kg/ha. It is essential to improve both the productivity and the quality of tea in order to increase tea exports. Moreover, the Rwandan government must also encourage better uses of fertilizers, and expand the use of pruning.

Use of fertilizer

The MINAGRI recommends the use of 600 kg, at the ratio of 25:5:5 for nitrogen, phosphorus, and potassium in 1 hectare, each year. If this goal were to be met for every hectare of tea plantation in Rwanda, roughly 7,700 MT of fertilizer would be needed. In 2005, a total of 2,000 MT of fertilizer was used across the country. With an improved distribution of fertilizer by the government, in 2007 the total quantity used rose to 7,000 MT. Nevertheless, due to high transportation costs as a land-locked country, Rwanda’s fertilizer price is 60-80% higher than that of Kenya. In recent years, the soaring price of fertilizers became a major reason why many tea plantations could no longer afford to use enough fertilizer. In particular, smallholders lack access to funding, which in turn lowers their ability to purchase enough fertilizer. According to our field investigations, a tea plantation owned by one factory uses 600 kg/ha of fertilizer, whereas an individual farmer’s fertilizer usage remains at 500 kg/ha. The difference in the quantity of the fertilizer used many seem small, but the difference it makes to productivity is enormous. Tea plantations owned by factories produce 8,000-9,000 kg/ha, which is 1.3-1.5 times higher than an individual farmer who harvests 6,000 kg/ha.

As for the purchase of fertilizer, this is usually done through tea factories and tea cooperatives. The cost of fertilizer is deducted when green leaves are purchased from farmers. Moreover, as part of the government’s plan to thoroughly implement fertilizer use for all tea plantations in Rwanda, nationwide land registration is in progress. The government insists that nationwide land registration will allow tea farmers to secure loans, which would enable them to obtain enough fertilizer to increase their yield.

Improvement of plucking and pruning

The difference in yield between tea plantations owned by tea factories and plantations owned by farmers is not solely caused by the difference in the quantity of fertilizer used. Whether or not pruning and removing weeds are being carried out, and the difference in technical skills used in plucking all play an essential role in determining the final yield. One tea plantation owned by a factory increased its yield by 16% by simply switching to an improved technical skill in plucking. There is significant potential to increase yield by employing better plucking skills. However, if producer price of tea remains low, there is little incentive for farmers to switch to improved skills to pluck green leaves. In addition, many farmers are self-sufficient in some of their foods, which means they cultivate crops other than tea. These farmers have limited time to attend their tea crops. When they try to increase harvesting volume per unit time, more or less the quality must be sacrificed.

Plantations too large to pluck efficiently

A tea factory owns an average of 384 hectares for its tea plantation. To complete harvest in a 10 day cycle, 38 ha of land must be harvested per day. Given that this is an exceptionally labour intensive task, and because there is an insufficient supply of labor in the vicinity of these tea plantations, many green leaves are left to grow rather than being plucked.
6.4 Tea Distribution and Processing

6.4.1 Tea Distribution System

In Rwanda, 70% of green leaf harvest is coordinated by cooperatives, and the remaining 30% is done on tea plantations owned by factories. As for tea cultivated by cooperatives, there are two types of ownership: tea plantations owned by the cooperative itself, and plantations owned by individual farmers who collectively form the tea cooperative. The former used to employ workers from state-owned tea factories. In the 1970s, many workers were granted ownership of land by the tea factories, and while they currently manage and represent the cooperative, plucking and pruning is carried out by hired workers. Thus, the area of the tea plantation as well as the number of members in this type of cooperative are fixed. Every year, profit is shared between the members. As for the cooperatives that are formed by a collection of individual tea plantation owners, tea cultivation activities such as plucking and pruning are conducted by individual plantation owners themselves; it is only the selling of green leaves which they conduct as a group. Thus, for this type of cooperative, it is possible to have new members.

The quality of tea produced deteriorates significantly if green leaves are not processed immediately following harvest. Consequently, tea farmers have no choice but to sell their harvest to the nearest tea factory. Thus, the distribution of tea can be said to be rather inflexible and fixed. Additionally, because it is not possible for individual farmers to sell tiny amounts of green leaf harvest to factories, they must sell their harvest through a cooperative. As a result, smallholder farmers are limited to one distribution channel – selling through a cooperative. The purchase price of green leaves is set by the government. Although review is conducted on a 6-month basis, the price is usually fixed. When export prices rise and the factory makes a profit after buying green leaves from the farmers, the cooperative would pay them a dividend.

![Figure 115 Distribution Channels for Tea Leaves](source)
6.4.2 From Green Leaf Purchasing to Processing

*Lack of infrastructure*

Roads in hilly areas are mostly unpaved, which prolongs the time needed for the plucked green leaves to be transported to tea factories. Although cooperatives have set up a number of pickup points for the benefit of tea plantations that suffer from accessibility issues, driving trucks on unpaved roads is exceptionally time consuming. This becomes even more arduous and damaging for green leaves during dry seasons, when long transportation time increases heat exposure and thus reduces the quality of freshly plucked green leaves. On top of the problems brought about by unpaved roads, there is a significant lack of trucks. This is particularly problematic, as green leaves are damaged when trucks are overloaded.

*Aging of machinery and their high operating costs*

Many tea factories are still using out-of-date machinery, and their production continues to exceed capacity. This is the root of problems such as quantity of damaged tea leaves during processing, as well as reduced quality during the withering stage. In 2006, seven tea factories exceeded their production capacity; Rwanda’s tea industry as a whole is continuing to force tea factories to produce beyond their capacity. Thanks to privatization beginning in 2006, some factories now have new facilities which are increasing their production capacity.

Electricity is an indispensable element in tea processing. However, Rwandan tea factories spends twice as much on electricity than Kenya’s. Such a high running cost compresses profit margins. To improve the provision of electricity, the East African Tea Trade Association (EATTA) is working in collaboration with the United Nations Environment Programme (UNEP) and African Development Bank (AfDB) on projects building 6 small hydroelectric plants in 5 countries, including Rwanda.

Furthermore, given that black tea’s withering process requires a great deal of fuel, tea factories are obtaining firewood from forests, leading to deforestation. Afforestation to secure firewood further increases tea factories cost of production. For this reason, the government is ensuring that some budget is spent on tree planting, to provide fuel for new tea factories.

*Figure 116 Production Volume and the Installed Capacity of each Manufacturing Plants, as of 2006*

![Graph showing production volume and installed capacity of manufacturing plants](source: MINAGRI, Rwanda Tea Authority)
**Grading of black tea**

Of the CTC teas, the following grades are used, beginning with the largest shreds of leaves: Broken Pekoe (BP), Broken Pekoe 1 (BP1), Pekoe Fannings 1 (PF1), Pekoe Dust (PD), Dust 1 (D1), Dust (D), Fannings 1 (F1), Broken Mix Fannings (BMF), and Broken Mix Fannings Dust (BMFD). In addition, grades are divided into 2 groups: primary group, and secondary group. It should be noted that these grades do not reflect the quality of processed tea; they simply represent the difference between the shapes and sizes of shredded tea leaves produced in the CTC process. Moreover, there are no clear standards for how shredded tea leaves are graded; each factory will have their own classifications of grades as well as primary group and secondary group standards. Of Rwanda’s tea industry, 80% of processed tea belongs to the following three grades: BP1, PF1, and PD.

**Figure 117  Percentage of Tea at each Grade, as of January 2011**

Source: National Agriculture Export Board
**CTC Method of Black Tea Production**

Tea leaves are transported from the farm

Warm air from below dries tea leaves (withering)

CTC machinery shreds withered tea leaves

Tea leaves remain green at early stages of oxidation

During the final stages of oxidation, tea leaves darken in color
Large-scale dryer ends the oxidation process and dries the brown tea leaves.

Dried shredded tea leaves are of various sizes.

Sieve separates tea leaves into uniform sizes (grade).

Tea of different grades ranging from BP to D.

Tea cupping test at the manufacturing plant.

Samples to be sent to the auction.
6.4.3 Tea Export

Tea Export

Domestic consumption in Rwanda is less than 1% of the production and almost all tea is exported. The export value has been increasing since the mid-2000s owing to an increase in the auction price as well as in production volume. The major export destinations are UK, Pakistan, and Egypt. Together, these countries account for 77% of the total volume exported. The factories which are top at exporting are also the top producing factories, namely: Rubaya, Sorwathe, and Mulindi. They account for 37% of the national export value.

The highest priced tea for export is from Gisovu. Its export price has always been more than 20% higher than Rwanda’s average export price. Nyabihu and Kitabi follow, with their exported tea priced at 10~15% higher price than the national average. They are located on hillsides, and the high export price reflects the high quality of their tea. On the other hand, as the quality of Mulindi and Sorwathe produced on improved marshland is inferior, their export price is approximately 10% lower than the national average.

Just as for coffee export, overseas buyers consider poor contract compliance by the Rwandan tea exporters to be a major issue. Rwandan exporters’ reliability and their slow shipping schedule were particularly criticized. These remain the major challenges in export transactions.

**Figure 118  Export Level of Individual Tea Factories in Rwanda**

Source: National Agriculture Export Board
Value added and direct sale

70% of tea produced in Rwanda goes to the Mombasa auction, and the remaining 30% is directly exported to overseas importers. Because the auction price fluctuates in accordance to the international supply and demand, and since a global oversupply of black tea is expected, the Rwandan government hopes to learn from Sri Lanka's success and thus is aiming for domestically blended and packaged tea to reach 3% of total export volume by 2012. However, because it takes time to expand the production of blended tea, the government will first encourage production of value-added tea such as leaf tea and green tea manufactured by the orthodox process, aiming to increase value-added tea to 50%.

For instance, Sorwathe has already begun producing leaf tea, green tea, as well as white tea, and the production volumes for the year between July 2010 and June 2011 was 2 MT, 6 MT, and 0.3 MT, respectively. However the combination of low awareness of Rwanda as a tea production country, and overseas buyers’ low opinions of the Rwandan brand power, means that marketing and promotional support are necessary if Rwanda is to sell leaf tea abroad. Moreover, the government intends to expand the domestic consumption by increasing the production and sales of tea bags domestically. In fact, according to NAEB Secretary General Mr. Kanyankole, domestic manufacturing of tea bags has already begun.

6.5 Rwanda’s Tea Policy

To achieve its tea export targets, the Rwandan government is carrying out the tea action plan with a budget of $41 million over four years, beginning from 2009. Within the action plan, more than 60% of the budget is used for construction of infrastructure such as factory rehabilitation and road improvement. Other major activities include expansion of area planted with tea, seedling distribution, and extension training for tea quality and quantity improvement. In addition, environmental improvements, as well as marketing for domestic blends, are planned as an approach to increase value-added production. To implement the action plan, three working groups are set up for production/processing, marketing, and institution, consisting of government officials, factory directors, and representatives from donors.
### Table 3  Government’s Action Plan and Budget Concerning the Tea Industry for 2009–2012 (unit: $ thousand)

<table>
<thead>
<tr>
<th>Action plan</th>
<th>Budget ($1,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>6,210</td>
</tr>
<tr>
<td>Census and support to raise yields</td>
<td>680</td>
</tr>
<tr>
<td>Research and soil testing for the entire tea industry</td>
<td>300</td>
</tr>
<tr>
<td>Develop fertilizer bank and distribution channels</td>
<td>530</td>
</tr>
<tr>
<td>Agronomist support and training</td>
<td>1,000</td>
</tr>
<tr>
<td>Tea seedling distribution</td>
<td>1,000</td>
</tr>
<tr>
<td>Expansion of tea planted areas</td>
<td>1,500</td>
</tr>
<tr>
<td>Plant forest near factories</td>
<td>1,200</td>
</tr>
<tr>
<td>Institutional support</td>
<td>1,700</td>
</tr>
<tr>
<td>Reinforce cooperative management</td>
<td>360</td>
</tr>
<tr>
<td>Facilitate privatization of tea factories</td>
<td>100</td>
</tr>
<tr>
<td>Facilitate cooperatives’ access to finance</td>
<td>40</td>
</tr>
<tr>
<td>Enhance capacity of tea related institutions such as NAEB</td>
<td>1,200</td>
</tr>
<tr>
<td>Processing</td>
<td>31,730</td>
</tr>
<tr>
<td>Factory rehabilitation &amp; privatization</td>
<td>10,000</td>
</tr>
<tr>
<td>Improve quality of made tea</td>
<td>600</td>
</tr>
<tr>
<td>Improve field management</td>
<td>2,600</td>
</tr>
<tr>
<td>Value added: blending/packaging</td>
<td>600</td>
</tr>
<tr>
<td>Upgrade large-scale tea blending factories</td>
<td>1,500</td>
</tr>
<tr>
<td>Reduce energy costs of factories</td>
<td>500</td>
</tr>
<tr>
<td>Improve road infrastructure among tea plantations and between factories</td>
<td>3,930</td>
</tr>
<tr>
<td>Improve rural road infrastructure</td>
<td>12,000</td>
</tr>
<tr>
<td>Marketing</td>
<td>1,490</td>
</tr>
<tr>
<td>Develop Rwanda brand &amp; marketing campaign</td>
<td>250</td>
</tr>
<tr>
<td>Hold regular tea tasting for tea experts and buyers</td>
<td>340</td>
</tr>
<tr>
<td>Increase direct sales</td>
<td>150</td>
</tr>
<tr>
<td>Promotional activities to raise demand</td>
<td>750</td>
</tr>
<tr>
<td>Total</td>
<td>41,130</td>
</tr>
</tbody>
</table>

Source: MINAGRI, Rwanda Tea Authority
7 OVERVIEW OF FORESTRY SECTOR

7.1 Forestry and Forest Products

7.1.1 The State of Rwandan Forests

There are only a few forest areas located in the northwestern and southwestern high-altitude regions of Rwanda. As Rwanda is a densely populated country, most of the country’s land has already been developed for agricultural production. Moreover, the remaining forests were damaged both in civil conflicts, and in construction of refugee resettlements.

FAO estimates that Rwanda has a total of 440,000 hectares of forest, which is 28% of the total 2.47 million hectares of national land. Of this, 7,000 hectares are natural forest and the other 55,000 hectares are plantations.

According to estimates of the government, Rwanda had 80,000 hectares of natural rain forest in 2007, but 38,000 hectares of it is now degraded.

Eucalyptus, cypress and pines are the major species in forestation programs. The Rwandan government is promoting planting trees in order to prevent soil degradation and to provide firewood and charcoal. In 2007, there were 103,000 hectares for Eucalyptus plantations, 12,000 hectares for conifer plantations. The area planted with jatropha is also increasing as shown in section 2.1.7.

### Figure 120  Rwanda's Forest Cover

Source: FAO

<table>
<thead>
<tr>
<th>Area (ha)</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural rain forest</td>
<td>79,798</td>
</tr>
<tr>
<td>Degraded natural forest</td>
<td>38,004</td>
</tr>
<tr>
<td>Bamboo trees</td>
<td>4,381</td>
</tr>
<tr>
<td>Savannah</td>
<td>3,727</td>
</tr>
<tr>
<td>Eucalyptus plantation</td>
<td>63,561</td>
</tr>
<tr>
<td>Young eucalyptus plantation</td>
<td>39,205</td>
</tr>
<tr>
<td>Conifer plantation</td>
<td>12,071</td>
</tr>
<tr>
<td>TOTAL</td>
<td>240,747</td>
</tr>
</tbody>
</table>

Source: MINITERE
Figure 121  Rwanda's Forest Cover and National Parks

Source: Ministry of Forestry and Finance
7.1.2 Wood Production and Trade

**Wood and Charcoal Production**

Firewood and charcoal are the most important wood products for Rwanda. In farm households, 97% use firewood and charcoal for cooking. Vision 2020 aims to reduce charcoal and firewood usage from 94% in 2000 to 50% in 2010.

### Table 35 Wood and Charcoal Production in Rwanda

<table>
<thead>
<tr>
<th></th>
<th>Log</th>
<th>Charcoal</th>
<th>Lumber</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m³</td>
<td>m³</td>
<td>m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For Industrial use</td>
<td>Sawn wood &amp; Veneer</td>
<td>Other</td>
<td>For firewood</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>5,400</td>
<td>400</td>
<td>150</td>
</tr>
<tr>
<td>2001</td>
<td>5,495</td>
<td>495</td>
<td>245</td>
</tr>
<tr>
<td>2002</td>
<td>5,495</td>
<td>495</td>
<td>245</td>
</tr>
<tr>
<td>2003</td>
<td>5,495</td>
<td>495</td>
<td>245</td>
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<tr>
<td>2004</td>
<td>5,495</td>
<td>495</td>
<td>245</td>
</tr>
<tr>
<td>2005</td>
<td>5,495</td>
<td>495</td>
<td>245</td>
</tr>
<tr>
<td>2006</td>
<td>9,911</td>
<td>495</td>
<td>245</td>
</tr>
<tr>
<td>2007</td>
<td>9,998</td>
<td>495</td>
<td>245</td>
</tr>
<tr>
<td>2008</td>
<td>2,886</td>
<td>1,211</td>
<td>961</td>
</tr>
<tr>
<td>2009</td>
<td>3,077</td>
<td>1,212</td>
<td>962</td>
</tr>
</tbody>
</table>

Source: FAO

**Trade**

With economic growth, imports of wood products for building are increasing.

### Table 36 Imports of Wood Products

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sawlogs+Veneer Logs (C) (CUM)</td>
<td>27</td>
<td>6</td>
<td>640</td>
<td>217</td>
<td>275</td>
</tr>
<tr>
<td>Uncoated Woodfree (tones)</td>
<td>28</td>
<td>5</td>
<td>76</td>
<td>168</td>
<td>160</td>
</tr>
<tr>
<td>Case Materials (tons)</td>
<td>0</td>
<td>0</td>
<td>13</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>Other Indust Roundwd(C) (CUM)</td>
<td>252</td>
<td>131</td>
<td>287</td>
<td>550</td>
<td>983</td>
</tr>
<tr>
<td>Wood Fuel(C) (CUM)</td>
<td>25</td>
<td>0</td>
<td>88</td>
<td>56</td>
<td>426</td>
</tr>
<tr>
<td>Sawn wood (C) (CUM)</td>
<td>62</td>
<td>85</td>
<td>59</td>
<td>3,991</td>
<td>3,824</td>
</tr>
<tr>
<td>Veneer Sheets (CUM)</td>
<td>13</td>
<td>13</td>
<td>37</td>
<td>101</td>
<td>148</td>
</tr>
<tr>
<td>Plywood (CUM)</td>
<td>1,989</td>
<td>2,070</td>
<td>2,222</td>
<td>3,638</td>
<td>3,006</td>
</tr>
<tr>
<td>Particle Board (CUM)</td>
<td>18</td>
<td>86</td>
<td>374</td>
<td>263</td>
<td>277</td>
</tr>
<tr>
<td>Hardboard (CUM)</td>
<td>22</td>
<td>25</td>
<td>58</td>
<td>86</td>
<td>87</td>
</tr>
<tr>
<td>Fiberboard, Compressed (CUM)</td>
<td>89</td>
<td>157</td>
<td>7</td>
<td>236</td>
<td>340</td>
</tr>
<tr>
<td>Mechanical Wood Pulp (tons)</td>
<td>23</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Newsprint (tons)</td>
<td>11</td>
<td>28</td>
<td>29</td>
<td>31</td>
<td>41</td>
</tr>
</tbody>
</table>

Source: NISR

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79 (The National Institute of Statistics of Rwanda 2009)
Case study on reducing charcoal and firewood consumption—INYENYERI

A Rwandan business called INYENYERI aims to reduce charcoal and firewood consumption in Rwanda by providing innovative products to some of the poorest farmers. (This can be considered an example of an inclusive “BOP” business, as outlined in Promar Consulting’s report on Tanzanian Agriculture 2011)

The company, which started operation in May 2011, aims to reduce use of charcoal and firewood by expanding use of cooking stoves developing by the company World Stove to farm and city households, and by providing biopellets made from banana leaves and eucalyptus to use as fuel for the stove.

According to interviews, Rwanda is spending 200 million US$ for firewood and charcoal per year, and one third of the country’s wood was already consumed between 1999 - 2011. It is predicted that the charcoal price will continue to rise. INYENYERI also believes the business will reduce Rwandans’ problems with bronchogenic irritation which now accounts for 37% of hospital patients.

INYENYERI imports iron sheets from World Stove and assemble them into stoves in Rwanda. In Rwanda, standard homes use a stone oven outside the house which causes a large amount of smoke during cooking. Compared to stone ovens, INYENYERI’s stove produces almost no smoke, and can be used to cook inside the home. After being burned in the stove, the biopellets will become charcoal, which can be utilized as a soil improvement agent. Because of this, INYENYERI’s business is considered to be CO2 negative, and thus they will be able to sell CO2 credits.

They collect biomass from local farms, receiving biomass in exchange for 2kg of biopellets. For city residents, they sell biopellets at 150～250 RWF/kg, which is 70% less than the price of charcoal.

They are planning to have several hundred biomass collection points throughout Rwanda, in order to supply to whole country.

Figure 122 INYENYERI’s approach

Source: Promar Consulting
7.2 Forestry Policies and Support

MINIRENA and the National Forestry Authority, the implementing agency under MINERIA, exercise jurisdiction over Rwanda's forestry sector with the coordination of MINAGRI and other governmental agencies, NGOs and development partners.

In the Strategic Plan for the Forest Sector 2009-2012, the following points are emphasized:

- Increase area and diversity of national forest resource (Reforest 46,390 ha of government and peoples land)
- Promote cultivation of multi-purpose trees in all farming systems
- Avail improved seed and other germplasms
- Introduce, promote and support innovative financing mechanisms such as ecotaxes, trusts, payment for environmental services, carbon trade, etc
- Improve management of forest resources towards sustainability
- Develop management plans for state forests
- Promote value addition technologies to wood and non-wood forest products
- Reduce wood energy consumption
- Foster and facilitate national trade and export of forest products
- Scale-up forestry extension and education to schools and other communities
- Strengthen forestry and agro-forestry research

UNCR and JOFCA are supporting forestation programs in refugee camps.
8 OVERVIEW OF FISHERY AND AQUACULTURE INDUSTRY

Rwanda’s main form of fishing takes place in freshwater lakes such as Kivu Lake, and the Kagera River. There are also many fish farms. Compared to neighboring countries, Rwanda’s marine product consumption is extremely low: 2kg per person, per year. Although the fish farming industry is still small, it is likely to develop further in the future.

8.1 Fishery and Aquaculture

8.1.1 Fishery and aquaculture production

Based on FAO statistics in 2009, Rwanda’s total catch was at 4,250 tons. However, the number of people involved was estimated at 35,700. 25,000 were fish farmers; 8,700 were fishermen; and 3,000 were traders. Rwanda’s 2008 survey shows that in 2008, total catch was at 3,119 MT. 10,612 households were engaged in the fishing industry. Only 2,957 households had their own fish farms.

The main fishing areas are located at the western side of the Lake Kivu, and freshwater lakes in the Kagera River basin. Besides fish farming in freshwater lakes, in the southern and eastern areas, fishponds were created in inland marshes. Fish such as tilapia are farmed in such ponds. The number of ponds has increased partly due to government promotion policy.

Figure 123 Number of Households and Catch by Region (2008)

Source: NISR

80 (FAO 2011a)
81 (FAO 2011a)
Figure 124  Volume of Landings in Rwanda

![Graph showing volume of landings in Rwanda from 1980 to 2008.](image)

Source: FAO

Figure 125  Rwanda’s Total Catch

![Graph showing total catch from 1980 to 2008.](image)

Source: FAO

Table 37  Species Caught and Catch Volume

<table>
<thead>
<tr>
<th>Species</th>
<th>Catch (t)</th>
<th>Lake</th>
<th>Fishing Method</th>
<th>Location (catch (tons))</th>
<th>Fishing Unit no.</th>
<th>Yearly av. No. of Fishing Trips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh water herring</td>
<td>2,830</td>
<td>Kivu</td>
<td>Trimaran</td>
<td>Rubavu (880); Rutsiro: (100); Karongi (250); Nyamasheke (400); Rusizi (900)</td>
<td>35</td>
<td>220-242</td>
</tr>
<tr>
<td>Tilapia</td>
<td>2,500</td>
<td>Kivu, other</td>
<td>Purse net, seine</td>
<td>Kivu (445), other (1,700);</td>
<td>100</td>
<td>1,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>264</td>
</tr>
<tr>
<td>Other Cichlidae</td>
<td>1,500</td>
<td>Kivu, other</td>
<td>Purse net, seine</td>
<td>Kivu (1,500), northern lakes</td>
<td>25</td>
<td>300</td>
</tr>
<tr>
<td>Catfish</td>
<td>500</td>
<td>Other than Kivu, Bulera</td>
<td>Canoe</td>
<td>Northern (10) Central (30) Eastern (675)</td>
<td>Unknown</td>
<td>300</td>
</tr>
<tr>
<td>Lungfish</td>
<td>100</td>
<td>Other than Kivu, Bulera</td>
<td>Canoe</td>
<td>Central (104) Eastern (486)</td>
<td>Unknown</td>
<td>300</td>
</tr>
<tr>
<td>Other</td>
<td>70</td>
<td>Kagera river Basin</td>
<td>Canoe</td>
<td>Unknown</td>
<td></td>
<td>300</td>
</tr>
</tbody>
</table>

Source: FAO
Fishing

There is an expansion of small-scale commercial fishing in the western side of Lake Kivu. Isambaza (freshwater herring similar to the size of anchovy (*Limnothrissa miodon*), Nile Tilapia (*Oreochromis niloticus*), as well as Cichlidae, catfish, and Lungfish have been caught. 82

The species that is commercially fished the most is Isambaza. Freshly caught Isambaza is deep-fried near fishing areas, though usually they are first dried (like anchovies), then cooked with vegetables such as tomatoes. Isambaza were introduced from Tanzania by a Belgium team in 1959 in order to increase fishery production in Kivu, where fishery production was originally very poor. 83

Lake Kivu is a volcanic lake, which means methane and carbon dioxide levels are high. Currently, a project on how to use methane as a source of energy is in progress. 84

Fresh water herring is caught using trimarans (3 boats side-by-side fixed together with wooden poles). They set out at night time to catch fish with their nets, using kerosene lamps to lure fish. 85

Policies that promote sustainable fishing include establishing fishing areas where fishing is prohibited and setting regulations on the fishing net mesh size (larger than 40mm in the case of tilapia, over 8mm for fresh water mackerel, and over 20mm for all other fish). 86

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82 (FAO 2011a) (Snoeks & Verheyen 2005)
83 (Collart 1989)
84 (Browne 2010) (Rice 2010)
86 (FAO 2011a)
Aquaculture

Rwanda’s fish farming began in the 1950s. By 2002, there was approximately 130 hectares producing 300 MT of catch. FAO statistics show that in 2009 Rwanda produced no more than 388 tons, and estimates for the present production level is around 1,000 MT. The two main fish farmed are tilapia (Oreochromis nilotica) and catfish (Clarias gariepinus).

In addition to fish farming in freshwater lakes, small-scale fish ponds are being created in marshlands in the southern and eastern hilly areas. Previously, 13 fish farms were state-owned, right now all (except for the experimental farm located at the National University of Rwanda, in Butare near Rwasave) are privatized. Sadly, many farms were permanently damaged during the 1990s, and they fail to produce sufficient amount of catch.\(^87\) The experimental farm located in Rwasave has 18 hectares, and around 60 fish ponds. Besides conducting various experiments, this farm also produces fish such as tilapia, and carries out some processing.\(^88\)

Programs such as PAIGELAC (described below) have encouraged expansion of fish farming in marshlands. Take a cooperative we visited on our field trip as an example: they received support from the PAIGELAC program, and the cooperative was formed, consisting of 30 influential local people. The marshlands were then rented from the government, loans were taken from a bank, and the cooperative prepared irrigation and drainage systems before eventually building 16 fishponds for tilapia farming. Because of the high price of the fish, tilapia farming is the most popular enterprise among the fish farmers.

In 2010 a company called Lakeside Fish Farm was established. They plan to build a fish farm for tilapia and catfish on the Lake Kivu. Lakeside Fish Farm aims to produce 1,500 MT of catch per year.\(^89\)

\(^87\) (FAO 2011a)  
\(^88\) (Aquaculture CRSP 2009)  
\(^89\) (Lakeside Fish Farm 2010)
8.1.2 Distribution

Of the fish caught, sanbasa is dried, while tilapia is sold fresh. There are several small cold storage facilities in Kigali and Gisenyi (on the lake shores). These cold storage facilities help traders distribute fish to urban areas. Fish is transported in refrigerated trucks or simply in trucks with boxes filled with ice, as well as by bikes, or cars. The estimated post-harvest loss can be as high as 30%.  

Most fish sold at Kigali markets are imported from Tanzania, including dried small fish (called dagaa in Tanzania), and frozen tilapia.

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90 (FAO 2011a)
8.2 Fishery and Aquaculture Policies and Support

To ensure food security, the government set a policy in 1988 to reconstruct the agriculture sector around the lakes. Promotion, marketing, and investment promotion were carried out by the government. Together with the local residents, the government co-managed the reconstruction and continues to fight poverty in the area. The major projects are shown in the table below. As the table illustrates, PAIGELAC and the African Development Fund are the top investors in Rwanda’s fishery-related projects. The major projects they support include development of marshlands and encouraging more fish farms.

Responsibility for the management of the nation’s fisheries falls under the Ministry of Agriculture and Animal Resources (MINAGRI), and more specifically, the Rwanda Development Board (RDB) is in charge of fishing and fish farming. With regards to the environmental side of the fishery sector, the Ministry of Natural Resources (MINIRENA) is responsible. Furthermore, the Ministry of Finance and Economic Planning has control of other activities for the benefit of the fish farmers, such as investment promotion and cooperation.

The challenges facing Rwanda’s aquaculture industry are listed below. They are listed from the standpoint of protein intake in local diets, and especially there is emphasis on the need to develop the fishery sector for economic reasons.

- Decrease of inland fish stocks
- Farmers in the fishery sector have limited access to credits
- Technical support and laws & regulations are insufficient
- Soil erosion and environmental degradation around the lakes
- Unsustainable fishing
- Large post-harvest losses due to the lack of appropriate infrastructure

Currently research only takes place at the National University of Rwanda’s experimental fish farms, and in a project aiming to understand the ecosystem of Lake Kivu, sponsored by the Belgium government. 91

91 (FAO 2011a)
## Table 38  Rwanda’s Major Fishery-related Projects

<table>
<thead>
<tr>
<th>Project name</th>
<th>Period</th>
<th>Budget</th>
<th>Organization</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inland Lakes Integrated Development and Management Support Project (PAIGELAC)</td>
<td>2002</td>
<td>UAC</td>
<td>Rwandan government and Africa Development Fund (AFDF)</td>
<td>To support the Rwandan government with the implementation of policies, USAID, Belgian Development Agency (BTC), Canadian International Development Agency (CIDA), GTZ, World Bank, FAO, UNDP etc are taking part in this project. This project works in building infrastructure, increasing the production capacity of fish farmers, and to reach the target of catching 10,000 tons annually.</td>
</tr>
<tr>
<td>Kagera Transboundary Integrated Water Resources Management &amp; Development Project</td>
<td>2010</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>ACP Fish II</td>
<td>2010</td>
<td>NA</td>
<td>EC</td>
<td>This project promotes effective and sustainable management of fisheries resources. It also assesses soundness of fisheries management measures.</td>
</tr>
<tr>
<td></td>
<td>~</td>
<td>2013</td>
<td>NA</td>
<td>This project supports the aquaculture research activities in developing countries. The NUR has been receiving support intermittently for their research programs since the late 1990s.</td>
</tr>
<tr>
<td>Aquaculture Collaborative Research Support Program</td>
<td>NA</td>
<td>NA</td>
<td>USAID National University of Rwanda (NUR)</td>
<td>This project supports the aquaculture research activities in developing countries. The NUR has been receiving support intermittently for their research programs since the late 1990s.</td>
</tr>
<tr>
<td>Project to study the ecosystem Lake Kivu (Financing the Kingdom of Belgium)</td>
<td>NA</td>
<td>NA</td>
<td>NUR</td>
<td>Understand the ecosystem of Lake Kivu for development of marine resources</td>
</tr>
<tr>
<td>Pilot development of the sector Clarias (Financing the Kingdom of Belgium)</td>
<td>NA</td>
<td>NA</td>
<td>NUR</td>
<td>Developing sustainable production chain for catfish farming</td>
</tr>
</tbody>
</table>

Source: AFD, ACP Fish II, Aquaculture CRSP, FAO
9 CONCLUSIONS AND RECOMMENDATIONS

This report has focused on Rwanda’s agriculture, forestry, and fishery sectors. In particular, the report has detailed sections on rice, banana, coffee, and tea. In this final chapter, a summary of the main findings and recommendations are presented.

9.1 Rwanda’s Agriculture, Forestry and Fishery Sector

9.1.1 Conclusions

Rwanda’s economy, as well as its food security and poverty reduction plans, still depends heavily on its agriculture, forestry and fishery industries. Moreover, other than with mineral resources, foreign currency is largely obtained through coffee and tea export, as well as ecotourism. This further highlights the importance of Rwanda’s agriculture, forestry and fishery industry.

Under the current administration, recovery and infrastructure development have been happening at an incredible speed. Land and agricultural policies, privatization policy, and policies promoting the formation of unions are being swiftly implemented; rapid successions of new policies and institutions are also being developed. In the past 2-3 years, developments in terms of efficient agricultural use of arable land have had substantial effects. Imidugudu policy (moving farmers away from the traditional scattered style of settlements to living in designated grouped settlements facing roads), crop intensification program (banning the cultivation of crops other than the designated crop for a specific area), and the prohibition of intercropping (moving away from intercropping of banana with crops such as coffee or maize to modernized monocropping cultivation) continue to drastically change the landscape of rural villages.

With the introduction of the crop intensification program, the maintenance of marshland irrigation and drainage systems, along with fertilizer supply, has improved. Although agricultural production suffered considerably due to drought in 2003, as of 2011 Rwanda’s grain-related self-sufficiency rate has been enjoying an upward trend. The overall nutritional status has greatly improved.

Nevertheless, poverty rate is still high at 56.9%. Although in both urban and rural areas, the middle class and the rich are growing in numbers, the gap between rich and poor is widening. The gap in terms of the level of education is particularly wide. On the one hand, government officials and those working for private businesses have virtually all received higher education abroad, and are capable of taking part in international negotiations. Whereas, those from rural areas receive an appallingly low level of education (32% male and 14% of female completes primary education). Expanding the essential activities for advancing agriculture technology as a whole, as well as implementing research studies, are still facing challenges today.

Given the expected population growth and Rwanda’s extremely limited arable land, it is essential to continue with fast-paced improvements to productivity. To achieve this, extension activities and advanced research must be carried out. In addition, to achieve further economic development, Rwanda will need to reform its export strategy of relying solely on its two major export products – coffee and tea. Moreover, an
improvement of both the livestock and aquaculture industries would inevitably increase supply of animal protein. It is also necessary to develop further other areas of the industry, such as food processing and other agro-processing.

9.1.2 Assistance measures

The next sections summarize policy support measures for rice, banana, coffee, and tea. This section contains information on crops which, although we did not conduct thorough investigations of them, may be of some interest to the reader.

Technological developments to maximize yield through intercropping

In the Southern regions where arable farmlands are scarce, the crop intensification program has proven to be difficult to implement and risk in the area is high. However, intercropping does not necessarily have a negative influence on the crops cultivated and planting different combinations of crops may achieve higher yields in some cases. Thus, for farmers with small pieces of land, it is considered beneficial to support intercropping in order to maximize productivity.

Support for horticultural production of crops such as apples in Rwanda’s cool climate

Horticulture production is considered to be promising, with many crops having potential. Although Rwanda faces high transportation costs if these crops are exported, domestic demand is certainly on the rise for some crops. For instance, imported apples from South Africa are sold in large quantities in Rwanda. It is considered possible for fruits such as apples and grapes to grow in Rwanda’s cool climate. Furthermore, there is a need to actively promote light-weight high-value goods such as nuts and spices, which can be easily transported, for export.

No-till production study of grains, sorghum measures

Among grains, although sorghum is not labeled as a priority crop, there is high domestic demand for it. Because of this, to some extent it is necessary to emphasize sorghum production. For crops such as corn, the lack of water and dry soils is still an issue waiting to be dealt with. Irrigation facilities are provided for hillside farmlands; and farming methods such as no-tillage are encouraged to retain soil water level.

Agrotourism

Rwanda’s tourism sector is playing an increasingly important role in obtaining foreign currency. On top to the famous gorilla tours and national parks, cultivation sites for coffee, tea, and bananas are also attracting tourists. Agrotourism that allows direct personal experiences of production is considered an interesting approach for attracting more tourists.

Forestry – development of alternative energy fuel wood

In the forestry sector, at the same time as promoting more tree planting, development of energy sources other than fuel wood, and research that helps identify species with medicinal uses are viewed as top priorities. Promoting ecotourism is also considered an effective method of protecting the forests.
Aquaculture – promotion of tilapia farming

Development of inland aquaculture is considered to be essential for Rwanda’s fishery sector. In particular, cutting production costs of tilapia farming by allowing the fish to feed on plankton, algae, and various weeds is promoted. Given Rwanda’s severe lack of surplus grains for feed, and its limited pasture land available for rearing livestock, tilapia farming is a valuable source of animal protein.
9.2 Rice

9.2.1 Conclusions

*Even though the production level of rice is low, it is suitable for the marshlands, the only type of land left available for expansion of agriculture.*

Almost all rice is grown in paddy fields. The current production level is low, and roughly 20% of domestic consumption still relies on imports. Increasing domestic production is a priority, and the government aims to be fully self-sufficient by 2016. With such a high population density, Rwanda has high expectations for marshlands, areas of land which were previously idle land, to increase rice production.

*Cold weather damage is the main obstacle for Rwanda's long grain rice production, which is favored by the consumers over short-grain rice.*

In recent years, rice farmers have been heavily influenced by price trends as well as different government support programs. Farmers are producing rice as a cash crop rather than for household consumption.

Despite being more popular, long grain rice varieties are too difficult to cultivate in Rwanda and thus most of the rice production focuses on short grain rice. This is because there is an insufficiency of seeds for long grain rice varieties, and the fact that long grain varieties do not grow well at high sea level, combined with a climate of low temperatures. Rwanda’s climate is similar to that of Japan’s northern Hokkaido area. With limited arable land for rice cultivation, measures dealing with cold weather damage are extremely important.

*A range of support programs have been provided for Rwanda’s rice sector.*

Projects such as RSSP which provide construction and maintenance of irrigation systems, as well as the technical, soft support needed for these processes are supported by the World Bank, AfDB, USAID, and many other international organizations. Rwanda has also been placed in Group 2 of the Coalition for Rice Development (CARD) program, a Group that is led by Japan’s JICA program.

9.2.2 Assistance measures

In addition to help from CARD, the Rwanda Rice Development Strategy (RDS) is also in place. The objectives are clear as to how and where the support ought to be aimed. The following two points are emphasized.

*Measures against cold weather damage and development of cold-resistant long grain varieties are needed.*

Rwandan farmers are eagerly anticipating development of cold-resistant long grain rice varieties. While long grain varieties are preferred to short grain varieties, a suitable variety appropriate for Rwanda’s climate has not yet been identified.

In generally speaking, cold-weather damage happens easily due to Rwanda’s climate, and cold weather damage prevention measures are insufficient, due to lack of knowledge. Specialists in cold weather damage are in demand.
Development and support measures for fragrant rice are required.

Fragrant rice is another important sector to focus on. Currently the measures to improve rice quality in Rwanda are only through upgrading the milling facilities. However, imported Tanzania and Pakistan rice are preferred by high-income consumers not only because of better milling quality, but more importantly, because of the fragrance. It is quite important to introduce fragrant rice to Rwanda in order to compete with imported Tanzanian and Pakistani rice.
9.3 Bananas

9.3.1 Conclusions

*From a food security perspective, and viewed from the standpoint of farmer income, banana is an indispensible crop.*

Cooking bananas have traditionally provided a large percentage of people’s caloric intake, and this remains true today. At the same time, production of cooking bananas and beer bananas also support household income, as both are cash crops. Beer banana production is slightly higher than that of cooking banana production. Overall, production volume is roughly divided in half.

*Advanced technology for banana production has been introduced to Rwanda from countries such as Uganda; formation of cooperatives continues; and investment opportunities for farmers are looking up.*

Various advanced techniques for banana production have been introduced from advanced banana producing countries such as Uganda. Farmers with relatively stronger financial backgrounds are moving towards monoculture of bananas, focusing on improving fertilizer usage and soil quality. Since banana prices have been good, which can generate good returns for the farmers, progressive farmers consider banana farming as one of the most promising areas to invest in Rwanda’s agriculture industry. Moreover, cooperatives which aim at disseminating technical skills, as well as aiding the process of selling harvested bananas are being established at a fast pace.

*Banana beer production is undergoing dramatic changes as production moves away from farmer homes to small-scale factories.*

Traditionally, banana beer is processed by individual households and sold in local bars. However, with the government aiming to improve hygienic conditions in Rwanda’s processing industry, homemade banana beer is banned. Thus, production has switched to producers who hold health and safety certificates for banana beer production. Banana beer is in high demand, which is why many small-scale factories are being established.

9.3.2 Assistance measures

*Continual disease control is essential.*

The situation regarding BXW and Fusarium wilt remains unclear. During our investigation, there were many cases of confusion as to whether or not a particular banana plant was infected. Consequently, one of banana sector’s most important tasks is to improve disease control.

*Positive effects of microfinance provision promoting investment are seen.*

Demand for both cooking banana and beer bananas is high in local markets, and given that the banana sector is not undergoing large-scale development projects such as the marshland development, each banana farmer needs a high return on their personal investments. Access to funds is considered to have a
immense influence on improving banana production.

**Technical assistance in improving productivity of bananas under intercropping cultivation is necessary.**

As described in section 9.1.2, in the Eastern regions where arable lands are extremely narrow, risks are high and monocropping is difficult to implement. Farmers in these regions usually own little land, and are poor with little financial resources to invest. Development of agricultural technology that optimizes intercropping of bananas or other crops, with lower fertilizer need, will be a tremendous help to Rwanda’s banana production and the Eastern regions.
9.4 Coffee

9.4.1 Conclusions

Coffee crop is an important source of income for smallholders, but coffee production has been decreasing year by year.

Unlike most other coffee producing countries, instead of vast plantations, Rwanda’s coffee industry consists of a large number of smallholders. Approximately 390,000 farmers rely on coffee production as a source of income. However, neither coffee plant aging countermeasures nor appropriate coffee management are being implemented, and biannual production level fluctuations are significant. Coffee production has decreased since 2004. Production in 2009 was roughly half the production level of 2004.

Establishment of CPUs is underway, but although high quality coffee production is on the rise, issues regarding the operation of CPUs remain.

The number of CPUs nationwide was targeted by the government to increase from 2 in 2002, to 120 in 2007 and to increase the percentage of high quality coffee from less than 1% to 20%. However, the surge of new CPUs brought inefficient operation and excessive competition among processing facilities, leading 70% of CPU owners to fall into debt. As a result, the transition from hand-pulping to CPU pulping is occurring too slowly, and the pace of the increase in high quality coffee production has also been impeded.

Beans infected with “potato taste” form a disincentive for speciality coffee export.

A pest know as Antestia bug, exclusive to Africa’s Great Lake region, lives on coffee plants, and is the cause of a unique rotten smell in coffee beans called potato taste. If one defective bean accidentally ends up in a batch of coffee beans destined for export, then the whole batch of coffee beans loses its aroma and the batch loses its speciality coffee status for export. For exports destined for Japan, a market with highly stringent standards for quality, the potato taste problem is a major issue.

9.4.2 Assistance measures

Support is needed for the cultivation and management of coffee trees.

The main causes of Rwanda's drop in coffee production is aging coffee trees and insufficient coffee tree management. Distribution of new seedlings and instruction on seedling planting are necessary. Moreover, not only is replanting aging coffee plants vital, training on regenerating coffee plants and pruning to prevent biennial bearing are also crucial. In addition, pest control to prevent potato taste and limiting the use of pesticides on speciality coffee for export, which are very chemical residue-sensitive, are important measures. However, as of now, there is a lack of agricultural skills and extension workers to implement such measures, thus assistance in these areas would yield very beneficial results.

Domestic production of packaging for roasted beans for export is essential.

Presently, more value-added incentives for exporting speciality coffee have, to some extent, boosted the production of roasted coffee beans. In order to export roasted coffee beans, availability of a specific type of
packaging is a precondition, as it prevents oxidation of roasted coffee beans. However, Rwanda cannot produce this packaging domestically, as it does not have the manufacturing technology to do so. Currently, Rwanda has no other choice but to import this type of packaging. This increases the cost of exporting the final speciality coffee abroad. Therefore, before increasing export of high value added roasted beans, enabling domestic production of coffee packaging is critical.
9.5  Tea

9.5.1  Conclusions

*Tea is produced on hillsides and improved marshlands. Hillside tea cultivation has low yield but produces high quality tea; marshland tea cultivation has a higher yield but the quality is lower.*

There are 11 tea cultivation sites in Rwanda; 9 of which are located on hillside, and the remaining 3 are located on improved marshlands in the valleys. As irrigation systems are still under-developed on hillsides, yield is particularly low during dry seasons; however, quality remains excellent. On the other hand, improved marshlands have enough water available even during dry seasons, thus yield is high. The quality however is inferior compared to hillside yield.

*The distribution and price systems of tea are fixed.*

Green leaves must be processed soon after being plucked and therefore tea farmers have no other choice but to sell their harvest to the nearest tea processing factory. Additionally, individual farmers must sell their harvest to the factories through a cooperative, as factories do not accept small quantities of green leaves. This illustrates how the distribution system is rather rigid. Moreover, the purchasing price of green leaves is set by the government, a price level which is usually 6% above or below that of the selling price at the Mombasa auction.

*The production of black tea for making tea bags dominates the industry; however leaf tea and green tea production has just begun.*

Plucked green leaves are almost all sent to factories for CTC processing, eventually made into black tea for tea bags. However, we are beginning to see small quantities of leaf tea production and green tea processing. Furthermore, not only are factories producing the tea for tea bags, they are also starting to produce the bags too. It is planned that in the future Rwanda will blend tea domestically and export packaged tea.

9.5.2  Assistance measures

*To benefit small-scale tea farmers through assistance measures, first the distribution and the price system must be reformed.*

Under the current distribution and pricing system, even if measures are implemented to increase production and the quality of harvest, the rigid distribution system and the low producer prices means that smallholders will not benefit to a great extend from these assistance measures. This is a due to structural obstacles. Therefore, before implementing more assistance measures, it is absolutely crucial to first reform the fixed distribution and pricing system and to raise producer prices.

*Business partnership with Japan – Technical assistance for production of raw materials for plastic-bottled tea drinks for Japan*

Given Rwanda’s current tea industry structure, it can benefit not only from support from the government but also from the private sector. A partnership between Japan’s private sector tea industry and the Rwandan tea
industry could be beneficial to both sides.

Although it is difficult to export Rwandan tea to Japan in its current form as a CTC product, if black leaf tea and green tea become available for export, and if raw materials for producing the type of plastic bottle used in Japan could be supplied, Rwanda has a chance to deepen its relationship with the Japanese tea industry. If such a system were implemented, technical assistance and technology transfers of machinery to Rwanda could result in being immensely beneficial for the tea industry of Japan.
9.6 Recommendations for Support from Japan

So far, support from Japan for Rwanda’s agriculture, fishery, and forestry sector include food aid, technical assistance in the Eastern Province, provision of fertilizer, and provision of funding through the African Development Bank. Considering Japan’s future support for the agriculture, it is desirable to concentrate on efficiency and target areas that can take advantage of Japan’s specialties.

Rwanda has the reputation of being the safest African country for investment opportunities. The government puts more emphasis on private foreign investment than aid and is aggressive about attracting foreign capital. However, given the Rwanda’s size and its degree of market development, level of local consumption, and level of local educational background, Japanese private companies entering Rwanda may face numerous hurdles. In the medium term, it is important to build the relationship between Japan and Rwanda through continued economic assistance, as this is a necessary step to providing a foundation for the Japanese private sector to increase their participation in Rwanda. Nevertheless, it is considered possible for the private sector to make some sort of investment in Rwanda’s existing coffee and tea export industry in the shorter term.

Given Japan’s specialities, the rice and coffee industry ought to be the focus of Japan’s support to Rwanda’s agriculture sector. As for the rice industry, the major problems facing Rwanda are its high altitude and cold climate causing cold weather damage on rice crops. Although Rwanda is receiving significant technical assistance from the Africa Rice Center on rice production, based on studies of Western African countries, it should be noted that cold weather damage is not something that challenges Western African rice producers. This is a void in the plethora of technological assistance programs provided to Rwanda. Since Japan’s rice cultivation takes place in Hokkaido and Tohoku regions, and considering the positive outcome of assistance provided by China’s Heilongjiang province and Yunnan province, what could be of more interest to Japan than measures related to the rice industry? Moreover, in the coffee industry, given that Japan’s demand for specialty coffee is high, and since the problem of potato taste has been a major obstacle for Rwanda to boost its coffee exports to Japan, as well as being one of the major worries of Japanese coffee businesses, measures dealing with potato taste are recognized as top priorities of Rwanda’s coffee industry. Finding a solution to the potato taste problem is not progressing particularly well on a domestic level. Therefore, from the viewpoint of securing production to supply Japan’s demand for coffee, perhaps it is beneficial for Japan to focus on finding a solution to the potato taste problem.

9.6.1 Support to prevent cold-damage in rice farming

Rwanda is located just below the equator, with most of its rice cultivation situated at 1,000-2,000 m above sea level. It has an average temperature of 20 Celsius, though the drop is temperature at night is dramatic. Very much similar to Japan’s Hokkaido region, rice cultivations in Rwanda are in marginal areas for rice production. In addition to rice blast disease, sterility due to cold weather during bearing period and sheath brown rot are important issues to be deal with. As mentioned in the previous section, existing assistance from the African Rice Center, where intensive studies of rice production in Western African countries are conducted, does not include adequate cold weather damage prevention measures. After testing several hundred of rice varieties, merely 3 long grain rice varieties were deemed suitable for Rwanda’s climate. Even then, these varieties are not capable of producing rice for more than 2-3 years. Judging from interviews conducted by Promar Consulting, Rwanda’s local technicians have inadequate knowledge of cold
weather damage. In recent years, with the help of China, an agricultural technology support center has been set up to provide assistance including technical guidance on rice production. However, as the Chinese center is partnered with the University of Fujian, which is not located in a cool region, it is believed that there may still be a lack of knowledge of possible cold weather damage measures.

According to Mr. Ise of the Japan International Research Center for Agricultural Sciences at Japan’s Ministry of Agriculture, Forestry and Fisheries, during the 1980s a university in China's Yunnan province had been providing technical assistance on rice cultivation in Laos. Furthermore, varieties introduced from Yunnan during the 1990s can be traced back to traditional rice varieties of Japan. In the early 1990s, technical assistance initiatives introducing rice blast-resistant varieties, as well as cold weather damage-resistant varieties, were supposed to be carried out by a China-Japan research center in collaboration with the Rwanda Agricultural Research Institute, with the following 3 aims: (1) introducing high-yield cold weather resistant rice varieties; (2) determining rice blast-resistant varieties; (3) introducing technical skills for rice cultivation used in the Hokkaido region. Field trials was planned to begin in 1994, but unfortunately it all came to an abrupt halt when the genocide broke out in 1994. Cold weather damage research centers are located mainly in Japan, Korea, China’s north-east regions and Yunnan. Japan is the leading country in cold weather damage research. For this reason, it would be meaningful for Japan to target its assistance to Rwanda’s rice industry on cold weather damage measures.

9.6.2 Support to prevent potato taste in coffee

One of the most serious pests in Rwanda’s coffee industry is the Antestia bug, which causes something more commonly known as potato taste. Antestia bugs dig holes in coffee plants, which rots the beans of that particular plant, and the beans excrete a potato-like smell. Antestia bug is a pest found only in the Great Lakes region of Africa, and measures against this pest have been delayed.

If one defective coffee bean is included in a cupping lot, the potato taste affects whole the cup. Potato taste infection is particularly damaging to the quality of specialty coffee, whereas it is not viewed as something extremely bad for ordinary coffee. According to several specialty coffee exporters, 10~20% of their exports are rejected by buyers because of potato taste. Japan is particularly demanding of high quality without potato taste. For some companies, cupping Rwandan coffee is like gambling, never sure of your chances of finding a defective coffee bean included in the cupping sample. Even though a particular export lot is rejected due to potato taste by one buyer, it can then sometimes be sent to other buyers without a problem.

For this reason, in order to allow more coffee bean exports to Japan, it is crucial for the most careful country, Japan, to actively tackle the potato taste problem through various assistance measures. Though bourbon coffee has good flavor, it is difficult to secure the supply because it is susceptible to diseases and global production is limited. It is meaningful to support countermeasures against potato taste in Rwanda where bourbon coffee is still grown.

There are various measures under consideration in Rwanda such as development of organic pesticides and introduction of Integrated Pest Management (IPM). There are also cases of private institutions involving themselves in Rwanda’s coffee industry, providing assistance. Against a background of an array of research, programs, and dissemination activities, it is worth considering the possibility of highly-directed support for potato taste and technical assistance. In addition, given Japan’s sensitivity towards chemical residue in coffee imports, it is best to avoid the use of pesticide measures if possible. IPM guidance and support are necessary assistance measures.
## REFERENCE 1  FIELD RESEARCH SCHEDULE

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<tr>
<td>14-Nov-11</td>
<td>Ministry of Agriculture and Animal Resources</td>
<td>Outline and Policy of Agriculture (subsistence crop, cash crop, livestock), Forestry, and Fishery</td>
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<td>Ministry of Natural Resources (Land, Forest, Environment, Mining)</td>
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<td>Meeting with Mr. Shigeru Kondo</td>
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<td>15-Nov-11</td>
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<td>Outline of US’s Aid Programs (especially to the coffee and tea sector)</td>
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<td>RDB (Rwanda Development Board) at 9:00 am</td>
<td>Outline and Policy of National Development and Foreign Investment</td>
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<td>16-Nov-11</td>
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<td>ISAR (Rwanda Agricultural Research Institute)</td>
<td>Crop Variety Development and Production Technology</td>
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REFERENCE 2  BACKGROUND MATERIALS


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