ACIAR ‘TREES FOR FOOD SECURITY’ PROJECT

THE EXTENSION SYSTEM IN RWANDA: A FOCUS ON BUGESERA, RUBAVU AND NYABIHU DISTRICTS

Evelyne Kiptot, Ruth Kinuthia and Amini Mutaganda

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CONTRIBUTORS
Evelyne Kiptot
World Agroforestry Centre
P.0 Box 30677-00100
Nairobi, Kenya

Ruth Kinuthia
World Agroforestry Centre
P.0 Box 30677-00100
Nairobi, Kenya

Amini Mutaganda
Rwanda Agriculture Board
P. O Box 5016 Kigali-Rwanda
EXECUTIVE SUMMARY
As part of the baseline survey for the ACIAR Trees for Food Security Project, a literature review and key informants interviews were undertaken in June 2013 to understand the status of the extension system in Rwanda. Visits were made to RAB in Kigali, Eastern provincial headquarters, districts, sectors and cells whereby key informant interviews were undertaken to understand the extension systems in Rwanda. In addition, various NGOs and extension service providers were also visited. The major areas of focus were:

- Extension technologies disseminated to farmers
- Community engagement
- Capacity and efficiency
- Linkage with other institutions
- Commercialization and marketing
- Local innovation

Extension in Rwanda is under two ministries: MINAGRI (Ministry of Agriculture and Livestock) which sets policies and guidelines and MINALOC (Ministry of Local Government) which implements the policies. RAB (Rwanda Agriculture Board) is an institution under MINAGRI whose mission is to develop agriculture and animal husbandry through the use of modern methods in crop and animal production, research, agricultural extension, education and training of farmers in new technologies.

At RAB there is the Deputy Director General who is in charge of extension, and works with officers in other fields, agronomy, livestock and forestry. The lowest level of extension is at the village (Umudugudu) level, here there are farmer promoters who coordinate extension activities. In most cases these are the outstanding or lead farmers. From the village is the Cell (Akagari) level. Extension activities are coordinated by Socio Economic Development Officers (SEDOs). From the cell level, it is the sector level headed by the Sector agronomist and the officer in charge of livestock. District level is next in authority, at the district there is the District agronomist and the officer in charge of livestock. The RAB directors are in charge of extension at the province/zone level. RAB is the highest level of authority at the national level which heads extension.

The government of Rwanda has put up an elaborate extension structure that runs from the national to the cell level where extension staff is deployed. The Rwanda Government has adopted several approaches in order for farmers to access extension services. It uses a participatory extension approach where all stakeholders define their vision, analyze their constraints and needs and, therefore, plan together for implementation, monitoring and evaluation. It also uses a multi-method approach where various methods and approaches are recognized, provided that they are effective and complement each other. Thirdly it also recognizes that complementarities and potential synergy of different actors in agricultural
development (farmers’ organizations, research, extension, agricultural education institutions, input supply, micro credit and other public and private partners are important and hence establishing linkages with them and lastly it also builds on existing initiatives such as Imihigo, Ubudehe, Integrated Development Program, Girinka, Agasazi Ndatwa, and other related initiatives that emerge and prove to be effective or contribute to sustainable agricultural development.

Due to lack of resources, extension agents in Rwanda use both group and individual methods of extension in communicating new ideas to farmers. The specific methods used to introduce new technologies/practices include: arranging public meetings at a specified day and time through local leaders (religious leaders, leaders of local organizations & elders); through farmer promoters, setting up of FFSs in villages and field/exchange visits. As there is inadequate resources for extension in the country, SEDOs prefer to introduce new technologies/practices through farmer promoters and setting up of FFSs in various villages. They also work in partnership with various NGOs such Caritas Rwanda, World Vision and Millenium villages project among many other NGOs.

The Trees for Food Security Project could therefore build on these existing approaches/initiatives to scale up evergreen agriculture in project sites.
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<tr>
<td>ADP</td>
<td>Area Development Programme</td>
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<td>ADRA</td>
<td>Adventist Relief agency</td>
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<td>AEC</td>
<td>Agricultural Extension Committee</td>
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<td>APEPARWA</td>
<td>Amateur Pour la Protection de l’Environnement et la Promotion de l’Agriculture au Rwanda</td>
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<td>BTC</td>
<td>Belgian Technical Cooperation</td>
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<td>CBO</td>
<td>Community Based Organization</td>
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<td>CDC</td>
<td>Community Development Committee</td>
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<td>CIA</td>
<td>Central Intelligence Agency</td>
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<td>CIDA</td>
<td>Canadian International Development Agency</td>
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<td>CIP</td>
<td>Crop Intensification Program</td>
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<td>CMC</td>
<td>Community Mobilization Campaigns</td>
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<td>COMESA</td>
<td>Common Markets for Eastern and Southern Africa</td>
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<td>DAPF</td>
<td>District Agricultural Plat Form</td>
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<td>DEMP</td>
<td>Decentralization Environmental Management Project</td>
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<td>DFID</td>
<td>Department for International Development</td>
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<td>Decentralization Implementation Program</td>
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<td>EAC</td>
<td>East African Community</td>
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<td>EDPRS</td>
<td>Economic Development and Poverty Reduction Strategy</td>
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<td>FAO</td>
<td>Food and Agriculture Organization</td>
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<td>Belgium funds for food security.</td>
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<td>Farmer Field Schools</td>
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<td>MINAGRI</td>
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<td>Ministry of local Government</td>
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<td>Acronym</td>
<td>Full Form</td>
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<td>MINECOFIN</td>
<td>Ministry of Finance and Economic Planning</td>
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<td>MINIJUST</td>
<td>Ministry of Justice</td>
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<td>MINILOC</td>
<td>Ministry of local Government</td>
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<td>NAEB</td>
<td>National Agricultural Export Development Board</td>
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<td>National Agricultural Extension Coordination Orientation Committee</td>
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<td>NAES</td>
<td>National Agricultural Extension Strategy</td>
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<td>National Agriculture Policy</td>
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<td>NDP</td>
<td>National Decentralization Policy</td>
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<td>NEPAD</td>
<td>New Partnership for African Development</td>
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<td>NGO</td>
<td>Non-Governmental Organization</td>
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<td>PADAB</td>
<td>Project d’ Appui au Developpement Agricole de bugesera</td>
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<td>PAIRB</td>
<td>Project d’ Appui aux Infrastructures Rurales de la Region Naturelle du Bugesera</td>
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<td>PAPSTA</td>
<td>Support Project to the Strategic Plan for Agriculture Transformation</td>
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<td>PASAB</td>
<td>Development Project to Support Food Security.</td>
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<td>PRSP</td>
<td>Poverty Reduction Strategy Paper</td>
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<td>PSTA</td>
<td>Programme for Agricultural Sector Transformation</td>
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<td>RAB</td>
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<td>REMA</td>
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<td>RSSP</td>
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<td>RWF</td>
<td>Rwandan Franc</td>
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<td>SABM</td>
<td>Development Phase of the Food Security Project</td>
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<td>SAPF</td>
<td>Sector Agricultural Plat Form</td>
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<td>Subject Matter Specialists</td>
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1.0 INTRODUCTION
The ‘Trees for Food Security’ project led by the World Agroforestry Centre (ICRAF) and working with national partners in Ethiopia, Rwanda, Burundi and Uganda began its operations in 2012. The aim of the project is to enhance food security for resource-poor rural people in Eastern Africa through research that underpins national programmes to scale up the use of trees within farming systems in Ethiopia and Rwanda and then scale out successes to relevant agro-ecological zones in Uganda and Burundi.

The specific objectives are:

1. To characterise target farming landscapes and systems, and develop tools for matching species and management options to sites and circumstances.
2. To generalize predictions of impacts of tree species and management on crop productivity, water resources and nutrients at field, farm and landscape scales to inform scaling up to improve food security and reduce climate risk.
3. To develop effective methods and enabling environments for scaling up and out the adoption of trees on farms.
4. To develop databases and tools for monitoring and evaluation of the impact of scaling up and out the adoption of trees on farms, and
5. To enhance capacity and connectivity of national partner institutions (including farmer groups) in developing and promoting locally appropriate options for adoption of farm trees.

There are four research work packages tied together in a major effort to strengthen national capacities in the four target countries (Figure 1). Together they comprise an iterative cycle of co-learning and refinement that address key barriers to adoption of trees on farms, followed by immediate promotion of best-bet agroforestry options across a range of conditions. This is coupled with extensive assessment of the performance of species and management options in the initial scaling up trials (including farmer feedback and analysis of their adaptations) and intensive measurement and modeling of impacts of trees on water, soil health, crop yield and overall system performance, in more controlled experiments. The results from these assessments feed back into the development of tools to match options to sites and circumstances and predict impact of investments in scaling up and out. The emphasis of the research on methods to take adoption to scale focuses, on the one hand, on developing appropriate seed and seedling supply and extension methods for different contexts, and on the other, on policies and institutions that address barriers to adoption.
The objective of work package 3 is to develop effective methods and enabling environments for scaling up and out adoption of trees on farms. Under this objective we focus on extension methods (including seed and seedling supply systems) required to deliver germplasm and information to farmers as well as the institutional and policy environment required to overcome barriers to adoption. Together these constitute the scaling approaches that will be developed, tested and promoted. In order to identify the best fit extension approaches for scaling out the adoption of trees on farms, it is important to first understand the extension systems in the respective national countries, hence this study. This report, therefore, presents the findings of the state of extension in Rwanda based on a review of literature and key informant interviews which are described in detail in the methods section. The report begins with a general introduction of extension in Rwanda as a country followed by an overview of various extension initiatives. Methods of the study and findings of the key informant’s interview are presented. Finally, we discuss the implications to the ‘Trees for Food Security’ project scaling up activities.
Background Information about Rwanda

Rwanda is located in Central Africa between latitudes 1°04’ and 2°51’ south and longitudes 28°45’ and 31°15’ east. Its surface area is 26,338 km². The average population density in 2002 was 321 people per km² and the physiological density (people per area of arable land) was in excess of 500 people per km² (UNDP and UNEP 2006). The climate is characterized by temperate conditions, especially in higher altitudes in the northwest of the country. Despite a relatively high rate of arability (40%), overall agricultural productivity remains low due to the stress of high population growth (5.49 children born per woman) and small land holdings. With a population of 8.4 million inhabitants, Rwanda is the most densely populated country in Africa.

Rwandan economy is heavily dependent on agriculture which is still largely smallholder driven (Haba 2004). The country is predominantly agricultural with few options that would reduce the pressure on land resources. Agriculture is the main source of income for 87 per cent of the population (MINAGRI 2006). The agricultural sector contributes about 85% of export revenue. The share of agriculture to Rwanda’s GDP in 2007 was 38.2% (The World Fact book 2008). According to World Bank (2007) agriculture in Rwanda currently accounts for just fewer than 40% of GDP and provides jobs to 90% of the population.

Rwanda’s agriculture sector faces a set of unique challenges. Due to the country’s high population density, land is a scarce commodity, while labour is Rwanda’s most abundant factor endowment. As a result, soil fertility has deteriorated dramatically over time, while fertilizer use, both organic and inorganic, remains low. Furthermore, much of Rwanda’s land is at high risk of erosion not least because of the need of smallholders to cultivate slopes of up to 55% and to bring land under cultivation that is not suited for this purpose. Food crops remain dominant in the agricultural sector, although farmers are beginning to shift slightly towards higher value crops, such as fruit and vegetables, rice, sorghum, maize, groundnuts and soya beans. While livestock is an important potential source of income, livestock numbers remain relatively low (MINAGRI 2009a).

To overcome these challenges, the agriculture sector should be deeply transformed and modernized. This requires an extension strategy able to facilitate all producers to access technological packages and information they need. Extension is an ongoing process of getting useful information to people and then assisting those people to acquire the necessary knowledge, skills and attitudes to utilize effectively this information and technology. Leeuwis (2004) indicated that extension is a series of embedded communicative interventions that are meant among others, to develop and/or induce innovations which supposedly help to resolve a problematic situation. On the basis of definition of agricultural extension, the Rwanda vision of the National Agricultural Extension strategy is to ensure ideal conditions for the dissemination and exchange of information between producers, farmer organizations and other different partners in order to transform and to modernize the agricultural sector so that this sector can

**Brief history of extension in Rwanda**

The term “extension” holds different connotations, depending to some degree on the history, tradition and values of the natural and agricultural sciences in a country. The Neuchâtel Initiative (2000) specifies three elements, which may well characterize individual extension approaches.

- **Transfer of technology**: supporting farmers improve their ability to use new technology.
- **Advisory work**: supporting farmers to solve their own problems now and in the future.
- **Facilitation**: supporting farmers to become more actively embedded in the agricultural knowledge and information system.

Historically, extension and outreach programmes focused on adoption and diffusion of technological advances (Swanson 2008). Swanson (2008) wrote that much of the development of new agricultural technological advances and the diffusion of such are being taken over by privately held companies. He further wrote that extension needs to take advantage of the opportunity to create partnerships with those privately held companies that are developing and diffusing technological advances.

Before colonization, there were no agricultural extension services in Rwanda and technical services were related to social interactions by exchange of information and goods. During the colonial period, the agricultural extension services aimed mainly at introduction of export crops such as coffee, tea and pyrethrum. Farmers were obliged to blindly fill standards defined by the colonial services. Due to frequent famines, the colonial authorities introduced sweet potato and cassava as crops to ensure food security. From 1962 to 1980 after the independence, the new authorities maintained this directive. Farmers who did not respect the unilaterally decided system were punished. During this period, a large number of public extension workers were recruited and stationed throughout the country at national, province and sector level. Several extension approaches were tested for instance extension through contact farmers, pilot zones, demonstrations in public fields, extension through farmers settled in non-occupied lands etc. (MINAGRI 2009b).

In 1982, the first national extension system was officially launched. It included two important orientations which are development of partnership with farmers and collaboration in extension service delivery between extension workers and local authorities. The system was replaced by the Training and Visit (T & V) system defined by a workshop held in 1986 on the theme projects reorientation. This extension system was initially tested by the “Projet Agricole de Gitarama” in 1990, and was extended to 8 prefectures out of 10 with the support of the “Projet des services agricoles”. It was introduced in the beginning of the liberation war, and did not get enough time to prove its reliability. From 1994 to 1998, it was the emergency period when government efforts
were oriented to rehabilitation of infrastructures and reconstruction of the country. During this period, many farmers associations were created mainly to benefit from assistance of NGOs and not to share their efforts and capacities to solve common problems. This contributed to instability of farmers groups and/or farmers associations. This problem is still experienced today whereby these associations are not real partners of extension workers, in respect of delivering agricultural extension services but rather as a means to get assistance. It is also in 1998 that extension workers (MONAGRIS) at sector level were removed from public staff and this led to a distortion of extension service delivery, because there was no longer a link between the ministry of agriculture (MINAGRI) and the farmers. Indeed, without MONAGRIS at sector level, the extension workers at district level were insufficient compared to the number of farmer households that needed to be supported (MINAGRI 2009b).

**State/Government Extension**

Prior to 1994, the extension system in Rwanda was dominated by the government through the Ministry of Agriculture (MINAGRI) using a top down approach that included the (T&V) extension model that was introduced by the World Bank. After the 1994 genocide, both national and international NGOs began organizing farmers in groups and associations and providing them with extension advices and services. Most of these NGOs worked in isolation with little or no coordination or sharing of information among them. In order to revamp extension and provide adequate linkages between research, extension and the various actors in the sector, MINAGRI undertook a restructuring that led to the creation of Rwanda Agricultural Board (RAB) and the National Agricultural Export Board (NAEB). The recent decision by the Government of Rwanda to decentralize agricultural extension activities to the Ministry of Local Government (MINALOC) aims at addressing efficiently specific needs of farm households within each District. This move along with a redeployment of staff especially Subject Matter Specialists (SMS) should strengthen extension and enhance its role by positioning staff closer to the population they are intended to serve. The current public agricultural extension including MINAGRI at National/Zonal level and MINALOC at the district, Sector and Cell level (see Figure 2) operate through offices in 30 districts, 416 sectors, 1500 cells and 14,876 villages. The widely accepted notion that extension should be provided through a pluralistic system that include the public sector, international NGOs as well as private sector fit well with the government new extension strategy (IFPRI 2011).

Internationally, Rwanda’s agricultural policies are embedded in a frame work of conventions and protocols such as Millennium development Goals (MDGs), NEPAD, Common Markets for Eastern and Southern Africa (COMESA), the East African Community (EAC), Vision 2020 (the country’s long term development framework), the Economic Development and Poverty Reduction Strategy (EDPRS) 2007-2012 and finally the Plan for Strategic Transformation of Agriculture (the mid-term implementation plan of vision 2020). Agriculture’s sector leading role
in economic development and poverty reduction is currently regulated by the National Agriculture Policy (NAP). Alongside the Agricultural policies and programs, the National Decentralization Policy (NDP) and the Decentralization Improvement program exist. These aim to empower people socially, economically and improve its local governance (MINALOC 2004).

All agricultural programs and policies have been institutionalized under MINAGRI which mainly collaborates with government ministries (MINECOFIN, MINILOC, MINIJUST), national boards (NAEB), local NGOs (Caritas, IPAR among others) and International Donor Agencies (FAO, World Bank, BTC, DFID, CIDA, UNDP among others). Also more complementary to the NAPs is the 2004 National Land Policy, the 2010 Trade policy framework, the gender equality provisions of current land tenure system that aim to enhance land tenure security for achievements of Rwanda’s EDPRS and PSTA aspirations.

Since 2000 the government of Rwanda has pursued the National Decentralization Policy (NDP). This NDP is based on the government’s commitment to politically, economically, socially and technically empower the local population to fight poverty (MINALOC 2004). The NDP is an umbrella of the Decentralization Implementation Program (DIP) and the National Agricultural Extension Strategy (NAES) under which agricultural extension services are delivered to farmers in Rwanda. For effective delivery of extension services in agricultural programs, NAES adopts the following principles: participatory extension, multi-approach and multi method extension, demand driven and market oriented extension, process and results oriented extension, multi actor extension and building on already existing initiatives (Alinda and Abbott 2012).

Before decentralization, MINAGRI was directly responsible for delivering extension services to farmers through agricultural extension workers at the sector (MONAGRIS), district and provincial level. These workers were directly accountable to the ministry. Following the decentralization and administrative administration reform of 2004-2005 (the new DIP), delivery of extension services was put under direct responsibility of the decentralized entities. The reporting system is from sector to district, from district to province and from province to Ministry of local government (Alinda and Abbott 2012).
Figure 2: Structure of Extension in Rwanda

**National level Roles and Responsibilities:**
Ensure implementation of NAES, agriculture policies & Programs; Propose to MINAGRI readjustment of extension programs strategies and policies; Ensure linkage of extension programmes at National Regional & International level; Approve and orient demands from agricultural extension partners; Mobilize resources; Consolidate reports from district level.

**District Level Roles and Responsibilities**
Consolidate extension themes & priorities of different sectors to submit to national level; Identify/consolidate capacity building needs of farmer organizations & service providers; Plan, monitor and evaluate extension activities; Propose to NAECOC readjustment of extension programs strategies and policies considering reorientations emerging from SAPF; Participate in district agricultural development planning; Develop an enabling context to improve performance of extension providers

**Sector Level Roles and Responsibilities**
Consolidate extension themes and priorities of different cells and submit to district level; identify/consolidate capacity building needs of farmer organizations and service providers; Propose to DAPF readjustment of extension programs, strategies and policies considering evaluation of programs & reorientations emerging from AEC; Participate in sector agricultural development planning; Coordinate extension activities of agricultural actors.

**Cell Level (Akagari level)**
Consolidate extension themes/priorities from farmer meetings and submit to SAPF; Propose to SAPF readjustment of extension programs, strategies and policies considering evaluations from farmer meetings at village level; Identify/consolidate capacity building needs of farmer organizations and service providers; Follow up on mentoring of farmers at village level; Ensure feedback to correct existing field data with actual situation; Promote farmers’ participation in research experimentation and extension activities

**Village level (Umudugudu level)**
Assess farmers information and capacity building needs; prioritize extension themes; orient AEC on themes, priorities, urgencies; Participate in extension and adapted research activities; Participate in M&E of extension activities; Feedback
Non-governmental organizations (NGOs)

In developing an extension partnership among public, private, and NGOs, Swanson and Samy (2002) proposed that by avoiding overlapping and duplicative activities, conflicts between public, private, and NGO agencies may be avoided. Furthermore, through capitalizing on their comparative advantage, each of these entities may ‘strengthen effective partnerships among public extension institutions, private firms, and NGOs’ (Swanson and Samy 2002). The partnership will lead to more effective service delivery of extension programmes to rural populations and rural development.

NGOs are a hybrid between the public and private sectors. Also, NGOs appear to have a comparative advantage in working with small and marginal farmers, including women and ethnic minorities. Moreover, NGOs tend to be managed more efficiently than public extension systems and have lower operational costs (Musgrove 1996). Swanson and Samy (2002) observed that NGOs tend to work well with marginalized smallholders, women, and ethnic minorities. The pattern of most NGOs is to consult with resource poor families to identify their most pressing needs and then assist them to achieve sustainable development. Moreover, NGOs can organize self-help groups, such as producer cooperatives, that address the most salient needs of rural populations like creating opportunities for income generation and building social capital.

In a number of countries, the recognized need to organize farmers into producer groups and organizations has prompted some NGOs to become engaged in the social capital dimension of extension activities, because these NGOs have employees who are socially committed to helping rural people play a significant role in building social capital within rural communities. However most NGO employees or volunteers are often not sufficiently technically trained in specific agricultural fields (e.g. horticulture, livestock, and fisheries) and therefore cannot provide the necessary technical management training that producer groups will need to successfully produce for and supply different markets. Consequently whenever possible, local NGOs should be used to initiate social capital development in rural communities but they will need to partner with agricultural extension workers or specialists to provide the technical and management training to these different producer groups (Swanson 2008).

NGOs are the driving force of the current extension service. They support the extension, assist in capacity building and have direct contact with the target groups. Specialist NGOs can contribute to the provision of inputs, credit and marketing. Local authorities have an increasingly important role to play at the grass root level in the promotion of extension services, market development and coordination with other partners. Commercial traders and agribusiness can complete the production chain and marketing An example is the Rural Sector Support Project (RSSP). RSSP supports NGOs service providers which in return train and supervise farmers’ organizational activities. Theoretical and practical trainings are provided to groups of 20-25 farmers and at the
end of the training cycle, trained farmers become farmers who each of them organize new groups to be trained (MINAGRI 2009c).

Another practice is the Caritas approach. Caritas Rwanda launched a major appeal in 2006 for emergency food aid, citing further problems such as Rwanda’s low-lying, semi-arid plains and plateaux, where even a minor disruption in normal rainfall patterns can spark a food crisis. The agency sought to help the country’s women, who after the genocide made up 70 percent of the population and accounted for most economic activity. Orphans were also helped, with at least 100,000 households headed by children. Caritas Rwanda worked with Government officials to buy food from selected suppliers and distribute it to those in need. The work was overseen by Caritas staff, linked by a network at the diocesan and parish levels. Caritas through poor households in areas with frequent food insecurity crises, links groups of farmers or individuals to microfinance institution called ‘Reseau interdiocesan de microfinance’ to promote income generating activities and to encourage them to constitute strategic stocks for food security (MINAGRI 2009b).

According to MINAGRI (2009b), local and international NGOs are not only fund providers for local communities (agricultural inputs supply, marketing and processing of agricultural production, counseling, facilitation in problem and solutions identification, facilitation in farmers organizations in commodity chain, capacity building of farmers organizations, lobbying and plea for local communities etc.) they also provide the feedback through stakeholders’ platforms, at different levels. Being service providers, they will have to sign contracts with public and private institutions funding in agricultural sector.

Private Sector

Rwanda’s private sector is particularly vulnerable because of the country’s history and its mostly rural nature. The private sector generally focuses on cash crops and income and addresses farmer households with strong market links. Some of the private sector firms that conduct business with farmers include Enterprise Urwibotso, Sosoma Industries and MTN Rwanda (IFPRI 2011). The national extension service is being restructured, in order to create a responsive and private sector driven extension service. It has created district platforms that cooperate with local farmers’ organizations to determine the extension needs of producers and to respond to these accordingly. These platforms will be strengthened over the PSTA II (Programme for Agricultural Sector Transformation) period and extended geographically to cover all areas of Rwanda. Government will continue to provide extension services to smallholder farmers. However, it will also work with producers and extension agents to develop and promote a system through which farmers contract their own advisors but are able to utilize an appropriate mechanism, such as vouchers supplied by the government, to pay most of the cost of the service. The system will first be applied on a pilot basis to the more commercial product chains such as potatoes, rice and fruits and vegetables. The aim of the system is for farmers’ groups to be able to choose their own
advisors, and to change them if they are not satisfied with the assistance provided. Gradually, therefore, the private sector will be mobilized to contribute to the provision of extension services (MINAGRI 2009c).

Governments can stimulate private sector participation and investment in technology transfer by providing a “level playing field” whereby private sector firms can compete with each other and whereby government ensures quality control through a systematic monitoring and regulatory system (Swanson and Samy 2002). Provision of extension and advisory services by private sector firms can be associated with input supply including: free or fee service activities; providing broader extension services to different groups of farmers. Other private sector (export) firms provide specific technical advisory services to farmers especially if they are producing products on a contract basis (Senadeera 2007).

Voluntary Farmer Based Extension

Another extension method used in Rwanda is the voluntary based extension. This is a system of voluntary farmers providing agricultural extension services to their colleagues. This system is based on the following principles: 1) voluntary service provider farmers are innovative people, with good communication skills, living in good relations with their neighbours and who agree to work voluntarily. 2) Motivation for those farmers is trainings, study tours and awards received in agricultural competitions. 3) Each voluntary extension service provider accepts to assist at least 5 farmers in their own neighbourhood (MINAGRI 2009b).

Commodity Chain Extension Approach

Commodity chain development is another approach being used by different development partners. It deals with promoting one commodity from inputs supply to the marketing of the final processed product. This approach is used by some farmer organizations and other partners. The advantage of this approach is that it tends to organize the producers in unions and federations which in long term can be able to replace public extension services for certain tasks within their specific commodity chain (NAES 2009).

Farmers mainly organize around common interests like agricultural production to pool their resources together and facilitate access to credit and farm inputs. Whether formal or informal, these farmers’ organizations have always played a role in the relationships between the state and rural society, though over time their roles have changed considerably. Many of the farmers’ association in Rwanda today were created mainly to benefit from assistance of NGOs. Nevertheless, private or state-own enterprises trading commodities such as tea and pyrethrum have gained extensive experience with organizing producers into associations to manage supply operations within the commodity chain (IFPRI 2011).
The Farmer based organizations can provide a range of extension and advisory services for example they may be organized around clientele groups with specific interests or they may carry out specific functions (Diaz et al 2004). Organizing farmers into these groups has the potential to strengthen the bargaining power of farmers in the marketplace (both for input supply and supplying markets). In addition getting farmers organized into groups can increase the efficiency and effectiveness in supplying needed extension and advisory service to all types of farmers (Swanson and Rajalahti 2010). FBOs can also influence government policies that may also help to increase farm income and thereby improve rural livelihoods (Chamala and Shingi 1997).

Other Extension Initiatives in Rwanda

Ubudehe Programme

Ubudehe is a Rwandan system of intra community co-operation based on collective and individual actions. It is initiated and implemented by the population itself at the level of the decentralized administrative entity nearest to the recipients, i.e. the cell/villages. The name Ubudehe was chosen as a reminder that collective action and participatory development are very rooted in Rwandan ancestral culture. The aim of the Ubudehe process as it has recently been designed in Rwanda is to build on the positive aspects of this history and complement it with modern participatory techniques, which have proven their worth in community development. The exact name of the programme: “Ubudehe mu kurwanya ubukene”, actually means “Ubudehe to fight Poverty”. Ubudehe is relevant and consistent with the “Vision 2020, the Poverty Reduction Strategy Paper (PRSP 2002-2005), the Economic Development and Poverty Reduction Strategy (EDPRS 2008-2012) and the Millennium Development Goals, which are guiding all the reform initiatives being undertaken by the government of Rwanda. In particular, the PRSP and EDPRS identified the key priorities as rural development and agricultural transformation, as well as the need to intensify small-scale agriculture, livestock and skills development (Niringiye and Ayebale 2012).

Ubudehe programme allows communities to collectively define their priorities and to actively participate in different development activities through joint planning. These activities for example are agricultural activities, water harvesting, construction etc. the funds for the collective activities are transferred directly to the grassroots level, and are administered by members of the community. Therefore, in addition to improving their welfare, the program makes the society responsible and accountable. As already practiced in the country, this programme and other initiatives can be the effective tools for improving participatory agricultural extension services (MINAGRI 2009b).

Imihigo Programme

Imihigo is as old as pre-colonial Rwanda. Imihigo is a cultural practice in the ancient tradition of Rwanda where an individual would set himself/herself targets to be achieved within a specific
period of time and to do so by following some principles and having determination to overcome the possible challenges. In the modern day Rwanda, the Imihigo practice was adopted as a means of planning to accelerate the progress towards economic development and poverty reduction. Imihigo has a strong focus on results which makes it an invaluable tool in the planning, accountability and monitoring and evaluation processes (RGB 2013). MINILOC and Ministry of Finance and Economic Planning (MINECOFIN) consults with district leaders on an action plan for better services to community members. This action plan includes contracts holding the president and other district leaders accountable for the goals that had been set. These contracts are called Imihigo and they have been signed since 2006 at the local government level with district, sector, cell, and umudugudu (village) officials (2007), as well as at the household level. Imihigo catalyzes the ownership, actions and processes concerning different development plans, enabling improvement of the living standards of the population (NAES 2009).

**Agasozi Ndatwa**
This is an effective way or a competitive approach of mobilizing a community to jointly implement the development plans, for example the Integrated Development Program (IDP). This was initiated by Government of Rwanda in 2008. This is therefore a process of implementing development programs, whereby a certain village after piloting, becomes a model for others to learn. The vision is to scale up the success from Agasozi Ndatwa to Umudugudu- cell- sector- and District Ndatwa and at the end, to have all the country (Igihugu) Ndatwa (MINAGRI 2009b).

**Girinka Program (one cow per family)**
This was inspired by the Rwandan culture and initiated by His Excellency of the Republic in 2006. The cabinet meeting of 12/04/2006 approved as one of the 2020 vision, EDPRS and IDP implementation measures. This program aims at enabling every poor household to own and manage an improved dairy cow which would help the family to better their livelihood through increased milk and meat production and to improve soil fertility of their land for their crops using the available manure. This will not only improve the nutrition, but also increase the earnings of beneficiaries from milk products, meat and sale of manure (MINAGRI 2009b).
2.0 METHODS

2.1 Study site

The ACIAR project works in two sites in Rwanda, semi-arid Bugesera in Eastern Province and sub humid Gishwati area in western Province (Figure 3). Bugesera site is in Bugesera district while Gishwati site is spread out in two districts, Rubavu and Nyabihu districts. Administratively, Rwanda is divided into provinces, districts, sectors, cells and villages.

![Figure 3: Administrative Map of Rwanda with Locations of Selected Sites (Sectors)](image)

**Study sites in semi-arid Bugesera**

Bugesera is one of the seven districts in Eastern Province of Rwanda. It is situated to the South of Kigali town and to the South West of the Eastern Province, covering a surface of 1337 Km$^2$ (Figure 3). The relief of the district is a succession of trays in the heights subsided and whose altitude varies between 1300m and 1667m above sea level. Compared to the other regions of the country, Bugesera is characterized by a hot and tropical climate, due to relatively low altitude, of the rarity of rains and the periods of drought excessively prolonged. It is characterized as a cassava Zone (Figure 4). The vegetation is composed largely by the acacias, the euphorbias and the cactus with otherwise a savanna made of spiny bushes. In the swampy funds, the dominant species is the *Sesbania sesban* (Umunyeganyege) reaching 4 to 6 meters of height. The swamps
cover themselves with papyrus (Urufunzo) thick that one also finds on waters sleep of the pools as well as on the borders of the lakes. Forest galleries are represented by the *Acacia sieberana* (Umunyinya) occupying a narrow strip of alluviums humidifies on the sides of the lakes and swamps.

Sectors selected for the ACIAR ‘Trees for Food Security’ Project are **Rweru, Mareba and Nyamata**. Extension officers in charge of agronomy in these three sectors were interviewed. At the cell level, socio-economic development officers (SEDO) in Kintabwe, maranyundo (Nyamata), Bushinyi and Rugarama were also interviewed.

**Figure 4:** Agro ecological Map of Rwanda with Selected Sites (Sectors)

**Sub-humid Agroecology: Gishwati Area-Western Province**

Gishwati forest is a protected reserve in the north-western part of Rwanda, not far from Lake Kivu where chimpanzees and golden monkeys live. Gishwati Forest used to be one piece in a complex system of rainforests through the middle of Africa. It used to extend west beyond Lake Kivu connecting with the rainforests of the Congo, and south connecting with Nyungwe Forest. These forest systems have become fragmented due to population increase and deforestation. The
area has faced years of degradation prior to the Rwandan Genocide. The area was designated for cattle ranching and agriculture until it became less productive but still remains the higher productive area compared to the remaining areas of the country. Erosion, landslides, reduced water quality has resulted from this degradation of the land. Yet, the reserve’s forests were largely intact in 1978, and substantial forest cover still remained in 1986. During the Rwandan Genocide, wave after wave of refugees arrived in Gishwati forest and began clearing it, often for subsistence farming. By 2001, only a small circular patch of native forest remained, 1,500 acres (6.1 km$^2$) of the forest’s original 250,000 (NASA Earth Observatory).

The ACIAR ‘Trees for Food Security Project’ works in two districts; Rubavu and Nyabihu. Sectors in Rubavu selected for the interviews were Nyundo and Nyakiliba. The cells were Bahimba in Nyundo and Gikombe in Nyalikiba. In Nyabihu district, sector agronomist from Karago was interviewed. At the cell level, the SEDO in charge of Kadahenda was interviewed.

### 2.2 Methods

A literature review, key informants interviews, visits to RAB in Kigali, Eastern provincial headquarters, districts, sectors and cells were undertaken to understand the extension systems in Rwanda. In addition, various NGOs and extension service providers were also visited and interviewed. The major areas of focus were:

- Extension technologies disseminated to farmers
- Community engagement
- Capacity and efficiency
- Linkage with other institutions
- Commercialization and marketing
- Local innovation.

### 2.3 Key Informants

- National level- Extension and Mobilization officer at RAB
- Province level- Eastern Province- Director of RAB Agriculture zone division
  (Eastern Province)

**Bugesera Site**

- Bugesera District- District agronomist
  District veterinary officer

- Sectors in Bugesera- Rweru sector agronomist
  Nyamata sector agronomist
Mareba sector agronomist

- Cells- Kintabwe SEDO (Socio-Economic Development Officer)
  Maranyundo SEDO (Nyamata)
  Bushinyi and Rugarama SEDOs (Mareba)

**Gishwati site**

- Rubavu District- District agronomist, District forester, District Coffee
  Extensionist, Fertilizer officer

- Sectors in Rubavu- Nyundo sector agronomist
  Nyakiliba sector veterinary officer

- Cells- Bahimba cell executive (Nyundo)
  Gikombe cell SEDO (Nyakiliba)

- Nyabihu District- District agronomist

- Sectors in Nyabihu- Karago sector agronomist

- Cells- Kadahenda cell SEDO (Karago)

**Non-governmental organizations**

NGOs/Projects visited and their officers interviewed were:

a) PADAB- Bugesera Agriculture Development Support project

b) PASAB- Project to support food security in Bugesera (Works with Caritas Rwanda)

c) World Vision

d) Millennium Villages Project- Rwanda

e) GWLM (Gishwati Water and Land Management Project)

**Extension service providers**

a) APEPARWA- A private sector organization dealing with Supervision of
  Environmental protection and Agriculture promotion in Rwanda.

b) Rwanda Farmers and Breeders Organization (Urugaga Imbaraga)
3.0 CURRENT STATUS OF EXTENSION IN RWANDA

Extension in Rwanda is under two ministries: MINAGRI (Ministry of Agriculture and Livestock) which sets policies and guidelines and MINALOC (Ministry of Local Government) which implements the policies. RAB (Rwanda Agriculture Board) is an institution under MINAGRI whose mission is to develop agriculture and animal husbandry through the use of modern methods in crop and animal production, research, agricultural extension, education and training of farmers in new technologies.

At RAB there is the Deputy Director General who is in charge of extension, and works with officers in other fields, agronomy, livestock and forestry. The lowest level of extension is at the village (Umudugudu) level, here there are farmer promoters who coordinate extension activities. In most cases these are the outstanding or lead farmers. From the village is the Cell (Akagari) level. Extension activities are coordinated by Socio Economic Development Officers (SEDOs). From the cell level, it is the sector level headed by the Sector agronomist and the officer in charge of livestock. District level is next in authority, at the district there is the District agronomist and the officer in charge of livestock. The RAB directors are in charge of extension at the province/zone level. RAB is the highest level of authority at the national level which heads extension.

RAB aims at increasing the efficiency and effectiveness of agricultural extension services through the Crop Intensification Program (CIP). This is a programme that started in September 2007 with the aim of enhancing food security in Rwanda and improving rural household incomes. CIP operates countrywide. The priority crops focused on in the programme include maize, wheat, rice, sweet potatoes, beans and cassava.

Land Use Consolidation (LUC) Policy in Rwanda

Land Use Consolidation is a policy that was implemented for the first time in 2008 by the Government of Rwanda, through the Ministry of Agriculture, as part of the Crop Intensification Programme (CIP). It is implemented in conjunction with MINALOC. Implementation of LUC policy depends on availability of land and agro ecology of the area. Negotiations are made with the district authorities to identify potential sites for consolidation.

Farmers are mobilized by the district agronomists, sector agronomists, SEDOs at the cells and farmer promoters in the villages to grow the priority crops in a consolidated manner. This enables farmers to benefit from Government services delivered under CIP which include: access to extension services, obtaining farm inputs- improved seeds and fertilizers, irrigation facilities and market availability for farm commodities.
Extension Approaches

Farmer Field Schools (FFSs)

In this approach, appropriate sites are identified for FFS establishment based on crops. Farmers are trained on the techniques of preparing fields, selecting appropriate seeds, crop rotation, diagnosing and controlling crop diseases and pests. Farmers therefore get the opportunity to try and discover by themselves the difference between traditional and improved practices, hence facilitating the adoption of new techniques.

Training and meetings

Trainings and meetings are also used in extension. Agriculture/Extension specialists from government ministries or from NGOs organize for training at different times based on the activities carried out. District and sector agronomists, Cell level extensionists and farmer promoters are all trained on the new technologies being introduced in order to pass on this information to farmers. Trainings are conducted on farms especially during the beginning of a season in order to give farmers guidelines on the different activities. The trainings focus on crop production, livestock management, water harvesting and environmental management.

Agriculture shows/farmer open days

They are conducted once a year. Farmers from different zones gather to show case technologies adopted in the different areas and commodities obtained. This enables farmers to see the results obtained by different farmers after adoption of the various technologies, positive results observed play a major role in their willingness to adopt the techniques.

Private/contractual extension providers

To facilitate CIP implementation, there are private extension service providers engaged through contracts in some districts with a high production potential in which the government and NGOs extension services are not adequate. These private extension service providers have two additional agronomists at the sector level who work together with the sector agronomists and provide services similar to those provided by government agronomists such as working with farmer cooperatives, establishing and working with farmers at the Farmer Field Schools. In Western province they have been contracted mainly for production of Irish potatoes. In Nyabihu district, they have contracted an organization called ‘Urugaga Imbaraga’.

Community Mobilization Campaigns

Community Mobilization Campaigns (CMCs) are aimed at creating awareness on the programs under CIP and encouraging farmers to adopt the technologies introduced to them. Policies and guidelines are made at the national level. Information is passed on to farmers and other
stakeholders (local administration, religious leaders, and security personnel) through meetings at the district and sector level.

Media

Media is used to disseminate extension technologies through the local programmes on Television and Radios. They collaborate with MINALOC and the National Broadcasting Cooperation for a period of time where researchers and technicians may be invited to give talks then farmers can ask questions. They also conduct TV shows, to explain their activities e.g. inputs distribution and they introduce contact persons to farmers in case they have queries. On Tuesdays, they have a programme on the National Radio on Agriculture activities that is aired for 30 minutes.

Linkages with other Institutions

RAB works with MINAGRI projects such as PADAB, PASAB/Caritas Rwanda, Land water harvesting (LWH) Rural Settlement Support Programme (RSSP), Japan International Cooperation Agency (JICA) - in rice and horticulture, United States Agency for International Development (USAID) and Private extensionists.

Market linkages

Farmers form cooperatives at the village level where they sell their commodities in bulk at favourable prices. It is easier for farmers to secure buyers for products in cooperatives as opposed to individual farmers. There is a task force at MINAGRI in charge of post-harvest crop handling which connects farmers with traders. This task force develops guidelines from time to time on the lowest prices farmers can trade their products at. The E-soko service by MINAGRI enables farmers to access market information which helps them in marketing their products.

Successes

- Increase in fertilizer use. It was at approximately 3% in 2008, now it is at more than 15%.
- Increase in yields, in 2008 maize yield was about 1.5tons/ha now it is 4.4-7tons/ha.
- Food security has improved; this can be ascertained from the reduced number of people suffering from hunger and malnutrition.
- Many agro processing units have been established especially for cassava.
- Construction of more storage facilities due to increased crop yields.
- Adoption of modern farming techniques; adoption is rated at 60%.
- Increase in income earned by farmers since most of them can now produce more for sale.

Challenges

- Few staff involved in extension at the district, sector and cell level, sometimes they fail to reach all farmers since the work involved is a lot.
- Some farmers are still reluctant to adopt new technologies; a lot of time is taken to convince them.
• Extension is under two ministries MINAGRI and MINALOC. RAB coordinates extension activities countrywide, sometimes it is a challenge to coordinate actors from the two ministries since they are answerable to their relevant authorities and may not give RAB immediate. Attention as may be required.
• High population in the country is a challenge since agricultural land is gradually declining.

Strengths
• There is a national extension policy which is strictly adhered to.
• More extension approaches have been introduced and are being implemented such as the FFSs and farmer promoters at the village level who help in training other farmers on improved technologies at the village level.
• Government support in terms of finances and training, extension officers are sponsored for trainings.
• RAB intends to open its offices at district level in order to bring its services closer to the beneficiaries for enhanced efficiency.
4.0 STATUS OF EXTENSION IN EASTERN PROVINCE

Structure

Implementation of extension policies takes place at the district, sector, cell and village level. The agronomist and livestock officers in charge at the district work with the sector agronomists and the veterinary officers. The sector officers work with socio economic development officers (SEDOs) at the cell. From the cell is the village level where there are farmer promoters on crops and livestock. These farmers provide feedback to the extension officers at the cell; they train and mobilize other farmers to adopt the new technologies introduced to them. Farmer promoters are chosen based on best performances; they are frequently called for trainings in order to assist in passing on information at the villages. They also assist in determining sites for farmer field schools and commodity prioritization in an area. They give feedback on performance, adoption of technologies and any other issues that may be raised by the farmers.

Every year, districts call up a meeting where different actors in extension meet to assess progress, determine the achievements, challenges and recommendations for future work. They have the ‘Imihigo’ (performance contracts) through which they are assessed. Administrative leaders such as the district mayor (head of district), sector and cell executive secretaries are also invited for these meetings. There are also quarterly meetings for the agronomists, veterinary officers and SEDOs to assess progress of activities.

Technologies

Improved seeds for maize, cassava, rice, beans are distributed to farmers. Crop disease management interventions, fertilizer distribution, training on preparation of organic manure, post-harvest handling technologies like drying and storage, improved livestock breeds, soil and watershed management, rain water harvesting and irrigation technologies are focused on.

Extension approaches

- **Farmer field schools** - farmers learn about new technologies by applying them practically on the farm. This method is efficient in that farmers are able to compare yields obtained by using traditional and modern techniques. Establishment of FFSs depends on the type of crop. A site is identified by farmers, local authority leaders and technical officers from RAB are involved. Farmers receive training on the introduced technologies in these schools and apply them on their farms.
- **Programmes in local radio stations**
- **Training and meetings.** Trainings are organized in stages depending on the themes; these trainings may take eight weeks. Modular trainings may take up to six months where farmers are given certificates after successfully completing the training. Owners of farms where FFSs are established mainly attend such trainings.
• **Leaflets and brochures** - these are usually given when a new technology has been introduced for farmers to read and learn more.

• **Field days** - organized by sectors, farmers from different sectors may also attend.

• **Study tours** mainly to farmer promoters’ farms and best performing farmers. They are aimed at training farmers on the different technologies.

**Opportunities**

• High agriculture productivity potential of the area due to favourable weather and soils.

• Commodities produced are suited for the area and are high yielding.

• NGOs and government projects are in support of agriculture interventions.

• More farmers are adopting the technologies and are willing to be engaged.

• Infrastructure (roads) - good for transportation and post-harvest handling.

• Available markets for commodities both local and international (the district is near Kigali).

**Challenges**

• Both human and financial resources are inadequate due to small budget allocation.

• Information dissemination is not adequate specifically in agriculture extension, trainings and meetings are not enough, FFSs are also not enough for all farmers.

• Willingness of participation and adoption of technologies depends on profitability, agriculture technologies take time to give returns, farmers become reluctant to adopt a new technology if the profits are not immediate for example when implementing cropping programmes some farmers were reluctant to adopt maize planting due to lack of market but when markets were organized farmers adopted the technologies, milk collection centers were also organized and farmers became positive about dairy farming technologies.

**Linkages with other institutions**

Work with NGOs such as Rural development Outreach Programme, send a cow Rwanda, Heifer International, Umutara polytechnic, Inatech Kibungo International, University of Rwanda, Adventist Relief agency (ADRA), Apeparwa Rwanda in Nyamata, PADAB and World vision.
5.0 EXTENSION IN BUGESERA DISTRICT

Bugesera District is one of the seven districts which make up the Eastern province and located in the south-east of the Republic of Rwanda. It is only 35 km from Kigali city. Its population is 308661 people; the surface area is 1421km². It is made up of fifteen (15) Sectors, seventy two (72) cells and 851 villages.

At the district level the District Agronomist is in charge of agriculture and extension. There is also a district veterinary officer who is specialized in livestock management. Technologies are disseminated to farmers through sector agronomists and veterinary officer at the sectors. The district veterinary officer and a sector veterinary officer is in charge of livestock management at the district level and sector level respectively. Two trained animal health workers are based in each cell to assist in livestock management. SEDOs are in charge of agriculture and livestock management at the cell level and farmer promoters at the village level.

Farmers are organized into cooperatives/groups based on the different crops produced. There are more than 241 community groups. All farmers are targeted and are encouraged to join groups or cooperatives. In each group there are lead farmers. Crops focused on through Crop Intensification Programme include maize, beans, cassava bananas, rice.

Extension approaches

Extension information is disseminated through trainings where by extension staff and farmer promoters are trained. The trained lead farmers assist in training other farmers. Farmer meetings are held demonstration trials for both chemical and organic fertilizer application and tree planting are set up. FFSs are also used. These are set up for different crops such as bananas, rice, cassava and maize. Management of FFSs is by farmers. There is a lead farmer for each FFS.

Other extension methods include study tours to different sectors, media where information is passed according to seasons through the local radio stations, farmer open days/agriculture shows, seminars and workshops for farmers.

Farmer competitions are held in the district. These are aimed at encouraging farmers to work harder and get better results; it is also a way of motivating farmers since outstanding farmers are rewarded. They are given cows, agriculture materials like wheelbarrows, watering cans, hoes spades and boots.

Technologies

Technologies disseminated depend on crops and season. Farmers are empowered to increase productivity through provision of improved seeds and fertilizers. Trainings are given on: weed and disease control, soil and water management techniques, post-harvest techniques and
irrigation of rice in marshlands. All cooperative members are encouraged to be active and participate in all activities unlike in the past where only the lead farmers were active. In Bugesera the government supplies seeds freely and fertilizers at subsidized prices. Farmer promoters assist in distribution of the inputs to farmers.

Farmers are also empowered on post-harvest handling techniques through trainings on drying crop harvests and treating them before storage. More than 16 storage facilities have been constructed for farmers with funds from MINAGRI. Farmers are trained on appropriate feeding methods of the livestock like use of fodder and improved feeds. Meetings for all farmers are conducted regularly where farmers air out their views, grievances and suggestions regarding livestock management.

Veterinary officers train farmers on Artificial Insemination in order to obtain higher quality breeds that produce more and better quality products such as milk. They also train farmers on disease control and management, vaccination and also enlighten farmers on signs and symptoms of diseases so that they can alert the veterinary officers on time in case such signs are detected.

**Challenges**
- Budget constraints, this limits meetings and trainings organized for farmers since these are expensive to organize.
- Improved feeds are expensive thus limiting the number of farmers who can obtain such feeds.
- Many activities aren’t planned for especially meetings; much time is spent on such activities.
- Agronomists get instructions from MINAGRI, MINALOC, Forestry department; sometimes they may be contradicting instructions.
- Inadequate finances for the activities. MINAGRI gives about six million RWF per year. This amount is not enough for all the required activities.
- Inadequate staff; only one sector agronomist and one SEDO for the cell yet so much work is involved.
- Long dry spell affects crop production.

**Markets**
Farmers market their milk through establishment of Milk Collection Centers (MCC), some farmers take their milk to Inyanje dairy, and they take their animals to the slaughter houses and butcheries.

Monitoring and follow up is done by the sector and cell veterinary officers. Uptake of the technologies is good and farmers are willing to be engaged.
Linkages with other institutions

They work with PADAB project especially for trainings on FFSs, PASAB, JICA- for rice and horticulture and RAB.

Achievements

- Increased crop yields for example rice harvest was at 2-3tons/ha, this has increased to 6-7 tons/ha.
- The new banana variety introduced, ‘Fig 25’ is more productive.
- Farmers know the prices of commodities and market conditions through the E-soko service by MINAGRI and CICA.
- Farmers can communicate to them easily through the free rate telephone, each cell has one phone.
- Farmers are now more enlightened on modern ways of production aimed at producing more for markets.

Extension in Rweru Sector

Technologies

At the sector level the sector agronomist is in charge of agriculture and extension. There is also a veterinary officer in charge of livestock at the sector level. SEDO is in charge of agriculture and livestock at the cell. At the villages there are farmer promoters who coordinate extension activities. There are several farmer cooperatives in the villages. There is one Natural Resource Officer in charge of three sectors who visits each sector at least twice a week or any other time on demand, these officers are important mainly for marshlands management.

Improved seeds and fertilizers are distributed to farmers; these inputs are provided by RAB. Seeds are distributed freely while farmers pay 50% the cost of fertilizers. Farmers are trained on planting and managing trees on their farms. They are encouraged to form cooperatives to enhance efficiency of extension services distribution; cooperatives help farmers in marketing their products more easily. They also build storage structures for their commodities such as maize, beans and sorghum. Other activities engaged in by cooperatives include fishing and livestock management. Zero grazing is encouraged in order to obtain more manure. RAB distributes fodder grass seeds to farmers who are also trained on disease control and management.

Extension methods

- Meetings are conducted at the beginning of the season in all cells to advise farmers on how to prepare for the season.
- Training- Farmers are trained on various activities at the sites. During the season different sites are visited for the trainings.
• Demonstrations of technologies for example fertilizer application. This is done on individual farms mainly belonging to the model farmers. The other farmers apply what they learn on their farms.
• Print outs/brochures explaining in details technologies introduced are distributed to farmers
• FFS- In farmer field schools, a group of farmers follow all steps of farming from planting to harvest together with technicians. After being trained at FFS they practice what they learn on their farms. RAB trains the farmers willing to participate in FFSs selected from different cells. They are trained for 5-6 months then go back to the cells for implementation. They are trained at district level. They have both theory and practical classes. Rweru sector has about ten FFSs where each FFS has only crop.

Strengths
• Farmers are committed to implement the technologies introduced to them.
• They have now established milk collection centers hence no much challenge in sale of milk.
• Involvement of all stakeholders in agriculture- Government, security, politicians, and NGOs/projects- PASAB, PADAB, ICRAF.
• Support from RAB.

Challenges
• Farmers lack adequate resources to purchase inputs like fertilizers and insecticides.
• Climatic changes- the long dry period causes low yields farmers get discouraged.
• FFSs are not enough due to small land sizes and inadequate trained personnel since RAB may put a limit on the number of farmers to be trained.

Incentives
Agriculture competitions are organized at district level; best performing farmers are rewarded with cows and agriculture equipment, through this other farmers get motivated to improve their performance.

Markets
Farmers market the commodities through their respective cooperatives. Awareness is created on the market conditions and this helps farmers in setting prices for the commodities.

Extension in Kintambwe Cell (Rweru Sector)
There are nine villages in Kintambwe cell. Each village has one farmer promoter. There are no cooperatives in the cell yet. Farmers have organized themselves into farmer groups for different
activities entailing crop production and livestock management. There are four groups in the cell each majoring in different activities; one for fishing, one for cows, one for maize and one for beans. The number of group members varies per group but usually each group has more than 20 members. The fishing group has men only; the other groups have both men and women.

**Extension activities**

- Improved seeds and fertilizers are provided by RAB, farmers are sensitized on the use of these inputs.
- There have a communal storage system at the cell. This was introduced to: reduce theft cases in the area, curb the problem of conflicts that emerged in some households where some members were selling farm produce without consent of the other members, and encourage farmers take advantage of market conditions and sell their products when market prices are high. After mobilization and sensitization on importance of storage, farmers agreed to store their produce at the storage facility constructed in the cell and at PASAB. Response to this technique was positive and has been in operation for six years. Farmers were required to pay a small fee for the services which they did since they were sure that their harvest was safe. Farmers obtained better proceeds from sale of their produce, theft and cases of conflicts reduced and farmers’ livelihood improved.
- Together with REMA, they sensitize farmers with farms on the marshlands to plant trees in the marshlands.
- Erosion control activities which include planting trees, digging terraces and planting grasses such as Napier.
- Livestock management activities which entail Visits to farmers to check the state of their livestock, encouraging farmers to practice zero grazing and use of improved feeds. Farmers are also trained on signs and symptoms of diseases and disease control.

**Methods of extension**

- Meetings- each month two meetings are held at cell level. All farmers and the farmer promoters are invited. Meetings are also organized at the village level.

- Farmer visits at the sites for technology demonstration

- Trainings on crops and livestock by experts from RAB/REMA. All the SEDOs and farmer promoters attend such trainings.

- Use of FFSs. In the cell there is one FFS for cassava, one for maize and one for bananas.

**Strengths**

- Introduction of land use consolidation has led to increased crop production.
- Farmers are willing to adopt the technologies due to the benefits obtained.
Farmer facilitators are motivated by the trainings they receive and the results they get after implementing the technologies.

Challenges
- Transport and communication is a challenge in the area.
- Long dry season in which crop yields decline.

Extension in Mareba Cell (Rweru)
The SEDO is in charge of agriculture and livestock activities in the cell while the farmer promoter is in charge of a village. At start of season, SEDOs call a meeting for all farmers and facilitators where they communicate the site chosen for each crop under the crop intensification programme. Plans for the season are made by the farmers and facilitators during the meeting. The SEDOs then meet with the farmers in their respective sites, these meetings are held 2-3 weeks before start of activities so that farmers have sufficient time to prepare for the season and they can also have time to mobilize more farmers to participate in the activities. Farmers reluctant to start farming activities are identified and summoned, some reasons given include lack of resources to obtain inputs, illnesses, and others have other businesses or may be working in other farms.

Extension technologies and methods
- After land preparation, planting methods are demonstrated to farmers e.g. line planting in maize with specific measurements for spacing. Some people are resistant to these technologies due to small land sizes however they are advised to plant bean seeds in the middle of these lines to utilize the left spaces. Seeds and fertilizers are distributed to the farmers. Seeds are distributed freely while only 50% of the fertilizer cost is charged to the farmers.
- After harvest they call farmer facilitators to discuss and compare yields with previous seasons. They also agree on the post-harvest handling techniques like pre-treatment of seeds before storage and the appropriate storage methods. There is a farmer cooperative that deals with storage of farmers’ produce which is engaged. Some farmers are resistant to this because they want to sell their produce immediately after harvest.
- Walantange method of storage is also applied in the area. This system was introduced by Caritas which constructed a storage facility targeting all farmers in the sector. In Walantange method, farmers bring harvest for storage, and then they are paid 70% of the value of produce. In case the farmers need their products back, they return the money that they had taken. Most farmers prefer the Walantange method since they can solve their short term financial needs after taking their produce for storage. It also helps farmers wait until market prices are favourable in order to sell their products hence increasing the profit margins.
- Erosion control measures in place include digging terraces, trenches and drainage channels at the edge of the farms to collect water especially on the hillsides. Planting grasses on terraces and planting trees on farms.
- Farmers are trained on preparation of compost/ organic manure using animal waste and crop residues.
- There are nurseries at the sector, farmers are encouraged to take tree seedlings from the nurseries and plant in their farms, common species include Grevillea robusta, Calliandra calothyrsus, Markhamia lutea, fruit trees like avocado, mango, and oranges. Trees are also planted in marshland belts to conserve soil.
- Implementation of Ubudehe program. This is a government initiative to improve community members’ livelihoods. The government gives an amount of money to a group of farmers in a village who decide on how to use it. For example the group members may decide to buy cows for milk production. In such circumstances, SEDOs sensitize them to have artificial insemination in order to obtain better varieties over time.
- Implementation of Girinka program. This is a program implemented countrywide specifically on cows. The communities determine the poor members in the community who are given cows. For example 20 members may be given 5 cows. The first calf is given to another household in the group this continues until all the members in the group have a cow. Any additional calves belong to the individual households. This has helped in reducing poverty rates in the country. Farmers are encouraged to practice zero grazing due to the small land sizes, to reduce spread of diseases and for environmental protection.

Strengths
- More crop yields are obtained as a result of the CIP program.
- RAB may purchase seeds for distribution in the following season from farmers at good prices.
- Extension technicians get trainings from RAB and help in disseminating technologies.
- With time farmers get used to the system and they become self-sufficient hence not requiring much follow up.
- RAB/ NGOs take farmer promoters, model farmers and technicians for study tours to gain more skills; this becomes easy for the extensionists since farmers have already seen the benefits.

Challenges
- Lack of transport facilities for farmer facilitators at the village level and for SEDOs at the cells. Communication costs are also high.
• Land use consolidation; farmers may have other farms different from the land consolidation site, hence may give more attention on the other farms.
• Hard to cover the whole cell due to inadequate transport facilitation.
• Difficult to convince some farmers on the crops to be used in the CIP since some farmers have other crop preferences.
• Some farmers are reluctant to change from the fallow system of cultivation since the policy requires land utilization at all times. They prefer the fallow system since they do not apply fertilizers which are expensive.
• Most farmers neglect use of organic manure and concentrate on the fertilizers supplied by the government.

Extension in Nyamata sector

Technologies
Implementation of Land Use Consolidation policy is through Crop Intensification Programme that is planting of the same crop in one site. This increases productivity and helps prevent spread of diseases.

Sector agronomists call for farmer meetings after which they visit their farms to check on the progress. In the meetings, farmers are trained on management of the selected crops (maize, beans, bananas, cassava) and Fruits (pineapple, mangoes, avocados, bananas, paw paws), disease control and management.

Farmers organize themselves into cooperatives. There are about five cooperatives in the sector formed according to crops such as cassava and vegetables also for storage of maize and beans. It is easier and more convenient to follow up farmers when they are in cooperatives.

Methods
• Work with NGOs to assist them in facilitating meetings e.g. providing transport and technical support for example JICA is involved in farming of rice and horticulture.
• FFS- they have FFSs for cassava and vegetables.
• Use farmer promoters in the villages and model farmers to pass on information to other farmers.
• Frequent farm visits to follow-up on activities.

Linkage with other institutions
Other stake holders include JICA, PASAB, PADAB, World vision, Millennium villages and RAB.
Extension in Maranyundo Cell- Nyamata

The cell has six villages. The farmer promoter is in charge of a village. The executive secretary is in charge of the cell. There are five leaders at the cell: the executive secretary of the cell, Socio Economic Development Officer (SEDO), population well-being officer, security officer and a communication officer. The cell has five cooperatives; one for cows, one for pigs and three for crops. The three FFSs in the cell are for banana, sorghum, beans and maize.

Extension Methods
Farmer promoters in each village are trained by RAB staff and subsequently train other farmers. There are also other model farmers in the villages that assist in technologies dissemination. There are about 12 model farmers in the cell. Trainings are mainly conducted beginning of each season. Meetings are held once in a month in the cell, in villages, meetings are conducted twice a month. Trainings are also conducted during some of these meetings. Technologies successfully adopted in other cells obtained during field visits are also showcased to farmers through video clips.

Technologies
- Train farmers on use of both organic and inorganic fertilizers.
- Train farmers on water harvesting methods, water tanks, making water harvesting ponds and terraces for erosion control.
- Have two nurseries in the cell level for Pinus spp, Jacaranda mimosofolia, Grevillea robusta, fruit trees such as avocados, mangoes, oranges where farmers are trained on raising seedlings, the seedlings from the nursery are distributed to the farmers.
- Farmers also engage in growing vegetables such as carrots, cabbage, tomatoes, eggplant.

Opportunities
- Land use consolidation programme leads to increase in crop production if properly implemented.
- Increased income due to higher production, results in poverty reduction.
- Farmers are encouraged to store their produce so that they can sell their produce at better prices when market conditions are favourable.
- Mobilization of farmers into cooperatives enhances efficiency in extension services.

Challenges
- Long dry season affects crop production.
- Some farmers are resistant to fertilizer application especially due to inadequate finances.
- Inadequate extension officers- not all farmers are reached.
- Late seed distribution by RAB thus delays planting hence affecting crop yields.
Extension in Mareba sector

Technologies
Technologies disseminated include: mobilizing farmers to implement land use consolidation policy, use of organic and inorganic fertilizers and sensitizing farmers to put together their harvests for market purposes through cooperatives. Farmers are encouraged to plant trees on their farms and homesteads e.g. *Grevellia robusta, Eucalyptus spp*. Farmers prefer fruit trees but seedlings are not enough. The fruit trees include avocados, mangoes paw paws, oranges (some of these trees are planted on the boundaries especially eucalyptus, others especially fruit trees may be intercropped.)

Farmers are trained on construction of soil erosion control structures like terraces, trenches, water drainage channels, planting grasses on terraces and rain water harvesting.

Methods
At the sector level the agronomist and the veterinary officer are in charge of extension services. The agronomist is also in charge of soil and water management, environmental protection and infrastructure. There are five cells in the sector; SEDOs are in charge of extension in the cells. The sector has 51 villages where there is one farmer promoter in charge of each village. Farmers have organized themselves into groups and cooperatives where a group constitutes about 20 farmers. Cooperative members vary depending on cooperative type and some may have up to 400 members.

Farmer meetings are called for in case they intend to disseminate technologies or new skills need to be passed on. Meetings are held when need arises but mainly at the beginning of the season. Extension officials usually visit farmers in the farms to check on progress and also to demonstrate to them application of technologies on the farms. Trainings are conducted for SEDOs and farmer promoters in order to assist in disseminating technologies to other farmers.

There are several FFSs in the sector in different cells- Gasagara, Nyamigina and Nyarugenge-managed by RAB and MINAGRI. The FFSs are for various crops including maize, beans, cassava and bananas. There FFS in Nyarugenge is for rice and it is managed by JICA.

Strengths
- RAB helps in training farmer facilitators at the beginning of every season. These farmer promoters assist in training other farmers in the village.
- Some projects like PADAB also help in training SEDOS and taking them for study tours. This motivates the farmers and helps them acquire more knowledge and skills.
- Farmers are committed in implementation of the technologies. They apply knowledge taught to them.
- Existence of farmer groups and cooperatives makes it easier to disseminate technologies and organize farmers for the various activities.
Challenges

- No motivation for farmer facilitators thus sometimes they are not committed. The farmer facilitators are not paid.
- Lack of adequate transport facilities, the sector is big and reaching all areas is a challenge. This makes it difficult to reach all individual farmers.
- Extension staff members are not enough to cover the whole sector adequately.
- Lack of adequate trained personnel especially at the cell where the SEDO is in charge of agriculture and livestock.
- Lack of resources to establish more FFSs. The existing ones are not enough for all farmers.
- Long dry season leads to lack of sufficient water which results in failure of crop and tree seedlings.
- It is challenging for farmers to take up a technology that requires them to spend much money, labour and time for example planting maize in lines. However extension is geared towards enlightening them on the ultimate benefits which make it worth their time and efforts.

Time of visit: Beginning of season during land preparation, planting, fertilizer application, in cases of crop attack by diseases/pests and during harvest for post-harvest handling activities.

Improvements due to extension

- Increase in yields due to land consolidation program.
- More use of fertilizers since farmers have seen the benefits.
- Cassava – initially planted mosaic (not resistant to diseases) now they are using improved varieties e.g ‘Kizere’, ‘Ndahirabahinzi’ which give more yields and are resistant to diseases.
- Introduction of new banana variety. Initially the most common varieties were ‘Gisubi’, ‘Intutu’, ‘Indaya’. Which were mainly used to produce banana beer. ‘Fia 17’ is one of the improved varieties which is being introduced to farmers.
- Improvement in rice growing, initially it was not a cash crop since only a few people were involved in rice growing. Currently it has become one of the major cash crops.
- Improved crop management techniques e.g. cassava management now involves weeding and fertilizers application.

Linkages with other institutions

Work with PADAB, JICA.

Markets

Farmers market their commodities through the cooperatives.
Recommendations

- Government to train and employ more staff in extension work.
- Government to provide more resources for facilitation for transport and communication.
- Tree seedlings to be raised by private organizations from where the government can purchase in order to distribute to farmers. Species most preferred are *Grevillea robusta* and *Eucalyptus spp.*
- Farmers prefer improved seedlings such as grafted fruit trees, the government should assist in availing them to the farmers.
6.0 NON-GOVERNMENTAL ORGANIZATIONS/PROJECTS WORKING IN BUGESERA DISTRICT

6.1 PADAB/PAIRB Project

PADAB (Project d’ Appui au Developpement Agricole de bugesera) which means Bugesera Agriculture Development Support Project is a MINAGRI project that started in 2007 and should continue until December 2013. Still under MINAGRI is another project, PAIRB (Project d’ Appui aux Infrastructures Rurales de la Region Naturelle du Bugesera) which means Bugesera Rural Infrastructure Support Project. PAIRB is a five year project that runs from 2010 to 2015. These projects are aimed at improving agriculture, main priority crops being maize, bananas, cassava, beans, fruits such as mangoes and avocados. They are also aimed at enhancing rural development through reclamation of marshlands to produce rice, farm organization and management, PAIRB project is mainly aimed at infrastructure development; electricity, water pumps and irrigation facilities in the two big marshlands in the project site.

Extension methods

Extension usually focuses on the priority crops based on the land consolidation policy; lead farmers are chosen within the community then trained. Farmers willing to be engaged/beneficiaries are trained by the lead farmers. Training is based on crops and this is done for the different activities during the season. All farmers involved work at the demonstration farm chosen from one of the farmers, guidelines are established for these farms based on agreements within the group, for example they may decide that the first harvest belongs to the group, subsequent harvests can be for individuals. This method avoids costs associated with renting land since they use land belonging to one of them. This also assists members to benefit as a group. Farmers also gain skills and can implement them on their own farms for better results.

FFSs are also used by the project to disseminate technologies (Figure 5, 6 and 7). This approach is preferred to demonstration plots. The difference is that in FFSs, farmers learn technologies at every stage and implement them together on the FFSs. In the demonstration plots technologies are illustrated to farmers on an individual’s farm then the farmers implement them on their own farms. One farmer volunteers to give out his land for demonstration purposes where extension officers and other technicians will work on as other farmers observe. In FFS there is follow up on the entire site at all stages of crop production. In FFS farmers become professional and expand their cropping land since they see potential for success. FFSs for this project were established as follows for the different crops: Bananas in 2009, cassava in 2010 and maize in 2011.

Success attributed to FFS is not only in introduction of technologies but also in use of farmers to train other farmers. Before this, agronomists were used; they were not always available since they were too busy with many other activities. Now farmer to farmer interaction is easier. Follow ups are made by supervisors engaged by the project for the different crops to help in overall guidance of the farmer. These supervisors are given allowance according to days worked. About
4000 people are direct beneficiaries of the project/ adopters of techniques introduced in different crops within the last two years.

**Figure 5:** A lead farmer explaining about 4 different banana varieties in an FFS plot

**Figure 6:** FFS members in the village

**Figure 7:** PADAB agronomist communicating to the farmers
Other extension methods include Field days/open farmers’ days, meetings with authorities- they encourage monthly meetings with facilitators and farmers.

**Technologies disseminated**

Fruit nurseries are established close to the lake. Grafted fruit trees are in demand among farmers; initially they distributed non grafted fruit tree seedlings which failed. They are now encouraging farmers to plant in orchards by first using a few farmers for demonstration. They started by distributing 5000 tree seedlings. They first created awareness to the farmers and established the criteria for adoption. Farmers willing to be engaged were required to have enough land, water and manure. Grafting is a challenge but the farmers work closely with the technicians, in Bugesera, PADAB has hired a consultant to help them in grafting of the fruits. The project is particularly keen on orchard development. PADAB intends to increase the acreage under improved fruits which include grafted mangoes, avocados and citrus. They also disseminate technologies on livestock management by introducing fodder trees like *Calliandra calothyrsus* and *Leucaena spp.*

**Opportunities**

Government support- GOR is on the forefront in supporting systems that focus on the increase in the importance of knowledge and information circulation among the communities. This is evidenced by the establishment of the Agricultural Information and Communication Centre (CICA) at MINAGRI because knowledge is the organizing principle for farming businesses and industry. CICA continues to inform farmers about new developments in the various industries.

GOR also supports cooperative movements for the various crops. It focuses on specialized cooperatives like fruit cooperatives with the aim of enhancing quality of products needed for international markets. The government through National Agriculture Export Board (NAEB) also streamlines bargaining power in the international markets.

**Markets**

There is availability of local market for farmers’ products. Farmers form cooperatives to help in marketing their products. The district being close to Kigali is an advantage in terms of finding markets for the commodities.

**Linkage with other institutions**

The project works with NAEB, World Vision and PASAB.

**Recommendations**

- More effort to be put in extension for technologies to reach more people, (this is reason as to why they have started engaging the SEDOs).
• More scion provision of fruit trees; these are preferred to other trees.
• Government should assist in outsourcing more scions to enable farmers carry out grafting in time.

6.2 World Vision

Area Development Programme (ADP) is a program under World Vision in which agriculture and extension activities are implemented. The program has three components: Education, Health and nutrition and Economic Development. Under Economic Development is Agriculture, extension and livestock management. The objectives of this component (Economic Development) are to improve sustainability of crops (cassava, maize) and livestock (cows, pigs, goats). Farmers are sensitized to organize themselves into Community Based Organizations (CBOs) since these are more convenient to work with. The most vulnerable groups of people (poor) are mainly targeted. Seven farmer CBOs in crop production are facilitated. One CBO has 15-50 members. Each CBO has its activities either crop production or livestock keeping. Pigs have been distributed to two CBOs and goats to five CBOs. Local goats are preferred; Hybrid pigs (Large white) are mostly preferred. Cassava which is a major cash crop is mainly focused on. About 300,000 cassava cuttings have been distributed to the farmer CBOs.

Methods used in extension

Support of the seven CBOs began this year, in the previous years focus was on health and nutrition as opposed to economic development. It is expected that demonstration plots and FFSs will be operational the following year. World Vision conducts trainings on both crop and livestock management to the farmers during seminars and workshops that they invite farmers to attend. In crop production training, emphasis is laid on fertilizer application (NPK) and preparation organic manure. Agriculture tools such as hoes, forks, rakes, wheelbarrows are distributed to farmers. Currently they have not established irrigation technologies since there are no marshlands in their work sites.

Study tours to different sectors are conducted for the farmers to learn from others. They also facilitate farmers in attending the agriculture shows (58 farmers were facilitated for the latest agricultural show that was attended).

Opportunities

• Most of the farmers are willing to be engaged.
• Farmers are willing to give their land for agriculture.
• Farmers are well organized in CBOs. This makes it easy to manage them.
• Local administration is in support of their activities in the area. For instance they work with about 3000 farmers: these were selected with the help of the local leaders.
**Challenges**
Some farmers still have no knowledge of the modern agriculture techniques and some are reluctant to adopt them.

Poverty makes it difficult for farmers to adopt techniques. They have small land for agriculture from which they earn little income hence cannot afford the improved farm inputs and modern farm tools.

**Markets**
They work with agro processing units such as Kotika-in Mayange sector which is a cassava farmers’ cooperative. The five CBOs producing cassava have been linked to Kotika which buys their products.

**Linkages with other institutions**
World Vision works with sector agronomists who assist them in trainings farmers. They also work with PASAB/Caritas for technical support such as training farmers on modern agriculture methods and post-harvest crop handling. They expect to partner with PASAB to establish a cassava processing unit. They also work with PADAB, Millennium Villages project and RAB.

**Recommendations**
Farmers need more awareness creation and mobilization on adoption of the technologies introduced to them. Local leaders should help in such mobilization since these are mainly the opinion leaders. The government should assist farmers in marketing their products especially for mushrooms where market is still a challenge.

**6.3 Millennium Villages Project-Rwanda**
Millennium Villages Project was started in 2006 under the support of UN and the government. It was aimed at implementing activities in line with the Millennium Development Goals (MDGs) and attaining Rwanda’s vision 2020. The project covers different aspects; Environmental management, crops, livestock, health and nutrition, infrastructure, education, business and community development. The activities involved in Agriculture sector are in line with MDG 1 and 6.

The project implementation is in two phases:

Phase 1: 2006-2011

Phase 2: 2012-2015

Communities are mobilized to participate in these activities. The project works in Mayange sector and every farmer is a potential beneficiary of the project. The community members organize themselves into CBOs which makes it easier for dissemination of technologies by the
officers. The technologies disseminated are in crop production and livestock management. They partner with the government sector agronomists in planning and implementation of their activities. There are five cells in the sector and there is one agriculture officer for the project in each. At the village level there is one lead farmer who acts as link between the project and other farmers.

**Technologies**

Crops mainly focused on include maize and beans. Initially they used to provide seeds and fertilizers to the farmers but stopped when the government started distributing the inputs to farmers. They distribute livestock to farmers for example they give pigs to poor households, they reward best performing farmers with cows and agriculture equipment like wheelbarrows.

Initially they were raising tree seedlings in their nurseries but they opted to be getting the seedlings from private nurseries then distribute them to farmers. Tree seedlings distributed to farmers include obtained *Markhamia lutea, Grevillea robusta, Jacaranda mimosifolia, Acacia spp, Leucaena spp, Calliandra calothyrsus*, fruit trees include avocados, mangoes and oranges.

**Extension methods**

- They conduct trainings to farmers. They train lead farmers who then train other farmers.
- They conduct study tours mainly for the model farmers since these will transfer skills learnt to other farmers.
- They have demonstration sites for rain water harvesting, rain water conservation ponds and irrigation technologies.
- They have field visits to other areas for example they took farmers to southern province to observe Land Use Consolidation activities in Kamonyi district.
- Facilitate farmers to attend national agriculture shows.

**Challenges**

- Many farmers are selling land to investors who construct buildings hence small land is left for agriculture.
- Climatic conditions- long dry spell and erratic rainfall causing low crop yields.
- Delay by the government to distribute seeds and fertilizers to farmers, rains fall before farmers have completed planting, this discourages farmers to adopt the use of improved seeds.

**Markets**

They advise farmers on potential markets for commodities.

**Linkages with other institutions**

They work with the government through district agronomists, World Food Programme (WFP), UNDP, PADAB and World Vision.
Recommendations
Timely delivery of inputs to farmers by the government to avoid delay in planting.

More fruit trees to be distributed to farmers, this will enable them earn more from sale of fruits.

6.4 PASAB/Caritas Rwanda

PASAB is a project under the Development Department in Caritas aimed at supporting food security in Bugesera. This department was started in 1998 to coordinate development activities planned by different catholic dioceses. The department’s mission is to:

- Support farmers with small loans in collaboration with inter-diocese microfinances.
- Improve food security and environmental protection in the local area.
- Increase dioceses’ capacity to support development activities.

Since 1999, Caritas Rwanda has been interested in food security of poor families in Bugesera District. Different projects have been established under caritas to improve food security. Development phase of the food security project (SABM) was the first phase that began by distributing food in health and nutrition centers to support the poor. Then upgraded to PASAB which is a development project to support food security. During the two phases, Caritas Rwanda has helped in livelihood improvement of the poor families, stabilization of life cost and its enhancing its affordability. In 2006 the storage system was introduced aimed at encouraging farmers to store their produce, PASAB developed the storage strategy. The storage strategy was to be implemented in two ways:

In the first method, the project buys agriculture products from farmers at a price 5% more than the market price after harvest. This price is offered to motivate farmers to bring their harvest at stores and enhance efficiency of transport to the facilities. Products are stored until the following season in which farmers that sold their products to the stores can buy back the products. The products that remain are sold to other farmers at a lower price compared to the local market price. The quantity of the commodities availed for trade in the market is controlled in order to avoid low prices due to excess supply in the market. This strategy is referred to as ‘Warrantage strategy’. This method helped farmers get better prices for their produce since they did not have to sell the excess produce after harvest when there was much supply in the market but would instead sell them when prices were favourable.

In the second method, another storing strategy was introduced. This method was aimed at enhancing beneficiaries’ involvement. Farmers would organize themselves into cooperatives then collect, store and sell agriculture products through the cooperatives. The cooperative
members would store their commodities jointly and pay a storage fee of 4% of the value of the produce. Both methods enabled farmers to sell their commodities when prices were high thus increasing their profit margins. Farmers also started getting funds from micro finances to boost their activities. PASAB constructed 14 storage facilities with the capacity of 3,250 tons in 14 sectors of Bugesera district; Nyamata; Juru; Mwogo; Ririma; Gashora; Rweru; Kamabuye; Ngeruka; Ruhuha; Nyarugenge; Shyara; Mareba; and Musenyi. Funds have been made available in RIM Ltd (a micro finance) in order to enable farmer cooperatives access credit facilities.

There are different departments in PASAB. Administration, Agriculture and livestock, Markets and Capacity building. PASAB is funded by Caritas Belgium and FBSA- Belgium funds for food security. Beneficiaries are grouped into cooperatives. In PASAB there are 17 cassava cooperatives, 10 cooperatives for maize, 14 for pineapples and 2 for legumes. Technologies are disseminated through cooperatives which are more efficient. They have community supervisors (trained agronomists from the project) who train community members on crop production-planting, fertilizers application, harvesting. They also train on cooperatives management.

Each sector has been divided into three sites; each site has about 150 households. One sector therefore has 450 households who are direct beneficiaries of the project. Each site has one leader (lead farmer). Within the 150 households, 15 households form a group; therefore having 10 groups in a site. Each group of 15 households has a contact person who also undergoes training.

Technologies

- Collaborate with RAB to distribute improved cassava seeds, conduct trainings on cassava production, cassava is chosen because it’s a high priority crop, training is also conducted on crop management, disease control, post-harvest handling and transformation.
- They have introduced agroforestry trees on cassava and maize farms like, Leucaena spp, Calliandra calothyrsus and Grevillea robusta. Fruit trees include avocados, mangoes, paw paws, these trees are raised in nurseries (one nursery for one site with about150 house-holds).
- They work with RAB in helping farmers to construct irrigation structures mainly for growing vegetables.
- Give farmers tanks with a capacity of 200-2500 litres for water storage.
- Provide livestock to farmers such as cows and goats, depending on land size and capacity. Rabbits are given to poor families.
- Provide training on zero grazing, construction of modern housing structures and proper animal feeds.

Methods

- Conduct trainings for the various activities involved. Trainings are conducted to sector agronomists and cooperative leaders who continually train farmers through meetings. Capacity and development unit organizes such trainings.
• Organize open days at sector level; farmers give feedback on achievements and challenges. They have farmer competitions each year on different crops between different sectors. The outstanding farmers are rewarded every year. Competition starts from the lowest group level of 10-15 groups who score up to higher levels, scores are awarded on various aspects e.g. health, finances, capacity building. Winners are awarded at every level.

• Study tours in the different sectors, on average there are two study tours in a year.
• Brochures and print outs where farmer testimonies are documented.
• They mobilize lead farmers to establish demonstration plots, where other farmers visit to observe application of technologies.

Strengths
• Organization of farmers in groups makes it easier to get trained and become self-sufficient, in that they may not require agronomists.
• Ensures the whole community participates since grouping into cooperatives is according to similarity of activities that is each group is formed on a common objective.
• Sustainability of activities is ensured due to cooperatives.
• Resources are made available to farmers in groups hence ensuring efficient use of resources.
• Farmers engage in activities that are most beneficial to them, hence own up the project.

Challenges
They are still not in a position to access credit facilities due to low level of resources.

Long dry season affects crop yields.

Markets
They help cooperatives access big markets like Kigali.

They work in collaboration with other NGOs, institutions and local government in follow up of the activities, trainings and advisory meetings. They work with RAB for provision of inputs and research on cassava and vegetables. They work with Rwanda Cooperative Agency (RCA) on cooperative management and PADAB on cassava trainings. Farmers learn from FFSs established by PADAB.

Recommendations
• The stakeholders to work more closely towards common objectives.
• Help facilitate farmers more to get funds for self-development.
• Insurance for farmers especially those in marshlands.
• Put more emphasis on trainings on proposal writing (to obtain funds for projects), leadership and business agriculture.

6.5 APEPARWA
APEPARWA is a French abbreviation for (Amateur Pour la Protection de l’Environnement et la Promotion de l’Agriculture au Rwanda) which means Supervision of Environmental Protection and Agriculture Promotion in Rwanda. It is a private organization started in 2003 as an association of agronomists involved in environmental protection; they were working with MINAGRI and other projects such as Support Project to the Strategic Plan for Agriculture Transformation (PAPSTA) and Kirehe Community-based Watershed Management Project (KWAMP). In July 2010 they started working with RAB.

Activities involved in and technologies disseminated
In 2006 APEPARWA had a contract with PAPSTA for management of watersheds in four districts in Rwanda: Ngororero (Nyange and Muhororo sector); Nyanza (Muyira and Kigoma sector); Nyamagabe (Kibumbwe and Cyanika sector); Bugesera, (Ruhuha, Ngeruka and Kamabuye sector) and Kirehe (Gature and Gahaha sector).

They started by mobilizing farmers in soil conservation measures such as terraces; agro forestry trees; planting grasses on terraces; use of organic and chemical fertilizers. They had two kinds of nurseries: community nurseries and individual nurseries. Community nurseries where prepared and managed by cooperatives, the project gave them seeds and bore 70% of the total cost. After raising seeds, the project purchased tree seedlings from the nurseries to distribute to other farmers. The members of the cooperative were trained by experts on nurseries preparation and management.

Since 2010 when they started to work with RAB, they were involved in mobilization and sensitization of farmers to implement the Crop Intensification Program (CIP). They trained farmers on:

• Use of fertilizers and improved seeds (maize, potatoes, wheat and cassava).
• Formation of cooperatives to help them register under Rwanda Cooperative Agency (RCA) and help them in working with Banks.
• Agriculture sustainability by trying to minimize production cost.
• Storage methods, MINAGRI supports them by constructing storage facilities.
• Disease control and management.
Extension approaches

Mobilization and sensitization
The Mobilization and sensitization is done through meetings where they get to know farmers’ needs and challenges on the ground in order to address them when designing a project. In each sector they have two staff for the project:

1) An agronomist in charge of watershed development and training on project activities.
2) A technical staff that is in charge of implementation of the watershed management activities.

Since the technical staff could not reach all farmers in the sector, they formed a farmers committee that was composed of five resource farmers from each district and a model farmer in each sector. A model farmer was in charge of five households and the resource farmer was in charge of 25 households, this committee was elected by farmers. The committee benefits from trainings and sometimes incentives like agriculture tools. Once the committee members are trained they train other farmers. Best farmers are awarded by being given agriculture equipment and tools.

APEPARWA has established Farmers Field schools (FFSs) on maize; cassava and wheat in Bugesera, Gicumbi and Nyarugenge in collaboration with IFDC where they provide trainings to farmers. At the beginning, these FFSs were supported by IFDC that provided trainings to their agronomists. These agronomists trained other farmers and also established other FFSs on key crops in the sectors they were working in. Study tours for the staff and the committee members are also conducted.

Evaluation
After six months, there is an evaluation done by the farmers to determine the achievements, challenges faced during the period and discussion on the possible solutions. Farmers were trained on how to evaluate themselves and write reports on the findings. After evaluation farmers plan for the next season’s activities based on results obtained.

Challenges

- APEPARWA works with different organizations and institutions such as RAB, MINAGRI, KWAMP, and PAPSTA on contractual basis. Activities involved may take a long time. Most of the time their contracts end before completion of their activities. For example in 2006 their contract for watershed management with PAPSTA ended and they had to engage government staff at the district to finish their work. The district also did not manage to finish the work and meet the objectives.
- In some places the local government is not committed in their activities.
• Some members of the farmer committee keep for themselves fertilizers and other inputs belonging to the farmers. These cases were found in Bugesera district, Nyamata sector where farmers got 20kg of chemical fertilizers instead of 50kg.

• Some farmers are resistant to CIP due to some conditions of the area for example in Bugesera district Gashora; Ririma; Juru and Mareba sectors they are not used to cultivate in September due to the long dry season.

• Some lands selected under CIP have owners living far from them. They have to hire different laborers for each season that are not well trained hence affecting productivity.
7.0 EXTENSION ACTIVITIES IN GISHWATI AREA

7.1 Rubavu District
There are 12 sectors in the district, 18 cells and a total of 525 villages. The district has a large population of about 141,000 people. Extension is conducted by a team of officers at the district level in charge of agronomy, livestock, coffee production and forestry. For forestry department, there is one forester in charge of two sectors. Each sector has an agronomist and an officer in charge of livestock. The IDP is in charge of the cell while the farmer promoter is in charge at the village.

Extension approaches
- They conduct meetings with the sector agronomists and the cell SEDOs to plan on the activities, check progress and evaluate results. Meetings are held quarterly or when need arises.
- Conduct trainings to sector agronomists, SEDOs and farmer promoters on the new technologies who train other farmers on the ground.
- Meetings are organized with cooperatives committee members. Cooperatives are formed based on different crops and activities. Crops include maize, Irish potatoes and coffee. Cooperatives aimed at environmental protection activities have also been formed.
- Use of FFSs to demonstrate technologies to farmers. Farmers learn from these fields and apply the technologies on their farms. There are about two FFSs per cell.
- Media- use of a local radio station. There is a program every Tuesday that discusses on agriculture issues; farmers have an opportunity of asking questions and getting feedback from the experts. Announcements to farmers are also made through the media.

Technologies
- Crops focused on include maize, Irish potatoes, beans coffee and pyrethrum. Government provides improved seeds and fertilizers to farmers. Fertilizers are distributed to agro dealers from where farmers purchase at lower prices. There are three major agro dealers in the country and 44 smaller ones who are engaged by the government to supply the fertilizers. These agro dealers are private firms but they also report to the sector agronomist.
- They collaborate with NAEB in order to distribute the coffee seedlings to farmers. The seedlings are distributed freely. Other inputs also availed to farmers at less cost include insecticides and fertilizers.
- Farmers are trained on coffee management in the coffee cooperative. The different varieties used include ‘Arabica’, ‘Jackson’ and ‘BM’. Three sectors in the district around...
Lake Kivu are mainly involved in coffee farming. Coffee is also grown in Nyamiyumba sector where land is divided into plots for different crops coffee being one of the crops.

- Digging of terraces to control erosion, planting trees, preparation and use of compost manure, rain water harvesting, provide water tanks on credit to people.
- Farmers are trained to raise seedlings in nurseries. The district has planned to establish more nurseries this year. Seedlings supplied to farmers include *Grevillea robusta, Alnus acuminata, Eucalyptus spp*, fruit trees include avocado. They do not plant fruit trees in the public nursery due to inadequate funds. *Alnus acuminata* is the most preferred tree species in the area.
- Train farmers on preparation of organic manure from animal waste and crop residues, they also prepare manure using coffee pulps mixed with lime.

**Challenges**

- Price fluctuation for coffee sometimes causes farmers to get low prices for their produce.
- Attack of coffee by pests and diseases e.g. coffee rust.
- High population density in the district. The area has approximately 1000 people/km² this leaves a small land area for agriculture due to many settlements. The high population pressure in the area also causes high charcoal/energy demand which leads to cutting of trees.
- Challenge of soil erosion and landslides due to steep slopes in the area.
- Lack of adequate staff for extension.

Other organizations involved in extension in the area include: Decentralization Environmental management project (DEMP) NAEB, RAB, GWLM, and International Fertilizer Development Center (IFDC) which trains agronomists on fertilizer application.

**Market linkages**

At the district there is a unit on business promotion that links farmers with markets. There are plans underway to build a cross-border market with Congo. Farmers also market their products through the cooperatives. E-soko service by MINAGRI enables farmers to access market information. The district is at the border of Congo and Rwanda which puts it at an advantage for market opportunities.
Extension in Nyundo sector

Extension approaches

Meetings

Meetings are normally held at the sector, cell and village level to create awareness about new technologies. In some meetings all farmers are involved but in others only their leaders are involved depending on the agenda. Meetings at the village level usually involve all farmers and they are aimed at introducing or demonstrating a technology in both crops & livestock. Administration leaders are invited in some meetings organized at the sector level in addition to the extension staff so that they can also be aware of activities being carried out. Such leaders are the opinion leaders who also help in mobilizing farmers.

Training

Training is conducted from time to time by RAB extension staff at the sector cell. Farmer promoters are trained on both crop and animal management. At the district level, trainings are organized quarterly. Livestock specialists are further trained on artificial insemination, vaccination, signs and symptoms of diseases, treatment and prevention. Livestock kept in the sector include goats, pigs, cows, sheep, rabbits and poultry. They are also trained on use of improved feeds for cows, pigs, poultry and rabbits. Implementation of Girinka project has contributed to increased number of cows.

Study tours and field visits

Study tours and field visits in different sectors are organized so that farmers can learn from other farmers in other areas and also observe success of technologies in other areas.

Opportunities for extension

- Farmers have gained skills and knowledge over time, success from technologies’ implementation motivates farmers to adopt.
- Involvement of local administration in extension. They play a great role in mobilization of farmers.
- Good climate and soils make the area favourable for agriculture.
- Farmers are willing to be engaged in extension activities.
- More women are involved in agriculture, considering that they are more in population enhances sustainability in agriculture.
Challenges

- Landscape of the area makes it difficult to reach all individual farmers. The area is hilly and extension workers have to walk to most of these areas due to lack of transport facilities.
- Training and meetings held are not sufficient to disseminate technologies to farmers adequately. Few meetings are held since organizing them is expensive yet financial resources are inadequate. Costs incurred in such meetings include transport, food, and trainers fees.
- Low milk prices in the area. This reduces farmers’ profit margins.

Extension in Bahimba Cell, Nyundo Sector

The cell has seven villages. There are farmer facilitators in each of these villages who are in charge of crops and livestock. They help in providing skills on agriculture to farmers, sensitizing and mobilizing them to adopt technologies introduced to them.

Extension approaches

- Farmer promoters attend meetings and trainings organized at the district. After trainings they train other farmers in the villages.
- There are two cooperatives (farmer groups) in the cell for maize and beans.
- They encourage farmers to use the improved seed inputs supplied to them. Farmers are also trained on preparation of organic manure.
- They follow up on crop production after planting with farmers for example in the current season; they observed a disease and obtained a pesticide from the sector early enough thus preventing spread of the disease.

Challenges

- Delay of inputs supply from RAB. This causes farmers to plant late hence affecting crop yields.
- Poor roads to the markets.
- Lack of improved bean variety suitable for the region. The farmers still use local varieties since new varieties have not performed well in the area. This has discouraged farmers to adopt improved seeds provided to them.

Market Linkages

Traders come to the cell to purchase commodities from farmers; they however sensitize farmers to store some produce. In some instances farmers take their produce to the local market for sale.
Extension in Karago Sector
Policies on extension are developed at the national level. Implementation is at the district, sector, cell and village level. Various committees are formed at these levels to oversee implementation of the policies. At sector level there is a committee consisting of the sector extension staff, six representatives from the cells (SEDOs) since there are six cells in the sector. At the cell level there is a committee comprising two farmer representatives from each village. The committee members are responsible for giving feedback on implementation of technologies at the different levels and appropriateness of a technology in an area.

Extension approaches

Training

Trainings are conducted at the sector, cell level to SEDOs and farmer promoters from the villages. These trainings are conducted before beginning of a season. They may give documented materials during such trainings to the farmers for further reading. Training is conducted on crop management techniques such as proper spacing during planting, disease control, use of fertilizers and manure/compost, post-harvest technologies which include treatment before storage and also rain water harvesting techniques. Soil erosion control measures such as terraces, planting trees along contours and on the farm belts, planting grasses on terraces. Most common tree species include *Alnus acuminata*, fruit trees such as avocados, tamarillo (*Ciphomandra lutacea*) and *Carica papaya*. *Alnus acuminata* is the most preferred tree species and it is widely established in nurseries (Figure 8 and 9).

![Sector nursery](image)

**Figure 8:** Sector nursery
Meetings

Meetings are held for all farmers at the village level. The agronomists and farmers discuss on the adaptability of any introduced crop varieties in the area, diseases and pests likely to affect the crops and the preventive/control mechanisms.

Farmer Field Schools

Sites for FFSs are identified with the assistance of village representatives, plans are made on FFS establishment and new technologies are demonstrated to farmers. There are 43 FFSs for different crops in the sector. In Kadahenda village there are two FFS for soya beans and maize.

Strengths

- High crop yields from FFSs motivate farmers to implement technologies on their own farms.
- The agro ecology is favourable for agriculture.
- Most farmers are willing to take up the technologies
- High demand for trees such *Alnus acuminata* and fruit trees
- Government facilitates transport at the sector level. The agronomists are paid a transport allowance of 69,000 RwF.

Challenges

- Inadequate budget allocation for trainings and meetings.

**Figure 9: Alnus acuminata** establishment at the nursery
- Agronomist has a lot of work, (he recommends more staff). Agronomist is in charge of agriculture, mining (Colombo Tantanite), infrastructure, and environment.

- Financial constraints limits number of FFSs established and trainings conducted.

**Linkages with other institutions**
RAB, MINAGRI, IFDC (train agronomists and farmers on fertilizer use).

**Market linkages**
At the sector level, they do not link farmers to market. Farmers market their products through the cooperatives. About 12 cooperatives are working in the sector for various crops: wheat, maize, Irish potatoes, tea and vegetables.

**Extension in Kadahenda-Karandazi Village**
The farmer promoter is in charge of agriculture, livestock production and environmental protection activities at the village level. He has a team of five farmers that he closely works with. These are the model farmers who may assist him in disseminating technologies to other farmers.

He attends together with farmer promoters in other villages, various trainings organized at the sector or district level. The trainings focus on implementation of the land use consolidation policy, modern farming methods, use of improved seeds and other inputs, preparation and application of organic manure, soil erosion control methods, tree planting and nursery establishment, livestock keeping and management. He also attends trainings organized by other institutions such as Urugaga Imbaraga.

After such trainings, farmer promoters go back to the villages to disseminate technologies learnt to other farmers. They act as a link between agronomists and farmers. They give feedback to the authorities.

**Challenges**
- Some farmers are resistant to adopt the technologies.
- They are not paid any salary so he has to use his resources and time to assist in information dissemination such as in transport and communication.
- The area sometimes experiences excess rain for a long period, this destroys crops, and farmers suffer huge losses.
- High cost of fertilizer discourages farmers from applying them.
- Late supply of inputs from RAB causes delay in planting which affects yields.
Extension in Kadahenda (Karago) Cell
There are nine villages in the cell. Major crops produced in the area include Irish potatoes, maize, beans and wheat. Livestock kept in the area include cows, goats, poultry, sheep and rabbits.

Methods of extension
- Use of farmer promoters to train other farmers at the villages.
- Farmers divide themselves into groups; each of these groups has a leader, who works with the farmer promoter.
- Trainings and meetings are held for farmer promoters.
- They motivate farmer promoters with farm equipment such as mud boots, wheelbarrows.
- Use of FFSs. So far only two are fully established the others are in the process of establishment.

Challenges
- Transport of input materials such as manure, seeds, fertilizers to the farms.
- The hilly area is highly affected by soil erosion.

Recommendations
- Provision of improved varieties of Irish potatoes at lower costs these varieties are usually expensive.
- Provision of more resources to construct soil erosion control structures.

Extension in Nyakiliba Sector
The sector agronomist and the sector veterinary officer are in charge of extension at the sector level. SEDOs are in charge of the cell while farmer promoters are in charge of the village. The cell has three community storage facilities. Farmers are encouraged to store their produce in these structures so that they can have food in times of famine and also enable them to sell their produce when market prices are high. A security officer is engaged to guard the stores, in this way farmers are assured of the safety for their produce. Products mainly stored are maize and beans.

RAB is in charge of providing seedlings and fertilizers. When preparing for the season, farmers give their seeds/fertilizer requirements by filling requirement sheets indicating names and
quantities of inputs. The farmer promoters return the sheets to the sector from where the total inputs requirement for the sector will be determined.

Livestock technologies mainly include artificial insemination. Farmers with three cows or more are sensitized and trained on biogas preparation. Farmers willing to adopt this technology purchase a biogas digester then the money they spend on it is refunded to them by RAB. The district supports farmers who want to produce biogas by enhancing access to loans. In Nyakiliba about seven farmers are involved in biogas energy production.

Methods of extension

- Meetings with farmers and local leaders.
- Training farmers on preserving milk, animal disease signs and symptoms, disease control and prevention.

The sector has signed a contract to deliver 100,000 litres of milk per day to Inyange dairy, milk market is therefore not a problem. Congo is also a potential market site for milk.

Strengths

- The area is suitable for agriculture.
- Availability of markets for commodities.

Challenges

- Too much rain that destroys crops.
- Some farmers do not fully follow instructions.
- Transport is a challenge, no transport facilities are provided.

Cell IDP- Gikombe (Nyakiliba)

The cell has five villages and a farmer promoter in each village the farmer promoter is in charge of livestock, agriculture and environment. Six cooperatives in the cell are involved in agriculture. The cell has six FFSs.

Activities carried out in the cell

- Planting trees on farms to prevent soil erosion especially on steep hill sides.
- Conduct monthly meetings to farmer promoters.
- Technologies disseminated include: Introduction of new crop varieties, modern farming methods, livestock management techniques.
• In the FFs farmers compare performance of new crop varieties and old ones before adoption.

• Soil erosion control—work with farmer promoters and identify a site that needs for soil erosion control structures. Other farmers are called for demonstration in order to implement it on their farms.

• Train farmers on rain water harvesting techniques such as water tanks, water conservation ponds and irrigation techniques.

• Engage in development activities such as building improved houses and health insurance policies. Farmers are encouraged to form investing groups such as merry go rounds to assist them in saving money.

• Encourage farmers to obtain credit facilities from micro finances for projects e.g. businesses, cattle rearing, marketable crops like potatoes and poultry for eggs.

• There is a women charitable organization called ‘Dusasirane’ (means bed preparation) which buys mattresses for poor people.

• Vision Umurenge Program (VUP) government puts in money in the program for old and poor people who are aged above 60 years, every month they are given 7000 RwF (family allocation) for self-development. Poor people who are physically capable without any employment are hired.

7.2 Nyabihu District
There are 12 sectors in the district. Farmers input needs are identified at sector and cell level then RAB is notified of the quantity required. Seeds supplied include wheat, maize, Irish potatoes and beans. Land use consolidation policy is implemented in the sites at the cells and villages. Follow ups are made at cell level during monitoring and evaluation. They get feedback reports from sectors. Extension is also done by service providers and non-governmental institutions such as Urugaga Imbaraga.

In environmental protection activities, erosion control measures such as radical terraces (Figure 10) and progressive terraces (Figure 11) are put in place. Community members are mobilized to construct these structures. An area of approximately 590 ha or more depending on slope of the area is targeted. If the funds allocated to the district are more than 20 million, they engage an organization called Radical Organization Specialized for Terraces (OSTR) to construct the terraces, if less than 20 million the community members do it themselves. The activities in the district are funded by MINAGRI. Support is also received from REMA and GWLM (Gishwati
water and land use management). In a bid to protect the environment, a distance of 10 meters from the water bodies is left uncultivated in order to prevent erosion along the river banks.

**Figure 10:** Radical terraces  
**Figure 11:** Progressive terraces

Crop production- Sector agronomists, SEDOs and farmer promoters are trained on crop management techniques such as cultivation, planting, intercropping trees with crops (Figure 12) disease/pest control, harvesting, post-harvest handling for example they have drying facilities for maize (Figure 13), wheat and beans at the sector level.

**Figure 12:** Trees planted on terraces intercropped with maize
Extension methods

- Activities are planned together with the sector agronomists. During this time, a work plan is made in which all the sectors must fit in the programs of the district. Different feedback reports from the sectors are submitted to the district.
- Trainings on different topics are conducted to agricultural facilitators and farmer promoters. Practical trainings are held on the farming sites where technologies are demonstrated to farmers.
- Implementation of most technologies is at sector, cell and village level. Sector agronomist co-ordinates all activities. There are two additional agronomists outsourced from the service providers. Each sector therefore has three agronomists. The additional agronomists help in facilitating technology dissemination. They give feedback reports to the district.
- Use of FFSs
- Conduct study tours, 30 farmers in four sectors were taken to Gakenke district the previous season to observe the post-harvest handling techniques for maize.

Challenges

- Change in climatic conditions has affected cropping schedule for example in seven sectors, maize was planted end of May to June but have now extended it to January and February due to the prolonged dry period.
- Farmers’ low capability to buy fertilizers due to high cost.
- Difficult to change the traditional mindset of farmers who are resistant to adopt the new techniques such as planting wheat in lines.
Unavailability of improved varieties of Irish potatoes such as ‘Ngunda’, ‘Gikungu’, ‘Mizerero’ the same varieties, ‘Kinigi’ and ‘Nyirakabondo’ have been planted since 1995. MINAGRI gives an allocation of 6 million RwF which is sometimes inadequate.
8.0 NON-GOVERNMENTAL ORGANIZATIONS IN GISHWATI AREA

8.1 Gishwati Water and Land Management Project

Gishwati Water and Land Management Project (GWLM) is a government project co-ordinated by MINAGRI. It was started three years ago to help in soil conservation since the region is highly susceptible to erosion and floods. The first step was to divide the area into land use blocks. An area of 6600 ha was to be utilized in the first phase. The land use blocks were divided into: Forestland, Rangelands and Crop lands. The staff in the project comprises one agronomist, two extensionists; one livestock officer, one forest and ecosystem conservation officer and one Land management specialist. In Nyabihu the project works in four sectors: Karago, Bigogwe, Rambura and Jenda. In Rubavu, it works in three sectors; Kanzenze, Nyakiliba and Kanama.

Forests
Total area designated for forests was 3,260 ha. These were areas with more than 40% slope inclination. Trees planted in these areas include Eucalyptus spp, Alnus acuminata and Acacia spp. Calliandra calothyrsus and Leucaena spp do not perform well in the area due to low temperatures and much rain. Seedlings planted in the forest lands are outsourced from private operators who are contracted to produce them. The seedlings planted in these areas are guarded to prevent damage and ensure proper growth.

Rangelands
Rangelands total area is 1540 ha. It was designated to enhance livestock keeping. Activities on the rangelands include planting grasses such as kikuyu grass and tripollium grass (planted in paddocks) and training farmers on livestock management.

Croplands
Total area under crop land is 2086 ha. Main crops grown include Irish potatoes, maize and beans (Figure 14 and 15). In crop lands terraces are dug to control soil erosion. Fodder grasses are introduced in the cropping system to be planted on terraces. Drainage channels are also constructed to drain water into waterways. In croplands modern farming methods are applied.
Methods of extension
The organization helps farmers organize themselves into self-help groups; they train them on crop production and livestock management techniques. Community members are grouped per site. In environmental protection areas are delineated according to watersheds.

Achievements
Drainage channels have been constructed in areas where there is a flooding problem; the problem of damaged roads has declined. They have assisted the local people and institutions in capacity building on environmental protection activities such as digging terraces, drainage channels, and crop and livestock management. Areas under the project site have improved as is evidenced by increased production and soil and water conservation.

Challenges
• Maintenance of the soil and water conservation structures is expensive and labour intensive.
• Forest encroachment by people and livestock.
• Lack of adequate skills in management of trees among farmers such as pruning and coppicing (some end up uprooting them). More awareness creation on trees management is needed.
• Indigenous trees take a long time to grow hence farmers are resistant to plant them. Farmers prefer trees that act as a source of income e.g. *Eucalyptus spp*.

Partner organizations: REMA, MINALOC, RAB.
8.2 Rwanda Farmers Federation (Imbaraga)

Imbaraga is an organization that was founded in 1992 through the farmers’ initiative. The idea of its creation emerged in October 1989 at the time of the first national congress of farmers associations from Rwanda which took place at Kabusunzu Kigali. The organization was launched in March 1992 by the representatives of farmers and breeders from all former communes in the country which met at Kabusunzu. In that congress the peasants realized that they had the ability to bring solutions to their problems and be able to defend their interests through an organization which can play a role of a spokesman of farmers and breeders at the national level. Imbaraga is currently registered and legally recognized as an organization operating countrywide. It operates in 27 districts.

Imbaraga’s mission is to promote and safeguard the socio economic and political interests of farmers and breeders beside the civil society and public authorities. Its vision is to professionalize farmers by developing their entrepreneurship skills to become more competitive into trade and any economic exchanges.

**Objectives**

Imbaraga aims at promoting solidarity between farmers and breeders to defend their rights and socio economic interests; to help farmers and breeders to organize themselves around the commodity chains; to defend the access of farmers and breeders to indispensable resources to promote their profession; empowering farmers and breeders in techniques of production, transformation management and negotiation; integration of gender mainstreaming, environment, democracy and sustainability in the management of development programs.

**Achievements**

There are about 64 regular employees of the Imbaraga. Some of its achievements include:

- Defending rights of farmers who cultivate the swamp covering an area of 85ha situated in Huye district to avoid its privatization.
- Regulation of Irish potatoes’ prices for the producers in Musanze district in Northern province.
- Members of Imbaraga have been specialized in quality seed multiplication for crops such as Irish potatoes, sweet potatoes, wheat, maize, beans and cassava seeds.
- Support of integration of agriculture and livestock by disseminating 5000 goats, sheep, and 100 cows to vulnerable groups of people.
- Decentralization of Imbaraga activities up to the lowest administrative level (villages and cells).
- A training center of Imbaraga located at Musanze that has been operational in 10 years.
- Contribution to environment conservation and protection through agroforestry trees planting in three districts- Musanze, Burera and Rulindo.
• Promotion of different agriculture technologies such as maize shellers, improved cooking stoves, maize dryers, fodder cutter, rain water harvesting structures.
• Sensitization of farmers to save money.
• Accompaniment of producers in selling their production- Irish potatoes, wheat, maize, beans, sweet potatoes.

Challenges
• Sometimes there may be no ready market for farmers’ commodities.
• Poor roads/infrastructure to transport market commodities.
• Lack of adequate storage facilities for farm products after harvest.
• Small land portions hence less agricultural land.
• Some farmers are reluctant to technology adoption.

Partnership
Imbaraga is a member of the Rwanda Civil Society platform, Eastern Africa Farmers Federation (EAFF) within EAC (East African Community). It is now in the process of being accepted as member of International Federation of Agricultural Producers. The financial partners of Imbaraga include USAID, Concern worldwide, ASARECA, IFDC, Oxfarm/Novib, Swedish Cooperative Agency.
9.0 CONCLUSIONS AND IMPLICATIONS FOR THE ACIAR TREES FOR FOOD SECURITY PROJECT SCALING UP ACTIVITIES

The Government of Rwanda has made major strides in agricultural development after the genocide of 1994. In spite of the many efforts Rwanda has made to improve agricultural production, indicators of poverty among the population still remain high. About 90% of the population depends on agriculture, while 57% still live below the poverty line. Agricultural sector in Rwanda is confronted with many challenges: agricultural production where the system is dominated by small-scale farming with less than one ha of cultivable land, soil degradation and dependence of agriculture on climate. To overcome these challenges, the Government of Rwanda has adopted the National Agricultural Extension Strategy whose Vision is to ensure ideal conditions for the dissemination and exchange of information between producers, farmer organizations and other different partners in order to transform and to modernize the agricultural sector so that it can effectively contribute to achieving the millennium development goals, Vision 2020 and the Economic Development and Poverty Reduction Strategy. The extension strategy is able to facilitate all producers to access technological packages and information they need. This is being done through development of partnerships with the private sector, local and international NGOs, farmers’ organizations, civil society, agricultural institutions of education and research.

The government of Rwanda has put up an elaborate extension structure that runs from the national to the cell level where extension staff is deployed. Due to lack of resources, extension agents in Rwanda use both group and individual methods of extension in communicating new ideas to farmers. The specific methods used to introduce new technologies/practices include: arranging public meetings at a specified day and time through local leaders (religious leaders, leaders of local organizations & elders); through farmer promoters, setting up of FFSs in villages and field/exchange visits. As there is inadequate resources for extension in the country, SEDOs prefer to introduce new technologies/practices through farmer promoters and setting up of FFSs in various villages.

Implications for the ACIAR Trees for Food Security project

The Rwanda Government has adopted several approaches in order for farmers to access extension services. It uses a participatory extension approach where all stakeholders define their vision, analyze their constraints and needs and, therefore, plan together for implementations, monitoring and evaluation. It also uses a multi method approach where various methods and approaches are recognized, provided that they are effective and complement each other. Thirdly it also recognizes that complementarities and potential synergy of different actors in agricultural development (farmers’ organizations, research, extension, agricultural education institutions, input supply, micro credit and other public and private partners are important and hence establishing linkages with them and lastly it also builds on existing initiatives such as Imihigo,
Ubudehe, Integrated Development Program, Girinka, Agasazi Ndatwa, and other related initiatives that emerge and prove to be effective or contribute to sustainable agricultural development. The Trees for Food Security Project could therefore build on the existing approaches such as the use of farmer promoters and other initiatives to scale up evergreen agriculture in project sites.
10.0 REFERENCES


## APPENDIX 1

### KEY INFORMATS INTERVIEWED

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<th>DATE</th>
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<td>19/06/2013</td>
<td>Jean de Dieu Dushimimana</td>
<td>Male</td>
<td>RAB</td>
<td>National Extension and Mobilization Officer</td>
<td>0782 380 380</td>
<td>Kigali</td>
<td></td>
<td><a href="mailto:Jooles-D@Yahoo.Fr">Jooles-D@Yahoo.Fr</a></td>
</tr>
<tr>
<td>17/06/2013</td>
<td>Celestin Myambi</td>
<td>Male</td>
<td>RAB</td>
<td>Director of RAB Agriculture Zone Division- Eastern Province</td>
<td>0788 592 978</td>
<td>Eastern Province</td>
<td></td>
<td><a href="mailto:Cmyambi@Gmail.Com">Cmyambi@Gmail.Com</a></td>
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<td>Dr. Leonidas Kayitankore</td>
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<td>MINAGRI</td>
<td>District Veterinary Officer</td>
<td>0788 873 340</td>
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<td><a href="mailto:Kayintankorel@Yahoo.FR">Kayintankorel@Yahoo.FR</a></td>
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<td>19/06/2013</td>
<td>Nkinzimagabo Jean de Dieu</td>
<td>Male</td>
<td>MINAGRI</td>
<td>District Agronomist</td>
<td>0788 401 749</td>
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<td>19/06/2013</td>
<td>Mutabazi Alfred</td>
<td>Male</td>
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<td>0788 475 209</td>
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<td><a href="mailto:Mutabazialf@yahoo.com">Mutabazialf@yahoo.com</a></td>
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<td>20/06/2013</td>
<td>Nkusi Francis</td>
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<td>0788 353 999</td>
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**NGOs/PROJECTS IN BUGESERA**

**PADAB/PAIRB PROJECT**

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<td>PADAB/PAIRB PROJECT</td>
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<td>0788 300 350</td>
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<td><a href="mailto:rwigemajb@yahoo.fr">rwigemajb@yahoo.fr</a></td>
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<td>World Vision</td>
<td>Development Facilitator</td>
<td>0788 466 434</td>
<td>Bugesera, Nyamata</td>
<td><a href="mailto:hitheon@yahoo.fr">hitheon@yahoo.fr</a></td>
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**MILLENIUM VILLAGES PROJECT**

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<td>Rwanda Farmers Federation (Imbaraga)</td>
<td>Executive Secretary</td>
<td>0788 423 047</td>
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<td><a href="mailto:gafarangajo@yahoo.fr">gafarangajo@yahoo.fr</a></td>
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<tr>
<td>28/06/2013</td>
<td>Pascal Twizelimana</td>
<td>Male</td>
<td>Rwanda Farmers Federation (Imbaraga)</td>
<td>Agronomist</td>
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