REPUBLIC OF RWANDA

Ministry of Agriculture and Animal Resources

Strategic Plan for the Transformation of Agriculture in Rwanda Phase III

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Contents

Chapter I: Vision for the Agricultural Sector

I.1. Strategic Vision for the Transformation of Rwandan Agriculture from 2013-2017

The intensification and commercialisation of the Rwandan agricultural sector will be essential to reduce poverty and drive growth over the next five years. The new economic and poverty reduction strategy, EDPRS II, prioritizes rural development and embraces the sector as a source of jobs and economic transformation. This document, the third agricultural sector strategy, seeks to facilitate the development of Rwanda's agriculture, through an approach based on resource management, human capacity and private sector driven value chains.

The sector has already witnessed incredible progress. Over the last five years of EDPRS I, rural poverty fell from 61.9% to 48.7% (EICV III), driven primarily by agricultural interventions to increase productivity and initial steps to move the sector from subsistence to a market economy. This represents improved living standards for one million Rwandans. Now, MINAGRI and its implementing agencies must continue to adopt forward-thinking agricultural planning and improve project implementation, efficiency and effectiveness to deliver the PSTA III.

The strategic vision for the next five years is a focus on both increased production of staple crops and livestock products, and greater involvement of the private sector to increase agricultural exports, processing and value addition. Investing in in high-value crops while also exploiting the opportunities offered by staple crops is key for the future, facilitating both domestic food security and higher rural incomes. In the short term, continued rapid food production increases will ensure further reductions in rural poverty and malnutrition. In the medium term, the goal is to move Rwandan agriculture from a largely subsistence sector to a more knowledge-intensive, market-oriented sector, sustaining growth and adding value to products. Over the strategy implementation period, MINAGRI's role in the sector will move from provider to facilitator, as capacity grows and private sector investment delivers demand driven agricultural products. This strategy, if realised, will support agricultural and GDP growth, and help meet the ambitious targets of EDPRS II and Vision 2020, to reduce poverty and to make a significant positive impact on the population, particularly those living in rural areas.

Chapter II: Overview of the Agricultural Sector

II.1. Context and Achievements

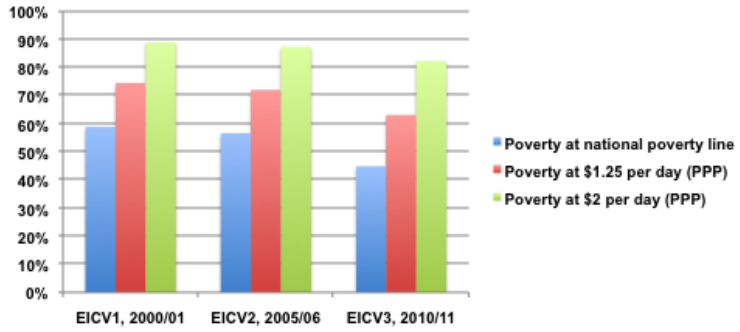
Rwandan agriculture has made major advances in the last decade. Productivity and production for a number of crops have sharply increased and improved rural incomes. It is vital to continue this rapid progress to further reduce rural poverty. The primary role of this Strategic Plan is to set guidelines for scaling up recent successes in the Agricultural sector in addition to reviewing challenges and defining programmes and policies that will further increase sector growth.

In the recent past there has been significant expansion of interventions which drive productivity gains, including successful land consolidation, increased areas under irrigation and protected against soil erosion, and expansion of cultivated terraces. Access to important services including agricultural finance and proximity extension services has been improved, and farmers are now more likely to use specific crops according to agro-climatic zones. There has also been an increase in the use of inputs, including agrochemicals and improved seeds. Distribution of livestock through programs such as Girinka has expanded the animal resource sector. Since the implementation of the Crop Intensification Programme, yields have also grown significantly. Post harvest infrastructure investments and subsidised transport has improved product quality and market accessibility. As a result of these interventions, production of maize, wheat, roots and tubers, soybeans, rice, cassava, horticultural products and meat and milk has increased.

Overall production of export crops has also increased, as has the value of premium products on the international market. The unit value of Rwandan coffee has increased generating substantial increases in incomes among coffee smallholders even though the production volume has declined. Coffee and tea command quality premiums and are Rwanda's largest exports by a wide margin.

Production increases have had a positive impact on both sector growth and reducing rural poverty. The overall agricultural growth rate between 2000 and 2010 was 5.8% per annum. It is also noteworthy that in 2010 68.2% of rural households had access to livestock with most rural households having goats (53%) cattle (47.3%), chickens (45.5%), and pigs (24.1%). Over the last five years, extreme rural poverty fell from 39.5% to 26.4% (EICV III) driven largely by interventions to move agriculture from subsistence to a market economy. Malnutrition also declined between 2006 and 2009, where households with food shortages or in borderline nutritional conditions declined from 34.6% of the population to 21.5% (NISR). However, as noted in the EDPRS II, many poor Rwandans continue to live below the poverty line. 80% of the rural population consists of subsistence farm families with an average land size of 0.59 ha. Therefore progress in reducing poverty must continue to come largely from the agricultural sector.

Figure 1. Percentage of the Population in Poverty, 2000/01 to 2010/11



II.2. The International Policy Context

African leaders have pledged to support the transformation of agriculture through the *Comprehensive Africa Agriculture Development Programme* (CAADP) developed under the African Union New Partnership for Africa's Development (NEPAD). At the East Africa level, the support is demonstrated by the formulation of the *Agriculture and Rural Development Strategy for the East African Community.* Trade linkages within the region will provide many growth opportunities, for example through marketing agricultural commodities in the DRC and Burundi. The East African Community (EAC) is also working to improve cross-border trade.

The private sector is increasingly engaged in development forums and programmes in Africa. The most important platform is the *Grow Africa* initiative that is bringing together investors and governments to promote private investment in African agriculture. *Grow Africa* is a country-led process, which seeks to strengthen investor interest in agriculture by building increased trust and shared commitment. This is accomplished by sharing information, lessons and best practices drawn from existing and successful projects, engaging all stakeholders including smallholder farmers, and addressing key issues such as gender inclusion, land tenure, climate change and resource management. Rwanda is among the first countries selected by *Grow Africa*. MINAGRI has presented an investment blueprint and policy package proposals to private investors.

II.3. The National Policy Context

Vision 2020

Vision 2020 is the primary socio-economic policy document on which all national and sectorial policies and strategies are based. It describes modernisation of agriculture and animal husbandry as one of the six pillars for building a diversified, integrated, competitive and dynamic economy. Vision 2020 seeks to transform Rwanda's economy through a rapid increase in growth and a significant reduction in poverty. By 2020 it is expected that the country will reach middle-income status with per capita GDP of US$ 1240 from US$ 220 in 2000. Other goals include a reduction by more than one-half in the incidence of poverty and extreme poverty and improvements in a range of standard of living indicators.

Agriculture is a priority sector, with an emphasis on moving the sector from subsistence to commercial production through attracting increased investment. The target for agricultural growth until 2020 has been revised upward to 8.5 % per year. The key national and agricultural sector-related targets of Vision 2020 are shown in Table 1. Vision 2020 recognises that the private sector will drive the economy and the State's responsibility will be to initiate, pilot, co-ordinate and monitor efforts. Some Vision 2020 goals, such as GDP per capita and the percentage of farmers using fertilisers, were exceeded in 2010, and have been revised to drive further improvements.

Table 1. Selected national and agriculture-related goals in Vision 2020

Indicator	**2000**	**2010**	**2020**
Population (million)	7.7	10.1	12.71
GDP/capita (constant 2000 US$)	220	400	1240
Poverty (%)	64	40	20
Agricultural GDP growth (%)	9	8	8.5
Agriculture as % of GDP	45	47	25
Agricultural as % total population	90	75	50
Land under "modernised" agric (%)	3	20	40
Fertiliser application (kg/ha/annum)	0.5	8	45
% banks' portfolio to agric. Sector	1	15	20
Soil erosion protection (% total land)	20	80	90
Agricultural exports	*n.a.*	*n.a*	*"5-10 times 2000 value"*

Source: MINECOFIN, Revised 2012

The Economic Development and Poverty Reduction Strategy

In 2007 the Government of Rwanda developed the first Economic Development and Poverty Reduction Strategy, EDPRS I, from 2008-2012. EDPRS II, from 2013-2017, has now been validated and the structure and objectives of this Strategic Plan are closely coordinated with its thematic areas and priorities. As the country's medium-term economic development plan, EDPRS II establishes the framework within which the Government will change the structure of the economy and move towards achieving or surpassing the long-term targets of Vision 2020 and the MDGs. EDPRS II aims to increase the pace of economic growth and further reduce the incidence of poverty, and lay the basis for sustainable growth into the future. The overarching goal of EDPRS II is to accelerate progress to middle income status and better quality of life for all Rwandans through sustained growth of 11.5% and accelerated reduction of poverty to less than 30% of the population. There are four thematic areas: economic transformation, rural development, productivity and youth employment and accountable governance. The first three are particularly of relevance to the agricultural sector. Each EDPRS II thematic area lists key priorities for different sectors to achieve thematic outcomes. Those priorities which relate to agriculture are listed below.

1. Economic Transformation

- Diversification of the economic base and better external and internal connectivity
- Private sector investment in value chains and agri-processing facilities

2. Rural Development

- Increased agricultural productivity to reduce poverty
- Rural infrastructure development to connect farmers to markets

3. Youth and Productivity

- Skills development and sensitisation, focused on youth
- Support entrepreneurship, access to finance and agri-business development

4. Accountable Governance

- Institutional development to generate improved service delivery
- Transparency and increased participation

EDPRS II also identifies foundational issues, which are long term ongoing priorities for which significant progress already been made during EDPRS I. Continued progress will lay the foundation for achieving thematic area outcomes. Three foudational issues have an key relationship to agricultural development.

1. Macroeconomic Stability
-> Economic growth, private sector development, poverty and inequality reduction
2. Food security and malnutrition
-> Coordinated community based nutrition programmes and information campaigns
3. Consolidating Decentralisation
-> Deepening participatory, democratic, accountable local governance and building local capacity

Finally, cross-cutting issues outlined in EDPRS II should be mainstreamed across all strategic plans to ensure equitable and inclusive development which is environmentally sustainable and encourages regional integration. These are capacity building, environment and climate change, gender and family, regional integration, HIV&AIDS, disaster management and disability and social inclusion. In the agricultural sector, environmental sustainability and geder inclusion are particularly important. Women make up 53% of the population and participate in subsistence agriculture more than men. Gender and environmental considerations, including climate change mitigation, are therefore mainstreamed across this strategic plan.

Agriculture is recognised in EDPRS II as a priority sector of the economy that will both stimulate economic growth and make the greatest contribution to poverty reduction. The overriding policy objective for the sector is to increase rural household incomes, to provide incomes from diversified sources, and increase food security. The government will develop markets and support the private sector to assume an increasingly important role. Public investments and policies will create an enabling environment to reduce the cost of doing business, helping private operators flourish.

The Millennium Development Goals

Rwanda has committed to meet certain target by 2015 under the Millennium Development Goals (MDGs). The majority of targets do not relate directly to agriculture, although agricultural growth and rural development are essential contributing factors. Significant progress has already been made, often driven by agricultural interventions. Production increases and greater food security mean that between 1990 and 2010/11 the proportion of underweight children under 5 was reduced from 29% to 11%, and the under-five and maternal mortality rates have fallen. The proportion of the population using an improved source of drinking water rose from 64% in 2006 to 73.6% in 2011/12, partly driven by rural development programmes. These achievements illustrate Rwanda's potential to achieve the ambitious targets set by national and international policies.

Chapter III: Strategic Framework

III.1. Sources of Growth and Agricultural Growth Targets

Rwandan agriculture in the last five years has been driven mainly by improvement in land management (soil erosion mitigation and terracing), irrigation, input provision, and increasing the national livestock herd. Developing and strengthening cooperatives has increased the sector's human capacity, accompanied by targeted extension, for example to improve the quality of coffee for export. There are also emerging initiatives to kick-start the market and facilitate commercialisation, for example the rapid development of a decentralised rural finance network. However, the first four areas, land, water, fertiliser and cattle, have driven the major increases in sector productivity, improved rural incomes and reduced poverty. Achievements in these key areas include:

- Maize yields increased almost 4 time and wheat yields by 2.5 times between 2000 and 2010
- Hillside terraces increase potato yields 6 times
- Legume production increased by 73% from 2005 to 2010
- Through Girinka and small stock distribution 47% of farm households have at least one cow and 53% have at least one goat
- Improving coffee quality and marketing have resulted in higher coffee prices

Acceleration of agricultural growth was driven largely by production for the domestic market, in staple crops, dairy and meat products. Coffee is an exception, as the primary export crop for international markets, and there are growing demands in regional markets, particularly Congo and Burundi, for dry beans, potatoes, maize, rice, cassava flour, maize flour, poultry products and live animals.

The annual agricultural growth target of 8.5% for the next five years is ambitious but achievable based on recent experiences. The major sources of growth will continue to be important, and new focus areas have also been added. In PSTA III, growth will be driven by:

- Continued investment in land husbandry, irrigation and inputs
- Expanding CIP to further increase the productivity of staple crops
- Expanding the livestock sector, particularly small stock and fisheries
- Investing in mechanisation, processing and post-harvest facilities to modernise production
- Extension targeted at producers to develop a skill-based sector
- Research that responds to farmers' needs and identifies optimal crop varieties
- Aggregating smallholder production to provide sufficient quantities for markets
- Improving the quality of traditional export crops to generate higher premiums
- Increasing production of emerging export crops including horticulture
- Value chain development to strengthen supply and develop market demand
- Encouraging entrepreneurship through agricultural financing and insurance to reduce risk
- Attracting investment through soft and hard market infrastructure
- Building institutional capacity across the sector
- Facilitating a participatory approach, including women and youth, for inclusive growth
- Environmental sustainability and climate change adaptation for long term prosperity of the sector

High level sector outcomes focus on increased productivity of crops and livestock, improved households' food security, enhanced research and extension, improved value chain development and integration including private sector investment, better post harvest facilities and institutional development. These will drive sector growth and reduced malnutrition under EDPRS II thematic and foundational goals. Some of the key targets to achieve these outcomes include 91% soil conservation (73% in 2012), 70,000 ha of irrigated land (25,000 ha in 2012), 25% mechanisation (13% in 2012), 90% of households with acceptable food consumption (79% in 2012), improved ratio of extension workers per farmer household to 1/600 (1/839 in 2012), new financing and 18% of loans for agricultural activities (8% in 2012).

III.2. Sector Challenges and Opportunities

Although the sector has experienced significant progress over the last five years under the implantation of PSTA I, PSTA II, and EDPRS I, the agricultural sector still faces various challenges. Agricultural growth over the last decade lagged behind industry and services, and there is limited private investment in the sector due to high risk perceptions. Although there has been significant development in land husbandry and irrigation, there has been a lack of consideration of environmental sustainability. Therefore, a further challenge is the need to address soil erosion and water conservation while also increasing productivity. Furthermore, diverse constraints affect agricultural value chains and thus limit the production and value addition potentialities of crops and livestock products. Challenges across value chains include:

- Quality and quantity issues with raw materials and inputs
- Limited rural infrastructure with high costs
- Lack of working capital and long term credit
- Low human capacity
- Limited sector innovation
- Small existing base of agro-processing.

In addition to the challenges on the supply side, it is essential that increased production is absorbed by markets. In the short run, domestic demand should continue to grow. Higher family incomes and population growth generate increased demand, and should support moderate increases in production. However, as incomes grow, the additional amount spent on food declines. Over the longer run this effect means that the rate of increase of demand for food products in the domestic market will slow. Regional markets and international markets represent opportunities for further growth, although subject to stiff international competition. Generating, identifying and tapping domestic, regional and international demand will remain a challenge. Production shifts towards higher value, quality and new forms of products (such as processed varieties) will address this, as will efforts to identify and establish links with external niche markets which attach premiums to quality. The integration of improved production quality and increased demand for agricultural production will be key to sustainable agricultural growth.

This strategy aims to tackle these challenges through continuing to adopt a dual approach of both production increases and commercialization. Further investment in relevant research, inputs and capacity building for farmers should continue to drive yield gains. Value chain development and initiatives to attract private investment should support the growth of agro-processing and value addition.

Therefore, the first major opportunity of this plan is to sustain the initiatives that have increased productivity and generated strong agricultural growth, through agricultural and animal resource intensification, research and training and aggregating of farmers.

Greater volumes of production will need markets, processing facilities and value addition, and post harvest facilities and training to reduce losses. Therefore the second strategic opportunity is value chain development, strengthening markets for agricultural products and attracting the private sector to add premium to productivity increases. Increasing market access and reducing losses will also generate employment in processing, packaging, and marketing. Tapping demand through innovation, new products and a more knowledge based sector, responding to market information transmitted through ICT and mobile phones, is also an essential opportunity for growth.

Funding the above will not be possible through public and donor financing alone. Therefore, the development of innovative new agricultural financial products, and leveraging private investment, is key.

Realising these requires a high capacity, efficient and knowledgeable sector, with an inclusive approach, accountable to all stakeholders. The final opportunity area is therefore sectoral development (both public and private sector, central, local and field level), including institutional capacity building, gender and youth mainstreaming and evidence based planning around improved knowledge management systems.

III.3. Goals and Strategic Priorities for Rwandan Agriculture

The primary goals of PSTA III are:

- ***To transform Rwandan agriculture from a subsistence sector to a market-oriented, value creating sector***
- ***To grow as rapidly as possible, both in relation to production and commercialisation, in order to increase rural incomes and reduce poverty***

The broad sector transformations that will result from successful implementation of the Strategy are:

- From *guaranteeing food availability* to generating *food security through economic growth*
- From farmers as *passive recipients* to farmers as *active market players with new skills*
- From government as a *direct provider* to government as *facilitator of the private sector*
- From supplying mostly the *domestic market* to *exporter to the region*.

For this to happen, it is essential that the private sector play an expanded role, and that management capabilities are strengthened in all areas, from farms to producer organisations to marketing programmes. Accordingly, strengthening entrepreneurship and business skills and the promotion of private investment in the sector is an important strategic orientation.

Private sector leadership will provide economic and managerial sustainability of agricultural enterprises and value chains. This will generate access to the specialised expertise that the sector will increasingly need and the resources required for investment in productive facilities. Finally, empowering the private sector will result in pricing for inputs and outputs based on market criteria, which will increase sector efficiency, driving growth in the longer term.

With a greater role for the private sector, government plays a more supporting role and public expenditure allocations change. Government also needs to ensure the regulatory framework is conducive to investment in the sector. Public expenditure should therefore focus on strategic areas, primarily development of basic growth factors (physical infrastructure and human capital) and building skills and knowledge in the sector, through research and entrepreneurial initiatives. The government will play a facilitating and more regulatory role in other areas, for example leveraging financing to catalyse investment, innovation and modernisation in products and product handling, processing, value addition and marketing, removing regulatory barriers to market efficiency and facilitating capital flows through agricultural finance. The government can also share investment costs in key facilities with the private sector, always under an exit strategy for the public sector. Sectors will continue to work closely with donors to invest in areas unattractive to the private sector, such as programmes to reduce malnutrition among the very vulnerable.

Therefore, interventions to drive growth will help to achieve the EDPRS II target of 8.5 % sector growth and 28% export growth. However, poverty reduction will also be prioritised, particularly through increasing incomes, improved food security and targeting nutrition. Household food security is positively related to increasing incomes, and is enhanced further by education and health care. Targeted support will help families with poor nutritional indicators to grow and consume a more nutritious and diversified diet. Post harvest facilities and training should help farmers have access to food during the lean season. On a national scale, food reserves of staple crops provide a buffer against short term shortages and price fluctuations. These strategic goals, and effective and efficient implementation of PSTA III, will therefore operationalise the priorities and objectives of EDPRS II

III.3.1. A Roadmap for Agricultural Transformation

Rwandan agriculture is entering a new era. As discussed, rapid growth in recent years has been achieved by government interventions. While most of these physical interventions need to be continued, progress will also depend on increasing soft skills in the sector, raising the technological and skill level among farmers and attracting entrepreneurs who have those skills. Private sector investment will be necessary to improve efficiency and orient the sector to a more sustainable paradigm which accesses and responds to market demands. Therefore, the key pillars for rapid sector growth are:

1. Land, irrigation, inputs and infrastructure
2. Soft skills and farmer capacity
3. Value chains and markets
4. Private sector investment

Supporting these strategic pillars are cross-cutting programmes for institutional strengthening, gender equity, and environmental sustainability.

To support these pillars, PSTA III highlights different areas compared to PSTA II. The new focus is on:

- Increased scale: Bulking up production of small farmers and linking them to markets
- Increased exports: Export support programme including certifications
- Investment: Strengthening value chains, accessing new markets, and active support for private operators in irrigations, inputs and agricultural finance
- Quality: PHHS and improved production technologies
- Professionalization of farmers: Reorientation incentives in agricultural extension, privatization and extension to cover business advisory services and marketing assistance
- Modernization: Promote mechanisation appropriate for small farmers;
- New research orientations: Meeting market demands and diversifying livestock
- New sub-sectors: Exploring emerging value chains including fisheries and sericulture
- Access to finance: Restructure rural finance to make it more resistant to shocks
- Agro-processing: Creating off-farm employment and value addition

These activities will increase production per hectare, generating income and food security for rural households to facilitate realisation of EDPRS II and the goals of Vision 2020.

III.3.2. Public and Private Sector Roles

Implementing the Strategy requires a different approach. Over the past decade the government led progress in the sector, driving improvements in the physical environmental for agricultural growth, creating input distribution networks, encouraging stronger cooperation among farmers to bulk up output, and initiating the development of modern post-harvest infrastructure with investments like packing plants, the airport cold storage facility, the cassava and soybean processing plants, and milk cooling centres. The government, supported by development partners and public-private partnerships (PPP), was the key implementing actor.

Nevertheless, continuing agricultural development requires a progressive shift in the roles of the public and private sectors. Often the private sector is better placed to assess markets and to commit resources on the basis of those assessments. It is essential to catalyse a leading role for the private sector in agriculture and instil a business attitude in farmers. Private investments should drive value chain improvements including farmer advisory services, input provision, quality control and value addition.

However, the public sector will still have an important role. First, to provide public goods, which are unattractive to the private sector but have major positive impacts (such as irrigation and terracing). Second, public resources should be channelled to the sector in ways that are designed to promote

efficiency, and catalyse private sector investment, such as infrastructure development (feeder roads and post harvest facilities), strengthening human capital, building entrepreneurial skills, and increasing availability of finance. Finally the government needs to play a monitoring and regulatory role and facilitate partnerships.

In PSTA III, different strategic areas are relevant to the public or private sectors, and many require partnerships. Government will lead investment in irrigation, land husbandry and soil erosion control, but will work with the private sector to provide machinery and inputs to farmers (for example, through vouchers). Pilot schemes will also involve private actors in irrigation development. The government will also continue to lead research programmes, with a more collaborative approach to national and international research institutes. However, private actors will be increasingly involved in providing extension services. The public sector will establish an environment conducive to private investment, for example through establishing an agricultural investment task force, agri-processing hubs and a catalytic fund for agriculture. However, hard infrastructure such as processing plants will be provided through PPPs or purely private investors.

To develop a commercially viable sector, it will be important to bulk up production. Under PSTA II, cooperatives of farmers agreed to plant similar crops and pool resources. This worked well in irrigation schemes and on hillside terraces, but the approach needs to be complemented with technical assistance on production and marketing, as well as management training and marketing assistance. Therefore, under PSTA III alternative methods of bulking up such as contract farming are proposed to link small farmers with markets. The different models can be implemented in the sector, depending on the crop and farmers' preferences. Civil society and farmers groups will play an active role in policy implementation.

With the drive to decentralise policy implementation, the public sector must also consider what responsibility lies at which level of government. Development of policy, budget allocation and overall monitoring will be implemented at the national level, in addition to efforts to lever private sector investment and remove value chain constraints. Districts will have increasing responsibility for extension, production gains and short term evaluation of programs. Working across government will also be important, and partnership with the Private Sector Federation (PSF) and the Chamber of Farmers will help attract and realise private sector investment targeted to farmer needs and opportunity. The Private Sector Development Strategy will guide actions. Therefore at multiple levels the public and private sector have different responsibilities in the implementation of PSTA III, summarised below:

- **Public Sector**
    - Development of basic growth factors, sector skills and knowledge
    - Programmes to catalyse investment,
    - Removing barriers to market efficiency
- **Private Sector**
    - Investing in high value traditional and emerging export crops
    - Sharing costs with public sector
    - Identifying profitable new opportunities and adding value
    - Market pricing for inputs and outputs
- **Development Partners**
    - Alignment with government implementation plans
    - Cost-sharing for public goods unattractive to private actors
    - Support achievement of indicators for poverty and malnutrition
- **Civil Society/Farmers**
    - Key programme implementers
    - Participate in budgeting, planning and monitoring of strategic implementation
    - Provide labour and cost contributions

Regular dialogues with different institutional actors will monitor and review PSTA III implementation and ensure accountability. The agricultural sector working group (ASWG) will meet regularly to oversee policy actions and the District Joint Action Development Forum (JADF) will review local level implementation.

Chapter IV: Strategic Programmes

There are 4 strategic programmes:

Programme 1: Agriculture and animal resource intensification
Programme 2: Research, technology transfer and professionalization of farmers
Programme 3: Value chain development and private sector investment
Programme 4: Institutional development and agricultural cross-cutting issues

Each is expressed in a set of actions for operational purposes, focused on those which will release further agricultural development. Some actions have the long-term purpose of promoting sustainability or efficient use of resources in the sector, while others will increase production, incomes and nutrition levels in the medium term. There are many synergies among programmes. Cooperative development supports other strategic drives including land consolidation, providing products for markets, developing private agricultural advisory services that respond to famers' priorities and watershed management programmes. Agricultural research can support a number of value chains with more market-oriented research and other areas such as livestock feeding. The development of entrepreneurship and creation of opportunities for the private sector will support quality enhancement and increasing quantities and the penetration of higher value markets. As such, an integrated and holistic approach to implementation is needed.

IV.1. Programme 1: Agriculture and Animal Resource Intensification

SP 1.1. Soil Conservation and Land Husbandry

Since 90% of domestic cropland is on slopes ranging from 5% to 55%, investing in land management structures and training are central to improving productivity. This sub-programme scales up successes of PSTA I and PSTA II with progressive and radical terraces, accompanied by soil fertility management and soil erosion control. Through substantial investment in soil erosion protection under PSTA II, by 2012 73 of land was covered by function soil erosion protection infrastructure. For less steep slopes progressive terracing and agroforestry have proven successful in reducing erosion and increasing the economic returns from the land.

However, there is still a lack of information on soil fertility and erosion rates. Furthermore, in addition to construction of terraces, a systematic programme of soil conservation needs to be implemented throughout the country. Soils are easily degraded but good soils are the basis of successful agriculture. Soil erosion results in decreased soil depth and loss of plant nutrients and therefore this strategy proposes soil protection and management programs at the watershed level which encompass both cultivated and uncultivated lands. Seven pilot projects of integrated watershed management have already been implemented, and these must be scaled up. Soil testing capabilities also need to be expanded and the nutrient levels of inputs monitored This strategy addresses these needs, to improve information around soil management and continue to develop a sustainable approach to land husbandry and soil protection.

Lines of action

SP 1.1.1. Land protection structures

Terracing projects will be scaled up. Sites will be selected according to improved criteria that have been developed, taking into account social, economic and technical watershed factors. Best practice developed from experience in infrastructure development, working with farmers' cooperatives, marketing information and crop selection will be applied. Environmental sustainability will be considered during construction of infrastructure. By 2017, soil conservation infrastructure should cover 91% of the relevant land area. Extension will ensure farmers know how to utilise and maintain structures.

SP 1.1.2. Agroforestry

An agroforestry program will be developed in coordination with agricultural research, marketing and the provision of technical advisors for tree crops (including leguminous trees). Farmers will receive advice on agroforestry packages. The implementation of these activities will be coordinated with the IWM projects. There will also be an analysis of how the Crop Intensification Programme (CIP) and Land Use Consolidation (LUC) can be harmonised with the country's need to promote permanent soil-cover and agroforestry. Protocols will be established and issued to farmers and land users in Kinyarwanda. New agro-forestry species will be developed, and up to 90% of farmers will use agro-forestry by 2017.

SP 1.1.3. Improve the understanding of Rwanda's soils

This sub-programme will include several related activities:

1. ***Establish provincial level soil and plant testing laboratories and rehabilitate existing ones*** to test nutrient and chemical characteristics and provide staff with appropriate training.
2. ***Test fertilisers in different agro-ecological zones*** to determine nutrient levels and appropriate application rates for each zone. Agronomists will be informed of appropriate rates for their areas.
3. ***Recalibrate soil loss models and re-estimate soil loss rates*** in major project areas, and evaluate soil erosion control effects of alternative control measures, and disseminate results.
4. ***Design a soil database questionnaire for erosion control assessment***
5. ***Develop a GIS tool for the automation of the interpretation of ortho-photo imagery or satellite imagery***
6. ***Establish a GIS Unit on active Soil Information System (SIS***) that would incorporate historical soil data, new soil information and store and manage data from the erosion control assessments.

SP 1.2. Irrigation and Water Management

Irrigation was identified as a key strategic activity in PSTA II. Rwanda signed the CAADP compact which establishes in its Pillar I on Land and Water management that the Government should allocate at least 2% of public funds for irrigation development. Irrigation is important to increase agricultural productivity through allowing multiple cropping and reducing vulnerability to weather shocks. This plan therefore proposes continued investment in irrigated agriculture, to harness Rwanda's fresh water resources and increase production, and provide security to rural households.

The total area under irrigation was just over 25,590 ha in 2012, including 2,490 ha of hillside irrigation, 23,000 ha of marshland irrigation and around 100 ha of small scale irrigation (garden plots with rainwater harvesting). New irrigation will drive up productivity and make farmers more resistant to weather shocks. Considering the potential impacts of climate change, irrigation infrastructure will also make rural households more resilient and adaptable to longer term shifts in seasonal rainfall. This irrigation development will take place in line with the National Irrigation Policy, the law on Water Users Associations and the Irrigation Master Plan. The lines of action in this strategy will reinforce implementation of these key documents.

Lines of action

SP 1.2.1. Public sector irrigation development

The new national irrigation policy will be validated and implemented. By the end of 2016 MINAGRI will develop additional hectares of irrigated land according to the policy and master plan, and considering potential effects of climate change and the most vulnerable areas. Small-scale schemes will be developed where possible based on water catchments, and farmer organisations trained in their development. It will be important to construct the systems so irrigation is available for two or three cropping seasons per year. MINAGRI will work with Districts to develop District Master Plans for Irrigation. Efforts will be made to get youth cooperatives involved in planning for irrigation projects and implementing them, especially small-scale systems. Extension work will ensure effective and sustainable management. WUAs will be strengthened and members trained on key issues including schistosomiasis.

SP 1.2.2. Private sector irrigation development

Earmark land for private sector irrigation development, and in 2020 evaluate the effectiveness of the private schemes vs. the public schemes. Crops for the schemes should be determined in advance to ensure schemes are profitable. Private schemes will be initially small scale, and the government will define eligible areas in collaboration with farmers and then lease these to private investors. The leases will be tradable assets, and renewable on satisfactory performance and by agreement of the farmers. Leaseholders will pay farmers an annual fee, and design, construct, operate and maintain the irrigation scheme and benefit from the profits generated. Should the leaseholder fail to respect contractual terms, the Government will repossess the scheme with compensation.

SP 1.2.3. Applying lessons from Integrated Watershed Management (IWM) experiences and development of IWM in additional watersheds

The steps will include reviewing the experiences of the seven integrated watershed management projects, extracting the lessons, and deciding what modifications are needed in the approach to make it successful and economically sustainable in other areas.

SP 1.2.4. Develop hydrological information for watershed management

To improve hydrological monitoring networks and better predict seasonal flows including droughts, floods and small-scale shortages, MINAGRI will collaborate with MINIRENA on the following:

1. ***Develop a permanent network of collection stations for hydrologic, physiographic, hydrometeorology, and water quality data***, along with systems for storage, retrieval, sharing and analysis of the data.
2. ***Develop water balances for all key watersheds*.**
3. ***Develop models and capacities for assessing and forecasting important events related to water,*** including flood and drought prediction, effects of climate change and water quality.

SP 1.3. Agricultural Mechanisation

Currently there are relatively low levels of domestic mechanisation and manufacturing of the required tools. Only about 12% of farm operations are mechanised, and the target is to achieve 25% mechanisation by 2017. Mechanisation has many benefits. It contributes to improving productivity of cultivated land and facilitates expansion of cropping areas, improving overall food security. Mechanisation also eases labour constraints including seasonal shortages, and reduces the requirement for physical drudgery, leading to both improved production and lifestyles for farmers. Agro-processing and value addition through mechanised equipment can also generate employment and raise rural incomes.

Certain interventions are already facilitating the mechanisation process. A Power Tiller Assembly Line in the SEZ is under construction, to assemble and improve distribution of power tillers. MINAGRI has also set up a workshop facility in Kafue, Kigali where new imported machinery is stored in the workshop, and then sold through a lease agreement with farmers where the machine serves as collateral. When the farmer has made the full capital and interest payment, they own the machinery. A mobile workshop has also been established to install and service farm machinery. This strategy aims to accelerate the mechanisation process, through further provision of necessary equipment, tools and training.

Lines of Action

SP 1.3.1. Development of mechanisation options and implementation of mechanisation strategy

This activity will assess the performance and profitability of mechanisation options in different terrains, identify and implement appropriate solutions according to the mechanisation strategy. Power tillers which are constructed domestically can serve as an entry point for mechanisation and are efficient, versatile and manoeuvrable on small farms. Small tool distribution will also be considered. Farmers will be trained in basic operations, repair and safety. Mechanisation courses will also be offered by colleges.

SP 1.3.2. Facilitating investment and financing for mechanisation

There is scope for enterprises of different scales to invest in mechanisation, and development of local hire services will provide mechanisation options to the small-scale farmers. MINAGRI will develop pre-feasibility, feasibility and ROI studies on these enterprises. Investors can choose PPP frameworks or private investments. Currently there are few actors engaged in leasing farm machinery to farmers and co-operatives. The Government will work to expand the sources of credit facilities. Since the machinery is used as collateral for loans, the Government can motivate and engage a range of financial institutions, including microfinance, in providing mechanisation loans to farmers.

SP 1.3.3. Maintaining mechanisation services

To establish efficient and effective distribution channels for equipment, spare parts and repair services, as well as other supplies such as fuel and oil MINAGRI will help establish service centres through business ventures with co-operatives or private entrepreneurs (with PPP models) in the Eastern province. The public sector will gradually withdraw and promote businesses in rural areas by encouraging local entrepreneurs to set up centres for machinery services and spare parts. MINAGRI will work with the Rwanda Bureau of Standards (RBS) to establish standards and safety regulations for spare parts, implements and machinery, and to certify machinery.

SP 1.3.4. Incorporating mechanisation in irrigation schemes

The versatility of engines fitted on tractors and power tillers to pump water and deliver it through hoses makes it easier for smallholders to utilize mechanisation for irrigation on a small scale. Fertilizer can be more efficiently applied on small and medium size farms using motorised pumping of water.

SP 1.4. Inputs to Improve Soil Fertility and Management

There has been an increase in fertilizer use since 2007. The fertiliser application rate in CIP areas has reached an annual average of 29 kg/ha/year in 2011-2012 compared to a national average of 4.2 kg/ha/year from 1998-2005. This has increased crop yields, especially for maize and wheat. Maize yields increased from 0.65 MT/ha in 2000 to 2.5 MT/ha in 2010, while wheat yields increased by 2.5 times during the same period. The target is 45 kg/ha/yr for fertiliser application by 2017. These crops have strong market linkages, giving farmers a better chance to recover the fertiliser expenditures plus profits. However, application rates are still below recommended levels for these crops and for other crops it will be profitable to begin to apply fertilisers. Increasing production volumes will require demonstration to farmers of the benefits of fertiliser use and widening the input subsidy programme. Increasing fertiliser use is the first strategic focus of this sub-program.

Fertiliser distribution and sales is also a key focus area. Subsidizing the international transport of fertiliser from Dar Es Salaam is expensive, and there have been difficulties in the printing and distributing of subsidy vouchers and monitoring their use. There is also a lack of profitability in the distribution chain, which results in high default rates on fertiliser loans among farmers and agro-dealers. The second strategic goals is therefore to establish a private distribution and sales network for fertiliser and other agro-inputs, without losing the incentives for farmers to apply inputs. Fertiliser will also be better matched to different soil conditions and cropping patterns. A strategic drive for improvement and privatisation of the distribution system for fertiliser and other agro-inputs must support input demand among the farmers.

Lines of Action

SP 1.4.1. Accelerating privatisation of input markets according to Fertiliser Strategy

According to the Fertiliser Strategy and the need to facilitate private investment, the input distribution system will be privatised. Private operators are already engaged. Agro-dealers are receiving training and better access to credit. Government subsidies are also being phased down, will still ensuring vulnerable farmers have access. These initiatives to facilitate privatisation will be strengthened.

SP 1.4.2. Improve the input distribution network
Strengthen the network of private agro dealers and distributors through training and policy measures that increase the profitability of firms in the network. Scale up fertiliser and seed distribution by combining advisory services with input distribution and use of microfinance to recover costs. Phase down the transport subsidy on fertilisers and encourage fertiliser imports by the private sector.

SP 1.4.3. Improve the infrastructure for fertiliser distribution
Conduct a feasibility study for a fertiliser blending plant and encourage private investment, or a PPP to build one. Construct additional fertiliser storage capacity under PPPs.

SP 1.4.4. Improve soil fertility management through use of organic fertilisers and liming
Farmers will be trained in methods to improve soil fertility, and received support to operationlise the approach for example through providing stores for organic compost.

SP 1.5. Seed Development

Sufficient quantities of quality seed are a critical resource for agricultural development. There have already been significant achievements in regards to the legal framework concerning seeds, increased production, and the building of basic infrastructure for reinforcing production and quality control. Under PSTA II, farmers received both high quality seed varieties and advisory services in seed and crop production. However, challenges remains, which this strategy will tackle. These challenges include:

- Inadequate quantities of seeds produced nationally for some crops which forces the Government to import seeds particularly for maize and wheat.
- Poor quality of internally produced seed; quality deterioration has occurred during seed production and storage.
- Poor sanitary status of seed and the prevalence of crop pests and diseases.
- Poor germination of seeds distributed under the CIP to date.
- Limited effective distribution

Therefore, this strategy has two orientations, to both develop production, quality and maintenance of seeds, and establish demand for high quality seed and ensure that demand is met and maintained through effective distribution and capacity building in relation to seed use, according to the National Seed Strategy.

Lines of Action:

SP 1.5.1. Implement a formal seed system
Currently, farmers are exposed to the three different seed grades (Figure 2):

Figure 2. Production, Processing, Sales and Quality Control of Seeds by Grade

<table>
<tr><th></th><th>Producers</th><th>Processors</th><th>Sellers</th><th>Quality Control</th></tr>
<tr><td>Certified Seed</td><td>Registered Certified Seed Multipliers</td><td>RSE, other traders, seed multipliers</td><td>Registered seed traders, seed companies, cooperatives and seed multipliers</td><td>Internal: RAB
External: NSL (certification)</td></tr>
<tr><td>Quality Declared Seed</td><td colspan="2">Registered QDS Seed Multipliers</td><td>Seed multipliers, registered village retailers</td><td>Internal: RAB
External: NSL (certification)</td></tr>
<tr><td>Farmer Saved Seed</td><td colspan="3">Farmers</td><td>No inspection</td></tr>
</table>

Certified Seed is the highest quality, most expensive and produced by certified actors. RAB and the National Seed Laboratory are responsible for quality control, and the Rwanda Seed Enterprise buys, processes and sells the seed through a network of private agro-dealers. MINAGRI will work with RSE to produce and distributed certified seeds for CIP crops. Quality declared seeds are a high quality formal seed grade locally produced by private QDS seed multipliers, with lower levels of quality control than certified seed. Currently, the demand for quality seeds in crops such as maize, wheat and potatoes is greater than supply. To increase the amount of certified seed that reaches farmers, the professional seed chain will be improved through the steps below. Emphasis should be on specific crops that represent the most promising markets for growth of the private seed sector.

1. ***Increased public sector*** **research and production** of breeder, pre-basic and basic seed
2. ***Improved support for private seed multipliers*** through provision of technical and business skills training, facilitating links and ensuring access to inputs Reinforced internal and external quality control procedures and sensitization delivered on importance of quality control
3. ***Revision and implementation of the national legislative framework for seeds***
4. ***Expansion of the National Gene Bank***
5. ***Implementation of initiatives to encourage farmer demand*** - demonstration plots and training
6. ***Facilitation of improved links between farmers, small traders, agro-dealers and MFIs***

SP 1.5.2. Facilitate the import of seeds and planting materials

These materials will be subject to sanitary regulations, and regulations will be developed and disseminated. The development of a national seed industry will concentrate on select crops, and quality seeds will be needed. Seed imports should be allowed while building local capacity.

SP 1.6. Livestock Development

Livestock development to increase the quantity and quality of animal products (milk, meat, eggs, fish and honey) will have two important benefits. First, it will improve nutrition levels through consumption of animal protein. Second, animal resource sector development has the potential to increase rural incomes through processing and sales. The One-Cow (Girinka) programme has been successful in raising rural household incomes and also in increasing milk production in the country. Since the beginning of the programme in 2006, a total of 134,548 cows have been distributed to poor families by June 2012 and 40,352 cows have been "passed on to other families". Milk production has also increased from 50,000 MT in 2000 to 450,000 MT in 2012. The corresponding 'One Cup of Milk per Child' school feeding program has contributed to reducing malnutrition levels. The national goal is to double milk production and consumption by 2017, targeting consumption rates of 80 litres per person per year.

For efficient milk production, it is important to consider access to feed and water for cattle. This strategy targets feed and other aspects of milk production and handling. Milk sheds support dairy development, but their specifications will differ according to location. Producers in the Kigali milk shed have a larger numbers of improved dairy cows and receive a higher price for their milk because of their proximity to the large urban market. There is potential to increase milk production in this milk shed and in the Gishwati plateau where rainfall is high and land is suitable for forage production. The Eastern Province has 60% of the cattle population, but experiences long dry seasons and therefore conserved fodder will be necessary.

The One Cow program will also be developed. There are four key intervention areas. First, different ownership models like joint ownership of cows will allow more poor families to benefit from the milk produced. Second, communal grazing areas for families with very little land will facilitate improved delivery of extension services including insemination and disease control. This re-shaping of the program will be combine with improved follow up training for current beneficiaries will ensure the cows continue to be a productive resource and that the poorest families have access to the program. The final initiative

will be expansion of the programme through provision of small ruminants, rabbits, swine and poultry to the poorest families. The animal resource sector development supported by this strategy will therefore increase milk and meat production and reduce poverty and malnutrition.

Lines of Action

SP 1.6.1. Improve milk quality, seasonality and productivity in line with the Dairy Strategy
To increase milk production and improve the dairy value chain, the Dairy Strategy will be implemented. Dairy specialists will be trained at Masaka and vocational centres. A specialised course of extension agents will work with livestock farmers and milk collectors. Also, in order to increase milk production, cattle feed and water regimes will be improved.

SP.1.6.2. Improved animal nutrition
Assess current and future fodder requirements against current availability, identify gaps and develop a strategy to increase fodder production through fodder plots at community level and distribution of fodder seeds, combined with extension work to promote adequate feeding and provision of water to livestock. The provision of dry season feed through the use of fodder banking and agricultural by-products will be discussed. Farmers will also be trained on the use of salt blocks and supplying other nutrients. Conduct research into optimal feeding and appropriate fodder species for different agro-ecological zones. Support the development of the compound feeds industry and quality control.

SP 1.6.3. Improve animal genetics in line with the 2012 Animal Genetics Improvement Strategy
Low livestock productivity is often attributed to low genetic potential and improving livestock genetics is a key intervention to increase animal productivity. Both cattle and small livestock will be targeted for genetic research and improvement through implementing the 2012 Animal Genetics Improvement Strategy. The following interventions shall also support genetic improvement:

1. ***Develop the capacity of Masaka Bull Station***, turn over and upgrade the current bull team and develop a national herdbook
2. ***Develop a cow identification programme*** for the crossbred and purebred dairy cows and carry out productivity trials by breed and cross under actual field conditions. Cow production information could be recorded and uploaded through the MCCs
3. ***Expand farm level artificial insemination of cows and pigs***
4. ***Develop and enhance research programs around small livestock***, including a genetic enhancement program for goats, sheep, poultry, rabbits and pigs,
5. ***Establish genetic research initiatives around emerging livestock sectors*** including fisheries and apiculture

SP 1.6.4. Develop diversified smallholder meat production following the Meat Industry Strategy
The animal intensification programme will include goats, chicken, pigs and rabbits. The rationale is to increase meat production. In addition, meat production processes at both the commercial and smallholder level will be improved. Implementation of the 2012 Poultry Strategy will be the first step. Development of intensive semi-commercial (smallholder) and commercial poultry and pig industries to meet increasing meat demand will be a priority for improving meat production. Compound feed centres will also be established. Feasibility studies on concentrate and by-product feed production, transportation, and utilisation will be conducted, to support the poultry and swine industry, To promote dissemination of quality breeds for smaller animals, nuclei centres will be set up.

SP 1.6.5. Extension of the Girinka programme
Girinka will be expanded. First to speed up poor family access to the programme, communal areas should be promoted (Ibikumba by'umudugudu). This will allow poor families to keep their cows in one place and share feeding and watering. This will also facilitate better delivery of veterinary services including insemination and disease control. Second, in the case of very poor households, joint ownership models of productive cows will be promoted, so more households can benefit from milk production. To ensure the program is continuing to deliver, beneficiaries should receive follow up training on care for their cows and

how to make use of their asset. Finally, to encourage the development of the small stock sector, the model shall be replicated to distribute small animals including goats, sheep, rabbits, pigs and poultry.

SP 1.6.6. Strengthen the veterinary service network and improve animal health

Existing veterinary provisions are promising. Veterinary drugs and equipment are in adequate supply, there is one government agro-vet in each sector, and RAB has well equipped animal disease testing laboratories in Rubirizi and is developing an extra laboratory at Nyagatare for testing for major animal diseases. However, there are challenges in skills and access of vets and in the management of certain diseases such as mastitis, which affects milk quality. Disease management and animal health will be improved through the following:

1. ***Expansion and promotion of the Animal Health Workers programme***, and training of farmers in key diseases, including mastitis prevention
2. ***Increased training of para-vets*** within RAB and development and upgrading of post-secondary training for para-vets
3. ***Increased access to veterinary services*** through provision of vet stations at MCCs and increased availability of transportation for veterinarians and agro-vets to reach their clients.
4. ***Encouragement of private veterinary practice*** through training community animal health workers who can provide basic health services under the guidance of an agro-vet or veterinarian.
5. ***Develop and implement a program of mastitis prevention***
6. ***Develop and disseminate materials on best practice in disease management***

SP 1.7. Nutrition and Household Vulnerability

Food production is increasing and food is flowing relatively easily within and outside the country. However, EICV 3 identified that in 2012, 82,000 households (4%) had poor and 378,000 households (17%) had borderline food consumption patterns. These households are vulnerable to seasonal shortages and also have inadequate provision in the case of drought or excess rainfall which reduce harvests. Food insecurity follows a similar distribution across districts as poverty.

As a result of food insecurity, households are also vulnerable to malnutrition. Malnutrition is the direct result of an inadequate diet and/or infection and manifests through acute malnutrition (wasting), chronic malnutrition (stunting) and micronutrient deficiencies. Children under the age of five are particularly affected and the prevalence of stunting among children under five in Rwanda is 43%. Inappropriate feeding and inadequate intake of animal protein are leading causes. Iron deficiency (anaemia) is also a concern, and affects 38% of children under five, and is highest amongst children aged 12 months old (at about 70%). Taken together, stunting and anaemia impose economic costs and contribute to increased risk of infection and mortality, delays in physical and mental development, and decreased work capacity.

Improving nutrition faces multiple challenges, including limited knowledge of basic nutritional practices and inadequate feeding, with insufficiently diverse diets and inappropriate infant feeding. Food security also relates to the stability of rural incomes, and events including crop failures and seasonal scarcities can reduce access to food. In Rwanda, poor rural households which farm small plots of land are the most food insecure, and a multi-sectoral framework of integrated interventions is required to tackle this, in line with the Nutrition Action Plan (NAP) 2013-17. The below lines of action are based on the NAP objectives.

Lines of Action

SP 1.7.1. Support households in nutritious garden practices and diversifying food production

The kitchen gardens programme will be scaled up, and farmers will be encouraged to use land around their homes to grow diverse fruits and vegetables including green leafy vegetables, and also to adopt inter-cropping practices. As discussed in SP1.6.4. and SP 1.6.5., small animals such as pregnant rabbits will be distributed to the poorest households.

SP 1.7.2. Improve nutrition related knowledge and practices for food insecure households

Nutrition gardens, intercropping and better nutrition (including cooking demonstrations) will be promoted through extension workers and FFS, district agronomists, agricultural village promoters, primary and secondary school gardens and a communication campaign in collaboration with MINISANTE, MINEDUC and MINALOC. MINAGRI will support a multi-sectoral Behavioural Change Communication (BCC) initiative to improve and institutionalise nutritional knowledge.

SP 1.7.3. Develop a programme of bio-fortified food

This programme will especially focus on beans fortified in iron, vitamin A rich maize, orange sweet potato, fortified cassava and rice. The production and consumption of nutritious seeds will be expanded, through distribution of seeds and extension work promoting planting and consumption. The campaign will focus on rural ubudehe categories, especially the lowest where high levels of food security have been identified.

SP 1.7.4. Expansion of One Cup of Milk Per Child Programme

This programme will provide demand for increased milk production and improve childhood nutrition. Households should also be sensitised to the benefits of milk consumption for both children and adults. Nutrition education is vital to ensure the success of the intervention.

SP 1.7.5. Continue to maintain a National Strategic Food Reserve

The National Strategic Reserves (NSR) have been established to address potential shocks to food supply that the market or other government programs cannot or have not adequately addressed thus helping to improve food security. This consists of selected staples like maize and beans. Care needs to be taken to not distort the functioning of markets when purchases are made and when stocks are released for renewal of the reserves. The reserve guards against extreme fluctuations in world markets for staples.

SP 1.7.5. Strengthen Rwanda's Food Security Information System

This system will bring together quantitative information from different sources and will be processed into indicators that are related to decision-making. The information flow should be simplified and harmonised with systematic data transfer through the district that is supposed to pre-process and consolidate data to MINAGRI and its agencies for effective monitoring. The system should be rationalized and harmonized among all stakeholders. Food security services will also be carried out more regularly. This action shall be harmonised with MINICOM and the public sector capacity building initiative food security module.

IV.2. Programme 2: Research and Technology Transfer, Advisory Services and Professionalization of Farmers

SP 2.1. Research and Technology Transfer

Agricultural research has made notable advances in recent years, from virus-free cassava varieties and disease-resistant maize, to more nutrient-rich varieties to combat malnutrition (maize high in lysine and tryptophan, beans high in minerals, cassava rich in vitamin A), to higher yield beans and rice, to management techniques for plant pathogens, and other accomplishments. The scientific team in RAB has the capacity to take on diverse issues, although Rwanda's agricultural research staff is still younger and less advanced in terms of postgraduate degrees when compared with staff in the region. More resources and partnerships with international agricultural research entities are required to strengthen capacity.

Research should facilitate both the production gains and commercialization which are the drivers of this strategic plan. Research should therefor focus on increasing crop and livestock productivity, improving natural resource management, meeting market requirements and responding to farmers' needs.

Lines of Action

SP 2.1.1. Market-related research

In addition to the on-going research in RAB, develop and support lines of research devoted to market-related issues and crops with strong market potential. Commodities like coffee, wheat, rice, soybean and horticulture present opportunities for this kind of research. It may be productive to enter into collaborative research agreements with agro-industries.

SP 2.1.2. Research on seeds, planting material and multi-crop rotations

In coordination with the private sector, establish a programme for developing quality seed and planting material for traditional and non-traditional crops. Conduct research on multi-cropping including agroforestry systems, for yields, disease resistance and input use rates.

SP 2.1.3. Research on farmers' fields

Research carried out in collaboration with farmers on their own fields has significant benefits. In coordination with District authorities and the JAF, decentralize part of the research portfolio to conduct activities on famers' fields that involves farmers and responds to their main priorities. The program will emphasise varietal adaptation, fertilisation, use of lime, trace elements and organic fertilisers, cultivation practices, intercropping options, disease and pest control, and water management.

SP 2.1.4. Competitive research funding

Institute a mechanism for competitive research funding under which any entity or group of entities may submit proposals for the competitive award of research funding. RAB may apply on its own or jointly with other institutions, for example with tea estates for research on high-quality tea clones. Equally, other institutions may make proposals on their own for research funding.

SP 2.1.5. Funding and international collaboration

Develop and implement a strategy to secure long-term funding support for public-sector agricultural research, with provision for eventual participation of the private sector in the funding, and for collaboration with international agricultural research entities, international universities and academies. Distance learning programmes and study visits will be encouraged.

SP 2.2. Extension and Proximity Services for Producers

Proximity services have made substantial progress in recent years but need further strengthening and some restructuring. The two key considerations in relation to proximity services are quality of the provided services and accessibility.

In order to increase quality, service providers must be able to deliver the most appropriate solutions according to problems faced by producers. A continuous programme of skills strengthening will be rolled out for all people involved in extension service provision. To improve accessibility, the number of extension service providers will be scaled up so that the majority of farmers can access advice when needed. This will require intervention in formal and non-formal adult education, and a practical approach to understanding the daily challenges faced by farmers. Only when the majority of farmers have access to appropriate and quality proximity service provision will they be able to exchange experiences and express their needs through a demand driven process for extension service provision.

Lines of action

SP 2.2.1. Extending Farmer Field Schools (FFS)

Following the 2011 FFS Guidelines, the programme will be expanded through increasing the number of trainers and facilitators. Quality skill provision will be prioritised through a season long practical training session. When establishing FFS in relation to new commodities, the group size, plot, facilitator and training curriculum will be considered. FFS will continue to empower farmers to become farmer leaders,

form groups which work in their interests, voice their needs and participate in research to improve agricultural practices. A FFS coordinating unit shall be established to guide and supervise the training of trainers and the implementation of the program. It will also be charged with ensuring channels of communication with agricultural researchers and extension agents, and trainers and facilitators. FFS will cover extensions for all sub-programmes of programme 1, including soil conservation and terracing, irrigation, mechanisation, input use, livestock and nutrition.

Season long training for FFS is required to ensure quality, but shorter term community mobilisation campaigns (CMCs) can be used to rapidly expand FFS lessons. This concept is usable in some specific cases where the topics to be covered are already well understood and the solutions can be demonstrated and easily implemented by large groups of producers.

SP 2.2.2. Training for agricultural entrepreneurship

Lack of enterprise and management skills is a major barrier to the successful development and new business in agriculture. Farmers also often lack knowledge of market opportunities. To tackle this farmers and farming organisations, including those targeting women and youth, will receive training in setting up businesses, during which they will develop business plans. Skills training will focus on accounting, cost control, business planning and marketing.

SP 2.2.3. Facilitating relationships between cooperatives and farm advisors

Government will act as facilitator to help cooperatives contact farm advisors for key issues. Public sector cost sharing will support the programme. Cooperatives will be able to choose and select advisor. A pilot will be established and evaluation, and if successful, the program will be expanded. MINAGRI will also liaise with the Private Sector Federation (PSF) in relation to its agri-business development services, to help farmers make links with extensionists specialising in agri-business.

SP 2.2.4. Expansion of agricultural advisory services

Following the guidelines of PSTA II, establish a permanent training service for extension agents, including district agronomists, which includes intensive, up-to-date training modules on relevant agricultural topics including value chain development, post harvest handling and storage and marketing. Training modules could be certified, and include contact with agricultural researchers, specialised international experts, and site visits. Provision should be made to encourage the development of female extension agents and district agronomists in these training programmes. A continuously updated database will be established of those advisors who have received training and been certified, and Districts and farmer groups will have access.

SP 2.2.5. Establish local forums for farmers and agricultural stakeholders

In coordination with District authorities, support and facilitate 'platforms' at different levels where farmers and other persons involved in agriculture meet frequently in the field, exchange information and coordinate activities for agricultural development. These District Agricultural Platforms will be initiated as sub-committees of the JADF similar to the platforms piloted under the PASNVA project. The support programme will strengthen the platforms' capacities and mechanisms to host farmers and facilitate farmer-to-farmer exchanges, and to assess needs for advisory services and orient service providers. It will evaluate the results of the farmer exchanges and work to make them as productive as possible.

SP 2.3. Farmer Cooperatives and Organisations

In order to increase production and commercialization of the agricultural sector, farmer cooperatives will play a key role. This sub-program builds on the successful development of farmer cooperatives under PSTA II, and has five key objectives:

1. Develop ***management and entrepreneurial*** capacities in farmer cooperatives and organisations
2. Support ***farmer organisation participation in activities of higher value***, both at the farm level and in post-harvest handling and agro-processing

3. Develop farmer organisations as vehicles to ***improve farmer access to inputs***, always in response to farmer initiatives
4. Develop rural ***women's organisations*** and groups within cooperatives
5. Promote the ***growth of social capital*** to provide farmer organisations with an enduring foundation for the long run.

Cooperative management has sometimes been a challenge but has improved with the support of efforts like RSSP 2 and SPREAD for coffee. In many cases members now perceive significant benefits from cooperative membership, especially receiving more information, sharing knowledge, and having greater access to finance. This strategy will further improve cooperative management and farmer engagement.

Lines of Action

SP 2.3.1. Implement a capacity building programme for agricultural organisations
In coordination with MINICOM, develop and implement a long-term programme of capacity building in village organisations, cooperatives, rural women's organisations and other farmer organisations, with emphasis on those dedicated to input purchase and output marketing and those linked to processing facilities. Define the institutional framework and roles of all relevant entities and the goals of the programme. Special attention will be given to promoting and strengthening rural women's organisations. The training will be tailored to types of production and cover organisational factors. Training will also inform cooperatives of the opportunity to access inputs in line with SP 1.4 Input Markets and SP 3.8 on post-harvest infrastructure. The most successful cooperatives will received further training.

SP 2.3.2. Develop a framework for share companies in farming areas
The legal basis for share companies will be established. The approach will be discussed with groups of farmers and pilot schemes of share companies established.

IV.3. Programme 3: Value Chain Development and Private Sector Investment

SP 3.1. Creating an Environment to Attract Private Investment, Encourage Entrepreneurship and Facilitate Market Access

The main requirements for successful exportation of agricultural products are market appropriate quality, quantity, and reliability. Quantity requires sufficient land devoted to a given crop, which is a challenge in a sector composed almost entirely of very small farms. Meeting this challenge and finding ways to bring small farmers together for producing and selling high-value crops represents a major opportunity to raise incomes for rural families.

Different modalities have been developed and implemented throughout the world but experience has made it clear that the approach of aggregating production via cooperatives is slow and therefore by itself insufficient to facilitate a rapid transformation of agriculture. This strategy proposes alternatives for the concept of consolidation of landholdings. The main alternatives are as follows:

1. Facilitated Contract farming. Under this approach a marketing agent, exporter or processor makes purchases from substantial numbers of small farmers. The farms don't have to be contiguous, but the model works best if they are located in the same area, to facilitate provision of technical advice and inputs, product collection, storage and transportation. Government facilitators can work to educate both parties

of the benefits of working together over the longer term, and government can also offer the risk guarantees of SP 3.1.3 to encourage the formation of the business partnerships.

2. Satellite farming. This is a variant of contract farming under which a larger farm (nucleus farm) produces a high-value product and serves as a demonstration for surrounding smaller farms (out growers), which over time agree to plant the same crop, follow the same cultivation procedures, and sell to the same buyer. The elements of the scheme include provision to out growers of high-yielding varieties and rental to them of farm machinery, plus training on post-harvest management and guaranteed purchase of the crop.

3. Consolidated land leasing. Under this approach, an agricultural entrepreneur reaches a 8-15 years lease agreement with a number of farmers whose lands are contiguous. The lease must be long enough for the entrepreneur to realize a full return on the investment. In the start-up years, when production has not reached its peak, the lease agreement usually offers the small farmers at least the income they earned before, and then in subsequent years it increases. In addition, small farmers and their families will be the first to be hired on the consolidated farm.

4. Cooperatives. As Rwanda's experience has shown, cooperatives can be effective in consolidating land for the purpose of cultivating larger areas of the same crop. It is important to recognize that under this model each farmer tills his or her own land, instead of working land collectively, which has not proven effective wherever tried in the world. However, by itself the cooperative model does not deliver the technology transfer that occurs under the previous three models. It needs to be complemented with the approaches on proximity services mentioned above and linked to the market.

In addition to bulking up production, agricultural entrepreneurship skills can facilitate the transformation of agriculture from subsistence to knowledge intensive and market oriented. Access to agricultural finance will catalyse innovations and business within the sector to increase market demand and sustain growth. Finally, improving agricultural standards provides the quality and reliability which add market value.

Lines of Action

SP 3.1.1. Creation of a farm management unit to focus on bulking up production

The unit will be responsible for facilitating land use consolidation projects such as facilitating contract negotiation and supervision of their implementation. Promotion of cooperatives and their training takes place under existing programmes for cooperatives. The unit will also work on facilitating new forms of farming mentioned above.

SP 3.1.2. Public-private partnerships and risk management in value chains

There are many kinds of public-private partnerships (PPP). The simplest kind is an implicit partnership in which the public sector extends infrastructure (electricity, roads, water and sanitation) and the private sector utilizes it to build productive facilities. In order to facilitate the development of PPPs in agriculture, the following steps will be considered:

1. ***The Draft PPP Law outlines key criteria***
2. ***Negotiations should take account of the entire value chain and systemic issues***: supply chain analysis, demand, rate of return, different types of guarantees, incentives and co-investments.
3. ***Public sector can mitigate risk***: Both sides of a value chain transaction perceive compliance risk. Smallholders may break delivery contracts due to a more attractive spot price and buyers can default or delay payments. Government can mitigate this risk to facilitate partnership formation.
4. ***Improved coordination between NAEB and RDB on investment and export promotion***: identify public sector support mechanisms such as loan guarantees, and identify and promote opportunities for the private sector through value chain analysis
5. ***Implementation across MINAGRI, RDB, MINICOM, MINECOFIN and MININFRA***
6. ***Establish the Agriculture Investment Task Force*** to oversee investment mobilisation and capacity development of the private sector and support to new PPPs

SP 3.1.3. Catalytic fund and support for agricultural entrepreneurship

The financing of agricultural enterprises is a problematic as banks view them as risky and micro-finance is not suitable for agro-processing investments. However, integrating producers into value chains and reaching higher levels of quality and marketability requires significant investments. A venture capital fund for agriculture recognises the need for sector innovation. The following steps are required:

1. ***Feasibility and design study for a venture capital fund*** including eligibility, project selection criteria (rate of return, sustainability and links with market) monitoring and evaluating impacts
2. ***Develop enabling legislation to make the fund operational***
3. ***Establish and operationalize fund, building on Rural Investment Facility (RIF)best practice***
4. ***Funding provided provides minority shareholdings for government to be sold at a set time,*** with first rights of purchase to the enterprise concerned
5. ***Entrepreneurs provide a percentage of capital***

MINAGRI will also work together with the PSF and the Chamber of Farmers, to organise annual agri-business contest and provide technical assistance to winning businesses.

SP 3.1.4. Agricultural exports and cross-border trade channels

Market expansion will be necessary to absorb production increases. The EAC region offers the best opportunity to trade, and there is already significant trade flows. Expanding sales in neighbouring countries will give Rwandan exporters opportunities to increase volume, generate economies of scale in processing industries, and experience the quality requirements of international trade. Currently, much trade is informal and therefore does not appear in official statistics, and therefore it is difficult to estimate the true volume. To facilitate regional trade, the actions below are required:

1. ***Establish a focal point within MINAGRI to improve collaboration with MINEAC and MINICOM, to implement the cross-border trade strategy*** and harmonise standards (SP 3.1.6.)
2. ***Improve information provision and mainstreaming related to regional and international trade into e-soko and COMESA Trade Information Desks***
3. ***Develop an export certification programme*** in collaboration with Rwanda Bureau of Standards (RBS) and raise awareness of export quality standards among farmers and traders
4. ***Develop a program to protect existing organic certifications***, and allow new ones. Map organic production areas and restrict input use of neighbouring farms
5. ***Provide incentives for export cargo space including airport cold storage***

SP 3.1.5. Strengthen sanitary, phytosanitary and food safety (SPS) and sensitize producers

The application of SPS measures (basic rules for food safety, animal and plant health) will be strengthened. Regulations such as the Plant Health Law and Animal Health Law will be more strongly enforced. Activities organised by the Rwanda National Plant Protection Organization (NPPO) and National Livestock Protection Unit will be supported. MINAGRI will coordinate with the EAC to harmonize and operationalize SPS policies, legislation, inspection and certification procedures, and establish zoosanitary and phytosanitary laboratories for diagnosis of pests and diseases. The SPS legal framework will be supported and transparency increased through working with SPS focal points. Producers and traders will be sensitized regarding SPS requirements, and links established with producer organisations, importers and exporters to ensure standards are uniformly followed. Finally, MINAGRI and NAEB will participate regularly in international and regional standard setting, in collaboration with RBS and other bodies.

SP 3.2. Development of Priority Value Chains: Food Crops

The requirements for developing priority food crop value chains are outlined below. These value chains have been selected because:

1. They are principle staple crops
2. Interventions are needed to remove critical bottlenecks in the chains

When implementing strategic actions, the whole value chain must be considered, from research, planting material, production, extension, post harvest, value addition and market analysis of supply and demand. The process should also identify key stakeholders and the business case for each value chain.

Lines of Action: Food Crops

SP 3.2.1. Bananas

Banana is by far the dominant fruit crop in Rwanda in terms of value of production. Four members of the banana family are consumed or produced in Rwanda: cooking bananas, beer bananas, apple bananas (kamaramasenge) and plantains. Apple bananas have highest unit value as they can be exported successfully in organic form to Europe. However, this product is most vulnerable to *Fusarium* wilt disease which is debilitating its production. Apple bananas have good market prospects, and production should be increased. Conditions are not ideal for plaintain which will continue to mostly be imported from the DRC. However, for cooking bananas demand outstrips supply and substantial imports that could be replaced. If production were to increase sufficiently it would even be possible to engage in exports. Cooking bananas are more resistant to *Fusarium* wilt, especially when irrigated and mulched. Given the importance of bananas as a food staple and for exports, the crop should be prioritised in policy, research, extension and value chain development. The following priorities will help realize some of the sector's potential:

1. ***Develop additional teams of Farm Field School (FFS) trainers for bananas,*** accompanied by demonstration plots of better crop cultivation practices
2. ***Include bananas as one of the crops in new irrigation schemes***,
3. ***Provide better quality planting materials to banana growers.***
4. ***Commission an exploration of the European markets for dried apple bananas and chips*** and a study of the feasibility of working with selected banana growers cooperative to supply those markets
5. ***Strengthen banana disease control programmes, extension and research*** w

SP 3.2.2. Wheat

Wheat production in Rwanda has increased significantly over the past five years. In 2007 its production was 24,633 MT, and in 2011 it reached 114,075 MT. The main constraint for improving the production of wheat is that varieties preferred by farmers suitable for wheat porridge boiling are not appropriate for wheat mills. For this reason, wheat imports have increased from 4,603 MT in 2008 to 82,616 MT in 2011. This strategy aims to increase domestic production and processing to reduce the need for imports through the following steps:

1. ***Improve and strengthen research into high quality wheat*** suitable for processing
2. ***Facilitate contract farming relationships between wheat processors and farmers*** to encourage value addition facilities high quality wheat production
3. ***Support cooperatives through the provision of improved post-harvest machinery***
4. ***Support PPP arrangement between processors, cooperatives and Government***

SP 3.2.3. Maize

Maize is now Rwanda's third largest crop in terms of area planted. Yields are also increasing extremely rapidly due to the diffusion of high-yielding, rapidly maturing varieties and higher rates of fertiliser application. Production also has been boosted by the introduction of farm mechanization equipment in some parts of the country, with emphasis on women farmers. A priority area in this strategy is to reduce post harvest losses, estimated at 22.5 %, through introducing proper drying, shelling and storage facilities. The activities below will facilitate better processing:

1. ***Work with the Rwandan Grains and Cereals Corporation and maize growing cooperatives to install post-harvest facilities and train farmers in their use***, and benefits in terms of crop sales. This will cover shelling, drying and storage facilities, and other facilities as required
2. ***Utilize grant mechanisms such as MLI to endow cooperatives with appropriate post-harvest facilities*** for maize and other staple crops
3. ***Explore potential export markets as processing improves*****,** for example South Sudan, Kenya, the DRC and identify potential marketing contacts and contracts for Rwandan maize.

SP 3.2.4. Rice

Domestic production of rice provides about 70% of the national annual requirement. There is substantial potential to increase rice production due to the following factors:

- ***Increased area of marshlands for rice cultivation:*** by 2017 a total of 32,000 ha of tmarshlands will be developed, mainly cultivated with rice
- ***Availability of good high yielding varieties of rice***
- ***High numbers of cooperatives already engage with the sector***, with the potential for capacity building

The new National Rice Development Strategy (NRDS) will be the leading implementation document through which all sector interventions will be made in a harmonized manner. NRDS aims at increasing productivity from the current level of 5.8 t/Ha to 7 t/Ha, and expanding the area under rice cultivation to 28,500 Ha by 2018. To achieve these targets, Rwanda must focus on key sub-sector issues including quality of seeds, management of diseases, provision of seasonal irrigation, post-harvest handling infrastructure for reducing the incidence of broken grain, maintaining appropriate levels of humidity, appropriate mechanisation of farming operations, improving cooperative management, establishing solid market linkages between producers, cooperatives and millers, and improving milling processes.

1. ***Accelerate rice variety development, and involve the private sector in seed multiplication and distribution***, to ensure delivery of high-quality seeds of diverse varieties, including fragrant rice
2. ***Extend the FFS system to rice producers***, and include site-specific soil tests for determination of appropriate fertiliser mixes and strategies to combat pests, emphasizing IPM.
3. ***Explore mechanisation options***, starting with testing of the small tractors that have proven productive in neighbouring countries.
4. ***Provide rice producers with PHHS project support and design and install appropriate post-harvest infrastructure***, to control grain humidity, impurities, and broken grains
5. ***Work with millers, cooperatives and producers to establish harvest purchase contracts*** to pay farmers promptly and provide inputs, and work to improve their financial management.

SP 3.2.5. Irish Potato

Irish Potato an important and fast growing Rwandan food crop. From 1966 to 2010, the cultivated area increased from 9,500 ha to 130,000 ha and production increased from 57,300 MT to 1,300,000 MT. Although farmers growing Irish Potato are familiar with cultivation techniques, recently both planted area and production have decreased because poor quality seed has forced producers to adopt alternatives. Seeds are provided mainly by the informal system (98%) and part by the formal system (2%). The number of seed multipliers has decreased for many reasons including:

- Some ***seed multipliers prefer to sell off part of their produced seed*** as consumption, driven by lucrative spot prices or limited financial capital for storage
- ***Potato seed multiplication requires four seasons*** for crop rotation while for potato consumption two seasons are enough
- There is a ***lack of professionalism at the seed multiplier level***

To improve the value chain, interventions will focus on strengthening the seed multiplication chain from pre-basic and basic seed production to certified seeds, including quality control and certification.

1. ***Capacity building of seed multipliers in technical and business skills***
2. ***Increase the number of seed multipliers and seed*** **dealers** by sensitizing potato growers as well as farmers in FFS groups to register and become seed growers
3. ***Facilitate the involvement of intermediaries (seed dealers/companies) in seed postharvest operations, conditioning and marketing***. This will mobilize private sector actors to register as seed traders, invest in buying seed from seed multipliers after harvest and store them until next season for sales. This will assist seed multipliers recover their investment in shorter time periods
4. ***New construction and rehabilitation*** of public and private aeroponic screen houses and increased production of in vitro plants to be able to supply seed to conventional screen houses.
5. ***Research development of new varieties more resistant to diseases***
6. ***Supervise the construction of a processing plant for Irish Potato*** and determine the best management model (public, private or PPP).

SP 3.2.6. Cassava

Cassava is the main crop proposed for intensification as a food security crop that is drought resistant. The main constraint to cassava promotion is mosaic disease. However, significant progress has been made in introducing resistant varieties and this activity should continue. In addition, a new cassava processing plant has been constructed and this will strengthen development of the cassava value chain. These steps will support development of the cassava value chain:

1. ***Continue and expand research on new varieties of cassava resistant to disease***
2. ***Set up a network of cassava cuttings multipliers*** for diffusion of healthy planting material
3. ***Work with the private sector to expand cassava processing and value addition activities*****,** collaborate with RDB to attract investors, develop agro-processing and explore new markets.

SP 3.2.7. Soya beans

Soya beans represent an important source of protein for local consumption. In addition, soya can generate significant incomes due to its processing potentialities including soya oil and animal feeds. Driven by a private company initiative, an oil processing complex is currently under construction in Kayonza District. Current actual production of soya is estimated at 38,400 MT with a yield of 0.8 MT/ha. However, to meet the full capacity of the plant of 45,000 MT per year, in season 2013 A soya was incorporated in the CIP to increase its productivity to at least 1.3 MT /ha. Interventions therefore focus on increasing the supply of soya for processing, following the priorities below:

1. ***Strengthen research on soya beans*** to introduce high yielding and disease resistant varieties
2. ***Increase production capacity of Rhizobium*** to be supplied to farmers
3. ***Promote soya as a CIP crop to increase production*****,** through land consolidation, distribution of seeds and inputs for farmers, training in cultivation and post harvest management.

SP 3.2.8. Beans

Beans are also an important source of protein in Rwandan meals. Production also has a comparative advantage regionally. As farmers are already familiar with good cultivation practices, interventions shall focus on research to introduce nutritious and bio-fortified beans, in line with SP 1.7 on nutrition.

1. ***Continue and strengthen research*** to introduce new bean varieties appropriate for each agro ecological zone of Rwanda and with higher levels of micro-nutrients and iron
2. ***Support cooperatives through the provision of improved post-harvest procedures*** through providing machinery and training farmers.

SP 3.3. Development of Priority Value Chains: Export Crops

This section considers both traditional and emerging export crops. Coffee, tea and pyrethrum are important export crops which contribute large amounts to Rwanda's overall export earnings. As such, the sub-programme areas are divided into further major activities. For horticulture, floriculture and sericulture, as emerging value chains the priority is to increase production and improve quality.

Lines of Action: Export crops

SP 3.3.1. Coffee

The coffee value chain deserves strategic emphasis as Rwanda's primary export crop. Coffee is a cash crop for about 450,000 families and export receipts over the last decade have averaged USD 58 million. In the 1990s price falls led farmers to neglect coffee plantations, but coordinated efforts of value chain stakeholders have prompted dramatic growth since 2002, with receipts growing at an average of 30% per year, although that has come mainly from higher prices and a higher-value product. Despite the still limited quantity of fully washed coffee (29% of the total in 2011), Rwanda's coffee industry has gained a positive international image. If it can maintain and enhance quality it will bring about increasing demand for its high quality Bourbon Arabica coffee with higher and more stable prices.

Although the production has substantially increased in recent years, price fluctuations and quality constraints mean revenue targets have not been achieved. However, there is potential to increase yields 2-3 times simply through improved crop and soil management. Better practices in the field, washing stations, storage facilities and shipping procedures will also lead to improved quality and higher prices in international markets. A strong production, logistics and marketing strategy for Rwandan coffee will place it in higher-end niche markets with buyers. To achieve this, all stages of the value chain, ranging from research, training and capacity building, to processing, logistics and marketing, will be targeted. The policy environment should also be reviewed to ensure it is supportive to value chain development, including export taxes and fees, selling requirements and price setting for cherries. Priority areas are:

SP 3.3.1.a. Research support for coffee

The coffee sub-sector is characterised by a variety of complex technical issues and targeted research will be conducted, particularly in the following areas:

- ***Fertiliser absorption***
- ***Control of the antestia bug, which causes the 'potato taste', coffee leaf rust and other diseases***
- ***Adaptive research on coffee varieties***

SP 3.3.1.b. Enhancing quality management throughout the value chain

Greater quality consciousness will be fostered throughout the value chain through establishing a quality monitoring and advisory unit, which will contract with international experts to oversee, identify and analyse quality issues throughout the value chain and work with other entities in both the public and private sector to address them. Training will be provided to actors along the value chain to tackle quality constraints. Efforts will focus on improved moisture monitoring, identifying berries affected by the 'potato taste', implementing procedures for separating lots in the washing process, classifying coffee in warehouses and establishing inventory monitoring systems.

SP 3.3.1.c. Improved management of coffee on farms

This sub-programme will expand and strengthen FFS to improve management of coffee crops through education in pest management including use of domestically produced pyrethrum, input use including fertiliser and high quality seeds, the potential for intercropping (particularly to tackle the antestia bug) and different composting approaches. Farmers will also receive advice on the management of nurseries for coffee seedlings. This activity will also work with smallholders in areas that were not planted in coffee before, to link them with entrepreneurial larger farmers who will provide technical assistance and facilitate the sale of the product for all the farmers in each zone.

SP 3.3.1.d. Strengthening coffee cooperatives and rehabilitating washing stations

A Turnaround Programme for coffee washing stations started in 2010 has made processing economically viable and sustainable. This programme will be expanded and strengthened. Business advisories will work with each cooperative to develop a business plan, strengthen organisation and governance in the cooperative, and build linkages with buyers and financial institutions. The washing stations will receive training in processing techniques, quality control and management practices, and will be assisted to set up a coffee traceability system. In addition, this activity will promote the installation and operation of well-managed eco-friendly mini-washing stations, and water recycling systems. Coffee farmers will also receive support to establish cooperatives and join the Rwandan Coffee Cooperatives Federation (RCCF).

SP 3.3.1.e. Improving coffee marketing

The following action areas will help improve the marketing of Rwandan coffee:

1. ***Developing the appellation program.*** This programme is under consideration and some of the producing areas suitable for appellations have been identified. However, for the programme to succeed it is essential that appellation (of location) is linked to a unique taste profile, through linking to specific producers and only accepting appropriate product. Specific training will be provided for the relevant producers, cooperatives, washing stations, and marketing agents in development of the program.
2. ***Promotion of the Cup of Excellence.*** Cupping events will be held in collaboration with international experts and buyers.
3. ***Assisting cooperatives in accessing certification programmes***, based on a preliminary study to assess which programmes (Fair Trade, organic, Rainforest Alliance, Utz Kapeh) will have the highest impact on farmers' income, and collaborate with the regional programme for building capacity for coffee certification and verification of the Eastern African Fine Coffees Association (EAFCA)
4. ***Support the development of a Rwanda coffee branding strategy*** to promote both national and regional origins, also building on certification. New origins will be advertised through dissemination of promotional material and marketing tours to visit international buyers or trade fairs. Training will be provided in coffee marketing and project management.
5. ***Target high-end buyers that reward quality and provide higher returns to farmers***. Work with high-end buyers like Starbucks and Marks & Spencer, and link up with rapidly growing coffee markets such as South Korea and China. It will be necessary to differentiate quality and consider market feedback, for example regarding vacuum-packaging for Japan.

SP 3.3.1.f. Strengthen coffee value chain logistics particularly shipping

Implement capacity building to support cooperatives and processors to improve planning around shipping and filling containers, and ensure appropriate packing methods are used to maintain product quality in shipping. This may require research into alternative methods such as insulated (grainpro) bags or vacuum packing. This programme will also support improved communication with buyers around delivery times. Feeder road programmes should also consider coffee producing areas.

SP 3.3.2. Tea

Similar to coffee, for tea increasing sales and income will depend upon improving quality and marketing to move up the value scale. As a whole, growth of the global market is slow, but trends within the market favour locations like Rwanda that deliver high-end products at competitive prices. Bulk black tea prices are projected to decline, but the opposite trend is expected for quality teas, for which Rwanda has great potential. Other favourable factors for the domestic tea industry include the fact that major world producers are constrained by land and labour shortages, tea consumption in Africa is growing, and Rwanda is well placed to access key markets under EBA/EPA, AGOA, EAC, and other agreements. Rwanda's tea is consistently quoted at a high price in the Mombasa auctions, just below Kenya. The tea sector is therefore another important strategic value chain to increase export revenues and drive growth.

Under PSTA II major progress was achieved in the sector through privatizing tea factories. Now, in collaboration with RDB, a prospectus has been developed to attract private investors for five new greenfield factories. Strategic emphasis focuses on both the production side, through improving yields and management of tea cooperatives, but also the need to access higher value markets, through these steps:

SP 3.3.2.a. Improving yields and the quality of tea leaves at the farm level

Using the results of research, expand FFS programmes in tea producing areas, emphasizing better techniques of plucking and pruning. Forge consensus on measures to ensure that farmers receive some of the benefits of higher quality leaves. Undertake soil and leaf analysis to identify fertiliser needs and work through FFS to promote application of appropriate fertiliser formulations in adequate doses. Sensitization of cooperatives and individual farmers to purchase fertilizers will also continue through tea factories with efforts to strengthen the tea fertilizer fund.

SP 3.3.2.d. Expand the area under tea cultivation

Working through land consolidation and in collaboration with growers, the area under production will expand by 18,000 ha over the next five years

SP 3.3.2.c. Improve management of tea cooperatives and integrate the value chain

This activity will work to improve cooperative management and business practices, with emphasis on developing business plans. It will collaborate with the unions and FERWACOTHE in this undertaking. Closer relations between cooperatives and tea factories will be supported so data and issues can be shared and farmers can receive better prices for their tea. As marketing efforts and quality improve, the economics of the industry should be able to support higher prices to producers and improve farmer returns. This programme will also facilitate coordinated efforts in the sub-sector to improve quality.

SP 3.3.2.b. Placing Rwanda's tea in higher value markets

This will be achieved through a set of coordinated actions including:

1. ***Increasing and improving diversified teas:*** Working with producers, cooperatives and factories to produce and label more diversified teas.
2. ***Develop a Rwanda brand:*** with logo and corresponding packaging, and test a marketing campaign with buyers, then refine it and implement it.
3. ***Develop a quality mark and certification of Rwandan teas***.
4. ***Strengthen quality control:*** Improve the training of tea tasters and factory quality management
5. ***Identify new distribution channels and buyers for direct sales:*** Send samples and build relationships.
6. ***Strengthen the profile of Rwandan tea on the world market:*** Carry out promotional and advertising activities and support attendance by Rwanda producers and processors at international tea fairs.

SP 3.3.3. Pyrethrum

Pyrethrum is a natural pesticide that Rwanda is uniquely well placed to produce. Considerable progress has been made in consolidating and improving the cooperatives of pyrethrum producers and improving processing. However, pyrethrum's domestic and international market potential has not yet been fully realised and there is significant growth potential. The sole pyrethrum factory, SOPYRWA, is currently functioning below capacity due to insufficient raw material. However, the factory has potential to produce all products extracted from pyrethrum including crude extract, pale extract and insecticide. There is market demand throughout the world, including the USA and Europe.

It is therefore key to tackle to supply constraints which limit production. These include:

- ***Limited land availability in the Northern province,*** where pyrethrum is grown in volcanic soils
- ***High population density of subsistence farmers in the key growing area***. Farmers prefer fast growing food crops over pyrethrum
- ***Limited availability of planting materials***

This strategy will increase production through providing improved planting materials and supporting growers. Coordination with SOPYRWA can also facilitate activities to encourage production through training in good practice and crop management. The following are priority actions:

SP3.3.3.a. Provide financial support for farmers to incentivise pyrethrum planting
Work with SOPYRWA and SACCOs in producing areas to develop and implement contract farming relationship. These will facilitate loans for farmers to purchase food for their families while awaiting the new pyrethrum harvest, and encourage greater planting areas. Growers will also be supported in the provision of solar dryers to improve the product at farm level.

SP3.3.3.b. Support research to develop and disseminate high quality planting material
This will be distributed to farmers under contractual arrangements for purchase of pyrethrum harvests.

SP3.3.3.c. Support private actors such as SOPYRWA to train growers
Training material will be developed and sessions conducted related to good crop growing protocols for cooperatives and private growers.

SP3.3.3.e. Development of export markets for high value distillates
A move to higher quality will increase and maintain market shares and revenue. Specialised technical assistance will be used to focus on export market development.

SP 3.3.4. Horticulture, Floriculture and Other Emerging Value Chains

Several studies on horticulture, floriculture and essential oils in Rwanda concluded that there is good potential for a viable export sector in these products, but that important obstacles have to be overcome to realize that potential. Despite having a favorable climate and good soils for horticulture, Rwanda faces constraints compared to direct regional competitors. Being landlocked, Rwanda's potential for exports exists in carefully selected segments and markets. Advantages should be based on a niche appeal of high value added products, not on volume or price. Perhaps more important than product identification is to add-value and build the vertical and horizontal value chains for non-traditional export products. Successful development of horticulture will require an integrated supply chain approach focusing on production and processing, transportation, and direct marketing through dedicated contracting arrangements with external buyers. This will include attracting investors for commercial production schemes, and establishing linkages and relationships between stakeholders at all stages. Downstream in the export market, international partners will be identified, products promoted and markets tested. The following priority actions will be the strategic focus:

SP 3.3.4. a. Develop vegetables with export potential
This will include earmarking horticulture growth poles for export vegetables, which are specific zones with agro-climatic, market accessibility and private sector willingness/demand potentials. Value chains will be selected according to market potential, but will include French bean, snow peas, tomato, onion, fresh and dried chili, spices and other Asian vegetables, among others.

SP 3.3.4. b. Develop fruits value chain with high potential
The whole fruit value chain will be considered. Local research will be supported to produce quality planting material and varietal trials. Farmers will also receive training in the development of mother gardens and nurseries, and other production areas including inputs, pest management and harvesting. Priority chains to be developed include:

- ***Avocado***: avocadoes have export potential and good prices in the international markets which can increase farmers' revenues. Actions required include development of avocado for exports on a large scale (Hass and Fuerte), general improvement of quality through introduction of GLOBALGAP procedures and improvement of farmers' revenue through contract farming.

- ***Pineapple***: The focus should be production of required varieties and quality. Due to its bulky nature, intervention will focus on processing pineapple through drying, jam and concentrates. Actions for this chain will focus on organic certified production, development of organic high value-added products to penetrate niche markets and general improvement of processing through improved mechanization of processing facilities.

- ***Macadamia Nuts*:** Due to the high quality of nuts grown in Rwanda, the potential for macadamia nuts is substantial. So far trade has occurred mostly in local and regional markets. Actions will focus on expanding the land area under macadamia cultivation, improving agricultural practices and establishing a roasting plant.

- ***Passion fruits***: Rwandan passion fruit has a superior flavor that is well received in the European and regional markets. The limiting factors are production, which has been devastated in some areas by diseases, and post-harvest handling. The main pests are passion fruit woodiness virus (PWV) and the *Septoria* spot fungus. The plant is also vulnerable to less serious diseases such as anthracnose (*Colletotrichum gloeosporioides*), brown spot (*Alternaria spp.*) and the cucumber mosaic virus. Actions for this fruit will focus on finding clean planting material through research and promotion of contract farming with processing factories.

- ***Apples***: Trials on tropical varieties of this fruit have started and have shown promising results that it can grow well in many parts of the country. Currently seedlings are imported from neighboring countries at high cost. Activities under this will include introduction of more tropical varieties and development of local capacity to produce seedlings. Farmers' capacity building in raising apples and other temperate fruits will be essential.

SP 3.3.4.c. Develop essential oils

Essential oils are a natural plant product which can be used for culinary applications, natural dyes, medicinal, health, flavor and fragrance purposes. This is an area which is not yet fully developed but has potential to generate export and farmer income. Plants currently used include Geranium, Patchouli, *Eucalyptus globulis*, and lemon grass. Activities to improve essential oil production will include supporting growers to acquire clean planting materials, increasing oil processing capacity and mobilizing new farmers to grow raw materials of essential oil plants through provision of training and input support.

SP 3.3.4.d. Develop floriculture industry including cut flowers, foliage and ornamentals

Efforts will be made to find more innovations to grow flowers without compromising food security. Since Rwanda has the required altitude for growing the large bud roses (Tea hybrids and Intermediate) which fetch more in the market than the small buds (Sweethearts) more land will be mobilized for rose production in the high and middle altitudes of the country. Production activities will include improved production techniques for roses and summer flowers that can reach export markets. Small flower growers will be facilitated to acquire high yielding cut summer flower and clean cuttings and seedlings for foliage and other ornamentals. Capacity building of flower producers will be reinforced and they will be supported to acquire inputs to boost the production.

SP 3.3.4.e. Facilitate communication among non-traditional export crop value chain actors

The Government will develop closer coordination and joint action teams to facilitate improvement of entire value chains for non-traditional export products, involving investor, exporter, processor, cooperatives, farmers, and financial institution in each case. A technical coordinating body with all those agencies should be set up, and the operational plan should be established along the lines recommended by the investor, exporter and (when relevant) processor. The financial institutions will be expected to assist

with bridge funding for producers, to enable them to await the harvests, and with export finance. Risk management support should be offered by the Government to both producers and exporters.

SP 3.3.4.f Sericulture

Sericulture is relatively a young industry in Rwanda and requires sustained support to make the sector economically meaningful. The National Sericulture Center (NSC) has invested in most key drivers of the sericulture industry, including the acquisition of silkworm seed, standard rearing techniques, improved mulberry productivity and capacity building at various levels of the value chain. Unfortunately cocoon production is still low. One of the major constraints in sericulture development initiatives is the lack of a dependable domestic cocoon market. Putting in place a system where farmers deliver cocoons and are paid promptly will stimulate increased cocoon production by several orders of magnitude. Other limiting factors include limited technical knowhow, inadequate extension service, lack of resilient silkworm seed adaptable to local conditions and lack of sufficient rearing houses and equipment. In this plan, the following interventions will be given priority to ensure 5,000 ha of mulberry by 2017. The plan requires high capital inputs to operationalize, but is achievable.

1. ***Acquisition of low capacity silk reeling and testing machine***. This will test silk quality, convert farmers cocoons into grade 1 silk for export purposes, and provide a ready market for cocoons, motivating more farmers to join silk industry
2. ***Rehabilitation of existing 350 ha of mulberry to increase productivity***
3. ***Prepare cuttings and support mother gardens for mulberry saplings***
4. ***Upgrade the NSC, Mulinidi and Provincial Sericulture Centers and support selected cooperatives to become Egg Multiplication firms,*** producing more than 5000 boxes per years
5. ***Establish sericulture model farms*** in each province
6. ***Launch a campaign to identify and map land for mulberry expansion***
7. ***Plant 150 ha of mulberry in 2013, with an increase to 5000 ha by 2017***
8. ***When production stabilises*** (1000 ha of mulberry) ***procure high capacity silk reeling machines***
9. ***By 2017 egg production capacity should have increased*** to 47,500 boxes (annually) to feed into 5,000 ha generating 1187.5 tons of fresh cocoons, 142.5 tons of raw silk yarn translating into US$ 3,562,500 and 7,837,500, respectively.

SP 3.4. Development of Priority Value Chains: Dairy and Meat

Development of animal resources has the potential to increase domestic food security and nutrition through increased production of animal proteins. However, there is also potential to leverage private sector investment in potentially lucrative value chains such as dairy, and to increase exports of regionally popular products such as hides and skins.

Lines of Action: Dairy and Meat

SP 3.4.1. Dairy

This strategy aims to double milk consumption over the next five years. This increase will be driven by expanding the One Cup of Milk per Child programme and by stimulating domestic demand through sensitization and provision of more diverse dairy products. Currently, raw, unpasteurised milk represents the largest share of domestic milk consumption due to greater profit margins for traders, and competition in the processed milk market from regional neighbours with lower costs. The country's milk processing plants are therefore operating below capacity, and some milk collection centres (MCC) in the East have closed. There is a risk that unless demand, including for processed milk, increases a surplus will result.

Therefore, the dairy value chain requires attention at all steps in the process. The entire supply chain will be modernised, to develop the processing industry, improve distribution channels and improve sanitary

control. Also, milk consumption should be encouraged to increase demand. The following are priorities

1. **Developing dairy markets** through raising consumer awareness of milk consumption benefits, making milk more consistently available and producing innovative products
2. **Improving quality in the milk value chain** through modernising the supply chain, including support to MCCS to increase utilisation and productivity, facilitating relationships linking MCCs to cooperatives and processors
3. **Institutional development and coordination in the dairy sub-sector** by including all stakeholders in the Rwanda National Dairy Board, and encouraging relationships between producers, MCCs and processors will be encouraged.

SP 3.4.2. Meat

There is considerable scope for expanding production of small ruminants, swine and poultry. The related processing industries can also expand, since rising incomes are increasing consumption of meat products. Current constraints include insufficient modern slaughterhouses and inadequate management of tanneries. The limitation of slaughterhouse capacity is being overcome by the construction of new facilities that are placed under local management. In this strategy, the focus shall be on modernising the meat supply chain, improving sanitary quality and developing and strengthening the cutting and processing industry for hides and skins. To facilitate sector growth, it will also be necessary to focus on developing the value chain for small ruminants, swine and poultry. The following are priorities:

1. ***Modernise the meat supply chain*** through establishing feedlots, rehabilitating existing slaughterhouses and establishing new ones and rehabilitating livestock markets in each province.
2. ***Improve sanitary control*** to develop hygienic slaughterhouse facilities, train technical staff in their proper operation and develop and disseminate guidelines for good hygiene practices
3. ***Development of the cutting and processing industry*** by rehabilitating facilities and training skin processors. Produce guidelines for skins and the handling of effluent in line with environmental standards and use technical advisory services to support potential investors in tanneries.
4. ***Improve promotion and processing of meat products*** including the development of a meat processing plant in Kigali under PPP. Quality standards for livestock products should be harmonised with the EAC, and if necessary, producers will be subsidised for quality certifications. ***Improve livestock related data*** to improve understanding of market dynamics and disseminate information to stakeholders

SP 3.5. Development of Priority Value Chains: Fisheries

In the fisheries sector demand has outpaced production, with consequent depletion of resources. Nevertheless, the sector has great potential and with improved management is capable of meeting demand sustainably and of producing regional exports, leading to improved rural incomes. Fish are also a nutritious addition to daily diets.

Lines of Action: Fisheries

SP 3.5.1. Research and technology development for fish and fish products

Conduct research to improve the freshness, flavour, texture, nutritional characteristics, and shelf-life of cultivated fish as well as new or improved value-added products. Research and technology development can also improve packaging, accessibility, and ease of preparation of fish products for consumers.

SP 3.5.2. Strengthen existing fish supply chain

The current fish market will be modified to include a section for lives fish to improve quality and hygiene. Quality standards will be developed, in harmonisation with EAC regulations, and adopted throughout the aquaculture industry as an assurance of product safety and to improve consumer confidence, and consumers and retailers will be educated about safe handling of aquaculture products. The market

information system will be improved and expanded for producers, processors and consumers. In order to develop exports, exports enhancement programmes and international trade missions for aquaculture will be supported, and trade barriers identified and resolved.

SP 3.5.3. Implement a system of cage aquaculture
It will be necessary to create awareness of cage culture as a viable fish production system through demonstrations, hands on training and sensitisation of profitability for farm managers and potential investors, production of promotion materials and cage investment and input support packages.

SP 3.5.4. Implement a system of tank aquaculture
Fish production in tanks represents a move towards intensification and needs investment in technology and management. Water quality management is key, which is closely related to quality feeding and water treatment. To establish this type of production it will be necessary to create technology uptake pathways via a PPP model. Technical assistance will be required to provide advisory services to pioneer investors in the system. A tank based production unit will be established in each province, and pilot and demonstrations plots established, starting with tilapia and catfish. Results including productivity and profitability of the system will be presented to the private sector and partnerships established.

SP 3.5.5. Implement a system of aquaculture parks
The aquaculture park system can be a model for transformation of small-scale subsistence fish farms that are scattered all over the country into commercial units. In collaboration with communities, production units will be constructed and leased to producers, with incentives to attract private investors.

SP 3.5.6. Establish industry to process fish waste into animal feeds and fertilisers
A study will be conducted to identify how fish waste can support the livestock industry, and recommendations operationalized.

SP 3.6. Development of Priority Value Chains: Apiculture

Beekeeping is a small activity on the national scale but is important for the communities involved, representing a significant source of additional income for poor families with marginal land for agriculture. There is particularly true in forested areas in the Southwest.

Lines of Action: Beekeeping

SP 3.6.1. Strengthen beekeeping
Expand and strengthen community development services, the provision of beekeeping equipment and technical assistance. Support will be provided to apex organisations and service providers including honey collection centres, and demonstration apiaries promoted. MINAGRI will facilitate cost sharing on processing equipment, packing and labelling materials, and obtaining certification.

SP 3.6.2. Conduct market research and develop a promotion campaign
The domestic retail sector requires analysis and sensitisation. A market survey will be conducted to document the volume of bee products actually sold in the formal market by producers, traders and buyers, existing value addition processes, volumes of bulk and value added products in the retail markets, domestic market share, export and consumer interest. The results will be used to develop a programme of promotion based on geographic specialities.

SP 3.6.3. Increase and harmonise quality standards
In collaboration with RBS bee keepers will be trained in international norms and standards of honey production, to facilitate both national and international certification and enforcement of standards for

both honey and beeswax. For organic honey, measures will be taken to prevent pesticide contamination of plants the bees pollinate.

SP 3.7. Agricultural Finance

There has been considerable recent progress in the development of agricultural finance. National programmes that specifically improve financial services in rural areas include the campaign to improve national financial literary, the training of staff of financial institutions and increasing use of the technology of mobile money transfers (MMT). In addition, at the sector level bank supervision authorities are monitoring closely the performance of the growing number of savings and credit cooperatives (SACCOs), and the Government's Agricultural Guarantee Fund (AGF) continues to encourage bank lending to agriculture. The Rural Investment Facility (RIF), now in its second phase, has boosted rural incomes. This strategy aims to strengthen, expand and introduce new agricultural finance instruments.

Lines of Action

SP 3.7.1. Consolidate SACCOs at the District level under an Agricultural Cooperative Bank
Strengthen SACCOs by consolidating them under umbrella district-level SACCOs and linking them to an apex organisation, such as an Agricultural Cooperative Bank, to reduce risk for individual SACCOs and strengthen governance. Strengthen the mobilisation programme for creation of SACCOs and undertake sensitisation and training campaigns to improve SACCO governance.

SP 3.7.2. Establish a warehouse receipts system
In coordination with MINECOFIN and BNR, develop conditions for a viable a system of warehouse receipts that will enable farmers to obtain financing based on harvests stored in certified facilities, along with a set of enabling regulations.

SP 3.7.3. Facilitate value chain finance relationships
Encourage value chain finance (triangular finance) involving a financial institution and two agents in the sector, such as a product wholesaler and a processor, or a cooperative and an exporter. The financial institution lends to one of the agents and is repaid by the other, who receives the agricultural product. The first agent lends to the other one, sometimes in the form of inputs.

SP 3.7.4. Expand agricultural insurance and rural finance
Following the recommendations of the July 2012 Agriculture, Crop and Livestock Insurance Feasibility Study expand and strengthen agricultural insurance programme and financial instruments such as RIF.

SP 3.8. Market-oriented Infrastructure

Post harvest handling and storage is a crucially important consideration across all value chains. In relation to the strategic intervention regarding value chains, specific interventions have been developed. Cooperatives will also receive post-harvest capacity training under program two.

The 2011 National Post Harvest Crop Strategy is a detailed, step-by-step plan for improving post-harvest infrastructure for staple crops and road access to markets. The plan identifies procedures for identifying priority post harvest interventions and developing technologies and skills to support implementation. The Post-Harvest Strategy will engage the private sector through dialogues on the opportunities in the value chains and encouraging development of financial instruments to support private sector involvement in post-harvest investments and operations.

Lines of Action

SP 3.8.1. Provide efficient and equitable transport systems across crop producing areas
This will involve providing an efficient and equitable transport system across staple food producing areas to reduce transport cost. Developing efficient and equitable transport systems across staple food producing areas will contribute to competitiveness, economic growth and improved resource use, positively impact food security in the long run. This strategic line has three components:

1. ***Investigating the transport component of staple and high value crop marketing costs***
2. ***Reducing road transport costs*** between production and secondary aggregation points in high potential areas through feeder road development
3. ***Addressing prioritized 'soft' constraints***

SP 3.8.2. Reduce staple crop post-harvest losses at producer and first aggregator level
Cutting down post-harvest losses and increasing storage capacity and efficiency is important to expand value chain profitability. Adequate drying, storage and processing facilities are needed to increase and stabilise farmers' incomes, and to preserve the quality of products. Costs of constructing facilities will be shared by the public and private sector, and coordination with PSF will help attract investment.

1. In all districts involved in maize, beans, wheat and rice production, ***modest drying grounds and temporary stores*** will be constructed to minimize post harvest losses
2. ***Post harvest facilities will be leased by cooperatives*** with sufficient management and financial expertise, and repayments credited towards eventual purchase of the facilities
3. ***Modern storage facilities will be constructed***, including warehouses and metallic silos, by both the public and private sector to manage the modern needs of agricultural production
4. ***Processing plants will be constructed*** to promote value addition

IV.4. Programme 4: Institutional Development and Agricultural Cross-Cutting Issues

SP 4.1. Institutional Capacity Building

The institutional side of the agricultural sector is at a critical juncture. In recent years it has performed well, with many successful projects and steady growth. However, institutional challenges remain, which this strategy will addresses through a comprehensive approach to both capacity building and institutional coordination.

In relation to Ministerial capacity building, issues such as high staff turnover, weak incentives, low levels of professional development, dependence on externally funded technical assistance and insufficient private sector engagement skills will be tackled by a new Human Resources Development Plan. This will foster long term staff development and retention through professional career advancement based on technical specialisation. Institutional coordination in the sector is also important, both within and across MINAGRI agencies and with other Ministries driving rural development. This strategy will strengthen horizontal and vertical collaboration between these different institutions to ensure effective implementation of the EDPRS II rural development goals and other national targets.

Lines of Action

SP 4.1.1. Develop a comprehensive Human Resources Development Plan
Skills should consider all Ministry functions, and the Development Plan should facilitate implementation of this strategy. There should be provision for staff training, opportunities for professional advancement, sufficient incentives to retain staff, and allowances for increases in staff size as required. Opportunities for professional advancement are key to tackle high staff turnover and should be a focus area.

SP 4.1.2. Develop staff incentives
In coordination with development partners, explore mechanisms through which adequate project design and management incentives can be provided to Ministry staff, to facilitate the accumulation of institutional knowledge and capabilities

SP 4.1.3. Staff capacity building
When external technical assistance is needed for the medium term, pair responsible Ministry staff with technical advisors to facilitate transfer of knowledge. Identify short-term technical training needs for Ministry staff and implement activities to meet those needs, and utilize visits to projects and programmes in neighbouring countries as part of the training process. Extend the capacity building programmes to farm leaders and small entrepreneurs in the sector.

SP 4.1.4. Strengthen and improve coordination of the Rural Development Group
This will facilitate and improve joint decisions on cross-cutting issues and investments that are important for agricultural development. For example, improving rural roads is a priority for reducing post-harvest losses and facilitating linkages with export markets and other high-value markets, and this will require close inter-Ministerial coordination.

SP 4.2. Decentralisation in Agriculture

In line with the Decentralisation strategy and under coordination of MINALOC, efforts have been made to strengthen local levels of administration, particularly at district level. The implementation of territorial reforms and decentralisation of functions have greatly enhanced the capacities of local government. Staffing varies according to district and their financial capacities, which sometimes allows for additional staff such as seconded extension agents from specific projects, RAB and NAEB. Currently, the district staffing for the agricultural sector includes one agronomist, one veterinarian, one sector agronomist and one cell development agent. RAB also have two specialised extension workers per district, and NAEB places coffee, tea and horticulture extension workers. Sector-wide projects and national entities also have a local presence to implement their initiatives and receive feedback on programme design from farmers.

District administrations have important roles, as they are in close contact with cooperatives and farmers and can build up knowledge of the districts' needs and opportunities for agricultural development. District staff can facilitate implementation of national projects and programmes, act as an interface and promote farmer-oriented extension approaches. Districts are also a channel for informing RAB and other MINAGRI units of the priority needs of farmers in their areas, and they help inform rural families of opportunities such as participating in new aquaculture programs, or linking up with investors for export crops. The role of Districts is summarized in the dispositions of Law No 29/2005 of 31/12/2005, which endorses the principle of subsidiarity, saying that Districts are charged with local economic development and planning and coordinating the delivery of public services. In recognition of this capability at the district level, internationally funded and NGO programmes have to be approved at the district level by the Joint Action Forums (JAF). These activities aims to strengthen and clarify the roles of Districts.

<u>Lines of Action</u>

SP 4.2.1. Strengthen the role of Districts in para-vet services and human disease control
Develop human and animal disease monitoring systems at the District level with reports that can be communicated to national authorities.

SP 4.2.2. Make Districts partners in all agricultural extension programmes
Districts will facilitate the provision of extension services in a participatory manner, rather than provide the services directly. Part of the role of extension is facilitating farmers' acquisition of knowledge through visits to projects in other areas and exchanges with farmers from other areas about agricultural practices

and innovations. The Districts must play the lead role in facilitating these kinds of farmer interchanges, which are very valuable for increasing farming capabilities.

SP 4.2.3. Support the Joint Action Development Forums and District feedback mechanisms
This can help identify farmers' priorities and needs. Formalize the reporting process on these and other issues to a decentralization coordination unit in MINAGRI. Also, strengthen the capacity of sector-level authorities to collaborate with farmers and farmer organisations in the review of problems and the formulation of proposals for programs' actions to be implemented at the district and national levels.

SP 4.2.4. Strengthen fiscal decentralisation
In relation to fiscal issues this strategy shall continue to strengthen the approach adopted under PSTA II. District level funding allocation may increase over time as district level capacity to absorb and execute funds is strengthened. Funds are transferred to Districts in order to ease the implementation of activities at local level and upgrade the Districts' Autonomy to reply to the Decentralization Policy. Those funds have been allocated so far based on different factors such as population, cultivated area, and poverty level (where some Districts are given special attention because of the high index of poverty). A new factor will be District Performance, where if a district performs well by the end of the fiscal year, in the following one more funds will be allocated accordingly.

SP 4.3. Legal and Regulatory Framework

Laws and decrees are important for guiding actions but in general they are more effective to the extent they reflect a societal consensus on what needs to be done and how it should be done. They are most effective when they can strengthen initiatives that already have been conceived or begun. Therefore, the legal and regulatory framework continues to capture the dynamism of the sector. Thus, it is important to maintain constant communications with technical experts and project personnel in order to be aware of evolving needs for legal and administrative support. In the context of market development and competitiveness within the region, the quality of agriculture and animal products should be improved and respond to the international required norms and standards. In this regards, a review of the current related regulatory framework in the agriculture sector will be conducted to update laws/formulate new ones in accordance with East African Community and international regulations. It is also useful to develop and disseminate examples of agreements, or model contracts, which can be applied in various circumstances by cooperatives and other stakeholders in the sector.

Lines of Action

SP 4.3.1. Formalise the National Irrigation Policy
Promote a dialogue on the proposed irrigation policy and formalize that policy with a Presidential decree. Develop the implementation plan for the decree and mechanisms to monitor its implementation, in line with SP 1.2 Irrigation and Water Management.

SP 4.3.2. Develop regulations for organic agriculture, pesticide and limestone use
These should protect high-value organic activities, soil and water quality and micro-nutrient availability.

SP 4.3.3. Develop regulations around the value chain guarantee fund
These should consider provision of risk guarantees to both farmers and product buyers in contract farming and value chain contracts.

SP 4.3.4. Develop the legal basis for an agricultural catalytic fund
There should be consideration of Grow Africa and provision for overview by independent experts.

SP 4.4. Agricultural Communication, Statistical Systems, M&E and Management Information Systems

Rwanda is undergoing a transformation from an agrarian subsistence economy into a sophisticated knowledge-based society. However, agriculture is characterized by insufficient use of improved local and advanced knowledge and technologies. To overcome this challenge, the agricultural sector should be deeply transformed, modernized and commercialised. This will require agricultural knowledge generated from research and other sources being turned into action to build a sector that is knowledge-based. Modernisation and transformation of agriculture requires the existence and implementation of a Knowledge Management and Communication (KMC) strategy; Management Information System (MIS) and Monitoring and Evaluation (M&E) framework and Statistical Information System Management with the objective of providing information, evidence and learning about best practice.

Lines of Action

SP 4.4.1. Agricultural communication strategy development

The objective of the communication strategy is to effectively and efficiently collect, produce, process, adapt, store, share and disseminate agricultural information sharing with a clear communication and evaluation plan for transforming agriculture through increasing the knolwedge base and facilitaitng greater stakeholder involvement. The acquisition and dissemination of accurate information and knowledge in agriculture is necessary to meet government targets for agricultural growth. CICA will be the key focal point for this activity, and will ensure collaboration with all stakeholders and the regular collection and distribution of agricultural information.

SP 4.4.2. Improvement of the Agricultural Statistical System

To improve the agricultural statistical system skills in the statistical unit should be upgraded and tools improved, for example, through improving the sampling frame. Large scale surveys should be reviewed to ensure effectiveness. For example, it should be considered whether multi-frame crop survey should be restructured to capture reliable information on high-value crops (fruits, vegetables and nuts) which occupy small land areas, and the potential to conduct crop surveys multiple times per year to enable better and more frequent production forecasts for decision-makers. A sustainable statistical program on agricultural statistics needs to be developed and aligned to the National Statistical System.

SP 4.4.3. Collection and use of agricultural meteorology data

Agricultural meteorology is vital to examine the effects and impacts of weather and climate on crops. MINAGRI will work closely with the Rwanda Meteorological services and other institution to collect and interpret weather and climate data and disseminate information. This will include development of an advanced bulleting to communicate agriculture meteorological information to all levels through working with extension agents and farmer promoters. A skills programme will be implemented to support the technical development of personnel in agro-meteorology expertise including data collection and analysis, modelling and information dissemination.

SP 4.4.4. Agricultural Monitoring and Evaluation and Management Information Systems

The M&E system has been developed and main indicators identified, and these will be modified to align with EDPRS II and the revised Vision 2020 goals. Now, the relevant actions and definitive indicators from the strategy will be incorporated into a MIS. Field visits will verify reports and ensure the information reflects the situation on the ground. The use of ERP (Enterprise Resource Planning) for the sector will also be considered. Using an ERP solution for agriculture will help integration of data, analysis, optimization of resources and decision making. It encourages professionalization and will support other existing initiatives such as the market price information system (e-Soko) developed to manage the market price information for multiple markets and commodities, and the Agricultural Management Information System (AMIS) for harmonizing different information and knowledge from across the sector. A specific unit will be designated to ensure effective knowledge management and oversee M & E and MIS.

SP 4.5. Gender and Youth in Agriculture

Gender

Rwanda has made great steps towards achieving gender quality. In addition to ratifying regional and international legal instruments to protect women's rights, Rwanda has a legal framework supporting gender equity and equality enshrined in the Constitution of 2003. The Constitution reinforces the principles of gender equality and elimination of all forms of discrimination against women and provides quotas (of at least 30%) for women in decision-making structures. Already, Rwanda is ranked highly in gender equality terms. In 2007, the country had a gender development index (GDI) value of 0.459 and ranked 16th out of the 155 countries with both HDI and GDI values and women's participation in parliament was 56% in 2008, the highest in the world.

Nevertheless, gender disparities are still prevalent in agriculture. Generally in rural areas, women spend more time engaged in farming activities and caring for the household than men. As a result, on average women have longer working hours than men. Women's burdens are worsened by the fact that they are involved in doing activities that are labour intensive and time consuming. MINAGRI has developed a gender strategy that describes the issues in detail and sets out an agenda to address them, and which this strategy is based on. Key gender issues in the agricultural sector include:

- Lack of gender related knowledge and skills among extension personnel
- Few female extension personnel
- High illiteracy levels particularly among women limits training opportunity
- Limited research on gender sensitive technologies such as appropriately sized machinery
- Designing of meetings and training sessions do not consider women's duties
- Difficulty accessing financial instruments due to lower levels of education among women
- Gender disparities in value addition and marketing of agricultural commodities
- Gender disparities among senior staff in the agricultural sector

In the long run, these challenges can be tackled through a robust legal framework and an active civil society which promotes and integrates gender equality with economic development and growth. Short term, this strategy aims to mainstream gender within MINAGRI's institutional and operational framework.

Gender: Lines of Action

SP 4.5.1. Institutionalise gender equality in sector entities

Governance structures across agricultural entities are required to have at least 30% representation of women. The following will facilitate the mainstreaming of gender equality:

1. ***Review existing human resource, operational and accountability policies*** and systematically mainstream gender awareness. Establish Gender Focal Points in key departments and projects.
2. ***Develop tools for engendering systems for accountability (M&E) and knowledge and information management (MIS).***
3. ***Develop guidelines for operationalising gender sensitivity in planning and implementing programmes and projects***, with procedures to achieve 30% representation of women.
4. ***Develop tools (manuals, guidelines or toolkits) on how to mainstream gender by extension personnel*** in planning training, meetings, workshops, and FFS
5. ***Facilitate development of gender sensitive data collection and analysis tools*** for agricultural surveys and assessments.
6. ***Develop incentives that motivate more women to undertake agricultural training*** and professional development.

SP 4.5.2. Develop capacities for gender-sensitive programming

Given the limited knowledge on gender issues and skills to mainstream gender, MINAGRI staff will receive sensitization training. Decentralised extension personnel will be trained in and equipped with gender-friendly training methods. At the cell level, sensitisation will be conducted using existing grassroots structures, like *Umuganda, Ikibina, Ubudehe or Guhingirana (Guhekerana).*

SP 4.5.3. Enhance gender responsiveness in agricultural service delivery
MINAGRI and its partners will raise awareness at the implementing levels of the opportunities to realize gender related rights and responsibilities. Gender equality can be promoted through all programme areas.

SP 4.5.4. Continue to develop, strengthen and operationalize partnerships with gender focused institutions
These partnerships within the agricultural sector and rural development related institutions will be key to implement the gender strategy and ensure gender mainstreaming across PSTA III programme areas.

Youth:

In Rwanda youth is defined as the 14-35 years age group, and there are 4,159,000 youths, or 39% of the total population. The largest age group within the youth is the 14–19 year olds, which comprise 14% of the total population. The main challenge for youth is providing employment opportunities and the training necessary to obtain higher-skilled jobs that help them break out of poverty. Many youth do not find traditional agriculture attractive and aspire to rural off-farm employment or urban occupations. Sensitising the youth to the opportunities of a modernising agricultural sector is important. The EDPRS II Thematic Area on Youth and Productivity highlights a number of youth targeted programmes. This strategy will further mainstream youth involvement in agriculture.

Youth: Lines of Action

SP 4.5.6. Develop a TVET curriculum for agricultural specialisations
In coordination with the food processing sector and with projects in areas such as quality control, mechanisation, post-harvest management and irrigation, curricula should be developed for TVET institutions and youth training centres that offer opportunities to youth to become technical specialists in these and other areas where there is demand for trained employees.

SP 4.5.7. Target youth in entrepreneurship programmes
Quotas for youth (and women) should be established in programmes for entrepreneurship training and venture capital to provide them with opportunities to launch careers as agricultural entrepreneurs.

SP 4.5.8. Develop an agricultural leadership programme for youth
Include intensive seminars and hands-on experiences in modern agriculture and visits to selected sites in neighbouring countries

SP 4.6. Environmental Mainstreaming in Agriculture

Agriculture and the environment affect each other and must be considered together. To foster a sustainable sector in the long term, sound environmental management must be mainstreamed in agricultural practices. Key areas include soil conservation, soil nutrient management, use of chemical fertilisers and pesticides, water management, and the construction of rural feeder roads. This strategy already addresses most areas, but this section systematically proposes environmental interventions. In addition, agriculture must be prepared to adapt to climate change and consider mitigation activities, both to assist adaptation of rural communities, and perhaps to generate carbon credits. The 2011 National Climate Change Strategy and Low Carbon Development will also be considered in agricultural planning.

Lines of Action

SP 4.6.1. Soil conservation mainstreaming

The watershed management (SP 1.2.4) and agroforestry (SP 1.1.3) interventions should be an integral part of crop intensification and hillside terracing efforts. Cropping plans for newly terraced areas should incorporate intercropping options and agroforestry. Soil protection should be emphasised and implemented, including living barriers (progressive terraces) and leaving crop residues on the fields.

SP 4.6.2. Fertilisation from a plant nutrient viewpoint

Fertilizer promotion should focus on both crop yields and satisfying plant nutrient requirements, and both organic and chemical fertilisers should be used. While there is still scope for wider use of chemical fertilisers, appropriate dosages should be emphasized in promotion programmes. Training sessions should also educate farmers in relation to the damage to water supplies of excess application.

SP 4.6.3. Reducing Pesticide Hazards.

The multiple issues regarding pesticide use are explained in detail in the Strategic Environmental Assessment (SEA) Study Report, European Development Fund, February 27, 2012. A wide-ranging programme for pesticide management will be developed which will include:

1. ***Training farmers in integrated pest and crop management through FFS***.
2. ***IPM and Pest Risk Analysis (PRA) protocols developed*** for all major crops, in Kinyarwanda
3. ***Regular publication of approved and banned agro-chemicals*** based on international norms
4. ***Authorized distributors periodically licensed and certified***
5. ***All agro-chemical products plastic-tagged*** with Kinyarwanda instructions
6. ***Pest and disease trials for crops documented and best practice issued***, extension staff trained
7. ***Pesticide leachate content of surface and ground water monitored and reported***

SP 4.6.4. Environmentally sound water management

Climate change projections predict more extreme climate events, which may damage farms and structures, and reduce water availability in dry seasons. For these reasons, it will be increasingly important to develop hydrological information systems, including water balances (SP 1.2.5.). In addition:

1. ***Water use efficiency*** should be considered in planning and operating irrigation systems
2. ***Irrigation design should ensure marshland development is consistent with watershed hydrology*** to ensure the marshland's flood mitigation properties are not compromised
3. ***A system of allocations of water use rights*** based on the water balances should be developed for each watershed, to encourage responsible use of water resources

SP 4.6.5. Environmental considerations in rural road design

Under PSTA II Rwanda made significant progress in rural road construction. Rural roads are a hazard to soils, crops and water supplies when extreme climate events wash the road away and onto neighbouring farm fields. This hazard is likely to be exacerbated under climate change. To tackle this, region-specific climate-proofed feeder road standards and specifications will be developed and applied (with SP 3.8.1.).

SP 4.6.6. Planning for climate change

Rwanda's climate is complex, varying across the country and with a strong seasonality. Climate variability gives rise to disasters, such as flooding, landslides and droughts, resulting in decreased agricultural productivity or crop failure. The impacts and economic costs of current climate variability and events are already significant for food production, and likely to increase with climate change, with predicted increasing temperatures and rainfall. It is therefore essential to implement adaptation activities. The 2011 National Strategy for Climate Change and Low Carbon Development highlights key actions including:

1. ***Risk assessment and vulnerability mapping***
2. ***Constructing water catchment structures,*** to reduce flood damage and provide water in drought
3. ***Increased emphasis to watershed management and soil retention measures***,
4. ***Monitoring pest incidence and crop yields to advise farmers on cropping adaptation***
5. ***With MINIRENA, exploring agroforestry and forestry projects for carbon credit markets***

Chapter V: Implementation of the PSTA III

V.1. Institutional Framework

This matrix defines institutional roles and responsibilities across the four main programme areas:

- Programme 1: Agriculture and Animal Resource Intensification
- Programme 2: Research and Technology Transfer, Advisory Services and Professionalisation of Farmers
- Programme 3: Value Chain Development and Private Sector Investment
- Programme 4: Institutional Development and Agricultural Cross-Cutting Issues

Prog.	Sub-programme	Strategic Areas	Lead Agency	Roles and Responsibilities
1	SP 1.1. Soil Conservation and Land Husbandry	SP 1.1.1. Land protection structures: construction of progressive and radical terraces	RAB	-RAB provides technical assistance -Districts implement terracing -SPIU works with DPs for projects
		SP 1.1.2. Agroforestry	RAB	-RAB provides research expertise and technical support -District agronomists and extension workers develop protocols and advise farmers
		SP 1.1.3 Improve the understanding of Rwanda's soils	RAB	-RAB leads research projects -Districts support testing
	SP 1.2. Irrigation and Water Management	SP 1.2.1. Public sector irrigation Development	TF I&M	-MINAGRI TF Irrigation and Mechanization leads programme -District level support -SPIU work with DPs for projects
		SP 1.2.2. Private sector irrigation development	TF I&M	-MINAGRI TF Irrigation and Mechanization collaborate with private sector actor -Coordinate with MINICOM and RDB
		SP 1.2.3. Applying lessons from IWM and development of IWM	RAB	-RAB leads research and expansion of integrated water management approach
		SP 1.2.4. Develop hydrological information for watershed management	RAB	-RAB leads research -Collaborate with MINIRENA
	SP 1.3. Agricultural Mechanization	SP 1.3.1. Development of mechanization options and implementation of mechanization strategy	TF I&M	-MINAGRI TF Irrigation and Mechanization will conduct assessment -District will provide information
		SP 1.3.2. Facilitating investment and finance for mechanization	TF I&M	-MINAGRI TF Irrigation and Mechanization with collaborate with private actors and financial institutions to improve financing
		SP 1.3.3. Maintaining mechanization services	TF I&M	-MINAGRI TF Irrigation and Mechanization will work with RAB, Districts, and private enterprises to set up maintenance points
		SP 1.3.4. Incorporating mechanization in irrigation schemes	TF I&M	-MINAGRI TF Irrigation and Mechanization will work with RAB, Districts and SPIUs
	SP 1.4. Agrochemical use and Markets	SP 1.4.1. Accelerating privatization of input markets according to fertilizer strategy	RAB	-MINAGRI/RAB will lead privatisation -Districts will facilitate working with agro-dealers
		SP 1.4.2. Improve the input distribution network	RAB	-RAB will lead initiatives -Districts will support implementation

		SP 1.4.3. Improve the infrastructure for fertilizer distribution	RAB/ TF PHHS	-RAB and TF Post Harvest Handling and Storage will collaborate with private investors
		SP 1.4.4. Improve soil fertility management through use of organic fertilisers and liming	RAB	-RAB and extensionists will work with farmers to increase productivity using alternative methods
	SP 1.5. Seed Development	SP 1.5.1. Implement a formal seed system	RAB	-RAB leads the programme -Collaborate with the National Seed Laboratory and Rwanda Seed Enterprise -Districts work with farmers to improve uptake and use of seeds
		SP 1.5.2. Facilitate the import of seeds and planting material	RAB	-RAB leads the initiative -District support local capacity building
	SP 1.6. Livestock Development	SP 1.6.1. Improve milk quality, seasonality and productivity in line with the Dairy Strategy	RAB	-RAB and the MINAGRI Livestock unit lead -District's support training in milk handling an processing
		SP 1.6.2. Improved animal nutrition	RAB	-RAB and MINAGRI Livestock unit will collaborate to assess animal nutrition and develop strategy to improve fodder production -RAB will conduct research into optimal feeding and fodder planting
		SP 1.6.3. Improved animal genetics in line with the 2012 Animal Genetics Improvement Strategy	RAB	-RAB will lead the programme to conduct research around improved breeds and turn over Masaka bull station -RAB will collaborate with Districts to expand artificial insemination
		SP 1.6.4. Develop diversified small holder meat production in line with the 2012 Meat Industry Strategy	RAB	-RAB and MINAGRI Livestock unit will collaborate to drive animal resource intensification -Districts will support local production
		SP 1.6.5. Extension of the Girinka Programme	RAB/ District	-RAB will provide support to Districts -Districts will distribute animals and provide training and monitoring
		SP 1.6.6. Strengthen the veterinary service network and improve animal health	RAB/ District	-RAB will provide technical support -Districts will provide para-vets and animal health training
	SP 1.7. Nutrition and Household Vulnerability	SP 1.7.1. Support households in nutritious garden practices and diversifying food production	RAB	-RAB provides input and technical support -Districts support training and planting -Collaboration with MINISANTE
		SP 1.7.2. Improve nutrition related knowledge and practices for food insecure households	RAB	-RAB leads, in collaboration with MINISANTE, MINALOC, MINEDUC to generate sustainable behaviour change
		SP 1.7.3. Develop a programme of bio-fortified food		-RAB leads research and dissemination with MINISANTE and Districts
		SP 1.7.3. Expansion of One Cup of Milk Per Child programme	RAB	-RAB leads the programme -Collaboration with MINISANTE and MINEDUC for sensitization campaign
		SP 1.7.4. Continue to maintain a national strategic food reserve	TF PHHS	-MINAGRI TF Post Harvest Handling and Storage manage the reserve
		SP 1.7.5. Strengthen Rwanda's food security information system	CICA	-CICA and the Statistics unit will lead monitoring of food security information

2	SP 2.1. Research and Technology Transfer	SP 2.1.1. Market related research	RAB	-RAB leads research into crops with market potential and new market opportunities
		SP 2.1.2. Research on seeds, planting material and multi-crop rotations	RAB	-RAB conducts research in collaboration with research institutions and disseminates results to agronomists and farmers
		SP 2.1.3. Research on farmer' fields	RAB	-RAB works with District level support to conduct field research
		SP 2.1.4. Competitive research funding	MINAGRI	-MINAGRI awards funding, RAB collaborates with other institutions to submit proposals
		SP 2.1.5. Funding and international collaboration	MINAGRI	-MINAGRI and RAB will collaborate with international agricultural research institutes
	SP 2.2. Extension and Proximity Services for Producers	SP 2.2.1. Extending Farmer Field Schools (FFS)	RAB/ District	-RAB provides technical support and leads the programme, District extension workers train farmer promoters
		SP 2.2.2. Training for agricultural entrepreneurship	RAB	-RAB works with extensionists, cooperatives and farmer promoters to teach market skills
		SP 2.2.3. Facilitating relationships between cooperatives and farm advisors	RAB/ District	-RAB and Districts will work with cooperatives to facilitate relationships with extension workers
		SP 2.2.4. Expansion of agricultural advisory services	RAB	-RAB will lead the programme to train extensionists and improve access to services
		SP 2.2.5. Establish local forums for farmers and agricultural stakeholders	District	-Districts will establish and facilitate local forums to share agricultural information
	SP 2.3. Farmer Cooperatives and Organisations	SP 2.3.1. Implement a capacity building programme for agricultural organisations	MINAGRI	-MINAGRI will work with RAB and Districts to train rural organisations in key skills -Collaborate with MINICOM to develop business and value chain skill sets
		SP 2.3.2. Develop a framework for share companies in farming areas	MINAGRI	-MINAGRI will lead the program, and collaborate with RAB and Districts to establish pilot projects
3	SP3.1. Creating an Environment to Attract Private Investment, Encourage Entrepreneurship and Facilitate Market Access	SP 3.1.1. Creation of farm management unit to focus on bulking up production	MINAGRI	-MINAGRI will lead programmes of land consolidation and facilitating contract negotiation, in collaboration with RAB and Districts
		SP 3.1.2. Public private partnerships and risk management in value chains	MINAGRI	-MINAGRI will lead coordination with NAEB, MINICOM and RDB to leverage private investment and mitigate risk
		SP 3.1.3. Catalytic fund for agricultural entrepreneurship	MINAGRI	-MINAGRI will lead a feasibility and design study for a catalytic fund
		SP 3.1.4. Agricultural exports and cross border trade channels	MINAGRI / NAEB	-MINAGRI and NAEB will collaborate with MINICOM and MINEAC to expand EAC trade -RBS drive export certification
		SP 3.1.5. Strengthen sanitary, phytosanitary and food safety (SPS) and sensitise producers	MINAGRI	-MINAGRI Inspection Unit will work with NPPO and National Livestock Protection Unit, RBS, NAEB and MINEAC
	SP 3.2. Development of Priority Value Chains: Food Crops	SP 3.2.1. Bananas	RAB	-RAB leads implementation -Collaborate with NAEB on export potential
		SP 3.2.2. Wheat	RAB	-RAB leads research and extension
		SP 3.2.3. Maize	RAB	-RAB leads production and TF PHHS provide facilities and training
		SP 3.2.4. Rice	RAB	-RAB leads research and FFS, working with TF PHHS/I&M to improve productivity

		SP 3.2.5. Irish Potato	RAB	-RAB leads seed development, collaboration with TF PHHS for processing plant
		SP 3.2.6. Cassava	RAB	-RAB leads research and collaborates with private sector to expand processing
		SP 3.2.7. Soya Beans	RAB	-RAB leads research and production
		SP 3.2.8. Beans	RAB	-RAB leads research and production
	SP 3.3. Development of Priority Value Chains: Export crops	SP 3.3.1. Coffee	NAEB	-NAEB leads coffee research, production improvement and marketing, working with Districts, private sector, DPs and MINICOM
		SP 3.3.2. Tea	NAEB	-NAEB leads research, expansion of cultivation and marketing, working with Districts, private sector, DPs and MINICOM
		SP 3.3.3. The pyrethrum value chain	NAEB	-NAEB supports expansion of production, training and research, working with private actors like SOPYRWA
		SP 3.3.4. Horticulture, floriculture and other emerging value chains	NAEB	-NAEB leads research and product development, and collaborates with value chain actors , MINCOM and RDB
	SP 3.4. Development of Priority Value Chains: Dairy and Meat	SP 3.4.1. Dairy	RAB	-RAB leads development of dairy products in collaboration with the Rwanda National Dairy Board, MCCs, MINAGRI livestock unit
		SP 3.4.2. Meat	RAB	-RAB and MINAGRI Livestock unit will work with slaughterhouse agents, meat processors and other value chain actors
	SP 3.5. Development of Priority Value Chains: Fisheries	SP 3.5.1. Research and technology development for fish and fish products	RAB	-RAB will lead research supported by MINAGRI livestock unit
		SP 3.5.2. Strengthen existing fish supply chain	RAB	-RAB will lead in collaboration with supply chain actors, private sector and projects
		SP 3.5.3. Implement a system of cage aquaculture	RAB	-RAB will lead the programme in collaboration with Districts
		SP 3.5.4. Implement a system of tank aquaculture	RAB	-RAB will lead the programme in collaboration with Districts
		SP 3.5.5. Implement a system of aquaculture parks	RAB	-RAB will lead the programme in collaboration with Districts
		SP 3.5.6. Establish industry to process fish wastes into animal feeds and fertilisers	RAB/ TF PHHS	-RAB will collaborate with TF Post Harvest Handling and Storage and private sector to establish fish waste processing facilities
	SP 3.6. Development of Priority Value Chains: Apiculture	SP 3.6.1. Strengthen beekeeping	RAB	-RAB will lead, working with Districts
		SP 3.6.2. Conduct market research and develop a promotion campaign	RAB	-RAB will lead and work with MINCOM and private sector actors
		SP 3.6.3. Increase and harmonise quality standards	RAB	-RAB will collaborate with RBS to align production with quality standards
	SP 3.7. Agricultural Finance	SP 3.7.1. Strengthen and consolidate SACCOs at the District Level under Agricultural Cooperative Bank	MINAGRI / District	-MINAGRI will collaborate with Districts and financial institutions to consolidate SACCOs through an Agricultural Cooperative Bank
		SP 3.7.2. Establish a warehouse receipts system	MINAGRI	-MINAGRI will collaborate with MINECOFIN and BNR to establish a system
		SP 3.7.3. Facilitate value chain finance relationships	MINAGRI	-MINAGRI will collaborate with stakeholder actors and financial institutions
		SP 3.7.4. Expand agricultural insurance and rural finance	MINAGRI	-MINAGRI will collaborate with private sector to expand agricultural insurance

	SP 3.8. Market-oriented Infrastructure for Post-Harvest	SP 3.8.1. Promote efficient and equitable transport systems	TF PHHS	-TF Post Harvest Handling and Storage will collaborate with MININFRA, MINICOM, DPs
		SP 3.8.2. Reduce staple crop post-harvest losses at producer and first aggregator level	TF PHHS	-TF Post Harvest Handling and Storage will lead the programme in collaboration with Districts, private sector and MINICOM
4	SP 4.1. Institutional Capacity Building	SP 4.1.1. Develop a comprehensive human resource development plan	MINAGRI	-MINAGRI will lead the programme in collaboration with SCBI
		SP 4.1.2. Develop staff incentives	MINAGRI	-MINAGRI will lead the programme
		SP 4.1.3. Staff capacity building	MINAGRI	-MINAGRI will lead with DP support
		SP 4.1.4. Strengthen and improve coordination of the rural development group	MINAGRI	-MINAGRI will lead collaboration with rural development group actors including MINICOM, MININFRA, MINIRENA etc…
	SP 4.2. Decentralisat-ion in Agriculture	SP 4.2.1. Strengthen the role of districts in para-vet services and human disease control	District	-Districts will lead development of human and animal disease control programmes
		SP 4.2.2. Make districts partners in all ag extension programmes	District	-Districts will work with RAB, MINAGRI and NAEB to be the lead actors in extension
		SP 4.2.3. Support JADF and District feedback mechanisms	District	-Forums will be developed and strengthened
		SP 4.2.4 Strengthen fiscal decentralisation	MINAGRI / District	-MINAGRI will lead in strengthening fiscal decentralization and earmarked funds
	SP 4.3. Legal and Regulatory Framework	SP 4.3.1. Formalise the National Irrigation Policy	MINAGRI	-MINAGRI and TF I&M will drive the process
		SP 4.3.2. Develop regulations for organic agriculture, pesticide and limestone use	MINAGRI	-MINAGRI will lead using results produced through RAB research
		SP 4.3.3. Develop regulations around the value chain guarantee fund	MINAGRI	-MINAGRI will lead in collaboration with MINICOM, private sector and financial institutions
		SP 4.3.4. Develop the legal basis for an agricultural catalytic fund	MINAGRI	-MINAGRI will lead in collaboration with MINICOM, investors and financial actors
	SP 4.4. Agricultural Communication Statistical Systems, M&E and Knowledge Management	SP 4.4.1. Agricultural communication strategy development	MINAGRI / CICA	-MINAGRI / CICA will lead development and implementation in collaboration with all agricultural stakeholders
		SP 4.4.2. Improvement of the agricultural statistical system	MINAGRI / CICA	-The MINAGRI Statistics unit will lead in collaboration with NISR
		SP 4.4.3. Collection and use of agricultural meteorology data	MINAGRI / CICA	-MINAGRI will work with the Rwanda Meteorological Services
		SP 4.4.4. Agricultural M&E and MIS	MINAGRI / CICA	-MINAGRI will lead M&E in collaboration with RAB, NAEB and Districts -CICA will lead MIS development
	SP 4.5. Gender and Youth in Agriculture	SP 4.5.1. Institutionalise gender equality in sector entities	MINAGRI	-MINAGRI will lead gender mainstreaming sensitization across all sector actors
		SP 4.5.2. Develop capacities for gender sensitive programming	MINAGRI	-MINAGRI will lead sensitization of staff -Districts will support extension work
		SP 4.5.3. Enhancer gender responsiveness in agricultural service delivery	MINAGRI	-MINAGRI will work with RAB, NAEB, Districts and DPs to raise awareness of gender in programme implementation
		SP 4.5.4. Continue to develop and strengthen and operationalize partnerships with gender focused institutions	MINAGRI	-MINAGRI will develop partnerships with MIGEPROF, gender based DP's and others

		SP 4.5.5. Develop a TVET curriculum for ag specialisations	MINAGRI	-MINAGRI will collaborate with MINEDUC, TVET and youth training centres
		SP 4.5.6. Target youth in entrepreneurship programmes	MINAGRI	-MINAGRI will target youth in funding and training opportunities
		SP 4.5.7. Develop an agricultural leadership programme for youth	MINAGRI	-MINAGRI will lead the programme
	SP 4.6. Environmental Mainstreaming in Agriculture	SP 4.6.1. Soil conservation mainstreaming	RAB	-RAB will coordinate with MINAGRI environmental focal point
		SP 4.6.2. Fertilisation from a plant nutrient viewpoint	RAB	-RAB will lead research and training with District extension worker support
		SP 4.6.3. Reducing pesticide hazards	RAB	-RAB will lead in collaboration with Districts, DPs and MINIRENA
		SP 4.6.4. Environmentally sound water management	RAB	-RAB will lead in collaboration with TF I&M, Districts, DPs and MINIRENA
		SP 4.6.5. Environmental considerations in rural roads	MINAGRI	-MINAGRI will lead, together with roads sub-group, DPs, MININFRA and private sector
		SP 4.6.6. Planning for climate change	MINAGRI	-MINAGRI will lead strategic planning in collaboration with all sector actors

V. 2. Risks Matrix

Potential Risk	Risk level	Mitigation
Insufficient private sector investment	*Moderate*	Attracting the private sector is a focus area under Programme 3. A new agricultural investment task force will identify private partners and facilitate their investment in the sector, and agricultural investment hubs will be established to provide conducive environments for agri-business, including infrastructure (electricity and roads), regulatory allowances and finance.
Donor funding shortfalls	*Moderate*	Development partner funding is likely to decrease over the strategy implementation, as donor countries face fiscal constraints at home. As such, donors cannot be relied on to cover the funding gap. Reaching out to the private sector through value chain development (Programme 3) and strengthening domestic reserves can mitigate this. Maintaining close donor cooperation, through exercises such as the ASWG, SWAp group and JSR, and transparent implementation, M & E should maintain good donor relations.
Regional neighbours have lower input costs and their agricultural products are more competitive at market	*Moderate*	Specific value chain interventions under Programme 3 will remove barriers to increased quality and supply of products, which should lead to lower prices. Post-harvest investments and feeder roads will also lower transport costs and the cost of losses. Insurance will mitigate risk, while PPP and a catalytic fund encourage private investment which increases efficiency.
Climactic risks affect crop yields	*Moderate*	The environmental sub-programme (SP 4.6.6.) considers planning for climate change adaptation, according to the 2011 National Strategy for Climate Change and Low Carbon Development. This will account for the potential effects of climate change and limit impacts.
Poor prioritization and delegation of responsibility cause implementation gaps	*Low*	Although the strategy is ambitious and covers diverse areas, responsibility will be carefully allocated according to the institutional arrangements above to ensure each programme has an appropriate implementation mechanism and prioritization.
Skills gaps at central and local levels limit strategy implementation	*Low*	SP 4.1. Institutional capacity building provides for the development of a comprehensive human resources development plan. The consultant has already been procured and the plan will be finalized soon, after which a training programme will be developed and implemented according to the needs identified at different levels.
Poor coordination between central and district level constrains programme implementation at local scale	*Low*	Currently decentralized budget disbursement is a small proportion of total budget, although with increased district capacity over time this will grow. MINAGRI, RAB and NAEB will work closely with districts to ensure programmme implementation, monitoring and evaluation. Under SP 4.2. Decentralisation in agriculture, there are provisions to strengthen the role of districts in extension and veterinary services, increase fiscal decentralization and support the JADF and other feedback mechanisms.
Weak statistical and M & E systems means targets and indicators are not fully monitored or achieved	*Low*	SP 4.4. Agricultural communication, statistical systems, M & E and MIS provides for improvements in statistic collection and M & E. Sub-working groups will continue to review and develop new methodologies to collect data, with regular monitoring field visits and evaluations for key outcomes.

Chapter VI: Monitoring and Evaluation Framework and Costing [NEEDS UPDATING]

								1 090 156 504 516
Sector Outcome	**Sector output**	**Indicator**	**Baseline**	**Target by 2017/18 (cumulative)**	**Means of verification**	**Assumptions**	**Total target**	**Total cost**
Programme 1: Agriculture and Animal Resource Intensification								808 653 263 184
SP 1.1 Soil conservation and land husbandry								44,949,400,000
Increased Agricultural Productivity	Area of land developed with progressive terraces increased	Ha of land developed with progressive terraces	802,292	1,107,227	Monitoring of District Performance Contracts, Annual reports of MINAGRI/RAB Agricultural Survey	Willingness to work hard at all level Partnership with local development organization (NGOs, farmers cooperatives, etc	305,935	30,593,500,000
	Area of land developed with bench/radical terraces increased	Ha of land developed with bench/radical terraces	46,246	165,596			119,350	11,938,400,000
	Soil conservation infrastructure established and effectively maintained	Percentage of coverage and effectiveness of soil conservation infrastructure	73% (1,095,914ha)	91% (1,365,413 ha)			-	300,000,000
	Fertilizer recommendation according to suitability to different priority crops and soil types made	Fertilizer application determined by trial results, No of constraints and strategy e to overcome soil response by crop by soil types, No of	Outdated FAO fertilizer recommendation, FDC fertilizer use and profitability demonstrati	Use of fertilizer recommendations for different priority crops and soils	Annual reports MINAGRI/RAB, Scientific publication, training manual		Agronomic and economic rates on Rice, Maize, Wheat, Irish potatoes, Beans, Soybeans and vegetables on	1,050,000,000

		agro-ecomic and economic according to crops by soil type	on				10 Agro-ecological zones determined	
	Decision support tool for erosion monitoring and control available and used	Decision support tool/model	Sediment and river flow under collection	Model calibrated, tested, and technologies assessed			Decision support tools are in use to target best bet technologies for erosion eradication	740,000,000
	Adapted forestry and agro-forestry tree species increased	Number of technologies adopted/adapted	5 -8	8 – 12	- Impact study reports			327,500,000
		% of farmers using technologies	60	90	- Field observations			
SP 1.2 Irrigation and water management								134 040 300 000
		Hectares developed for Hillside	2,490 (June 2011-2012)	8000 ha (cumulative)	Annual reports of MINAGRI/ RAB/TF IM, Annual report of REMA, Monitoring of District Performance Contracts	The necessary laws, regulations and policy will be approved by Sector	5510ha (Target for 5yrs)	55 100 000 000
		Hectares developed for Marshland	23,000 ha (June 2011-2012)	32,000ha (cumulative)			9000ha (Target for 5yrs)	54 000 000 000
		hectares developed for small Irrigation scale schemes	100	1,000			1,000	1,000,000,000
		No. of EIA certified schemes	N/A	All projects			-	0
		No. of Engineers who receive training in irrigation systems disaggregated by	0	40			40	1,440,000,000

		sex						
		No. of farmers who receive training in irrigation management disaggregated by sex	0	30,000 with at least 30% women			30,000	1,500,000,000
		Hectares well maintained (marshland and hillside)	10,000	20,000			10,000	21,000,000,000
		No of irrigation schemes transferred to communities using IMTA (10 for hillside and 70 for marshland)	0	80			80	
		Policy	0	Policy adopted			legislated Policy	300,000
SP 1.3 Agricultural Mechanization								328,352,850,000
		No. of tractors and machines maintained	100	350	• Annual reports of MINAGRI/RAB/TF IM • Agricultural Survey • Monitoring of District Performanc e Contracts	The private sector will be more involved	200	17,762,850,000
		No. of technicians, farmers and machinery operators who receive training disaggregated by sex	400 of which 5% were women	500 per year with at least 30% women by year 5			2,500	132,961,500,000
		No. of tractors purchased	81	1581			1,500	19,687,500,000
		No. of Power tillers to be purchased	250	11,250			11,000	22,050,000,000
		No. of attachments to be purchased	1200	22,750			21,550	28,271,250,000

		No. of planting machines to be purchased	35	12,035			12,000	26,460,000,000
		No. of crop treatment machines to be purchased	0	28,000			28,000	8,820,000,000
		No. of harvesters to be purchased	0	5,850			5,850	49,533,750,000
		No. of post harvesting machines to be purchased	0	12,100			12,100	10,206,000,000
		No. of agro-processing machines to be purchased	0	60			60	12,600,000,00
1.4 Agrochemical use and markets								141,947,498,628
	Developed policy for input use and input markets	Policy document	NA	Policy document validated	Annual reports of MINAGRI/RAB/TF PHH&S	Inputs distribution network established by farmers independently		141,947,498,628
	Access to inputs by farmers increased	No. of male and female agro dealers trained	354	1,000 agro-dealers accredited	Monitoring of District Performance		2000	
		No. of male and female distributors trained in logistics and management	NA	20	Crop Assessment Survey		20	
		MT of fertilizer imported and used Farmers accessing smart subsidies on fertilizers	36,000 MT NA	59,741 MT by year 5 720,670 by year 5	Agricultural Survey Coop. reports in MINICOM		#REF!	
		additional fertilizer storage capacity		8,000MT			8,000 MT	

		acquired						
		Feasibility study for one fertilizer blending plan	NA	Study available				
		Kg of inorganic fertilizer used per ha per year	29	45				
		Percentage (%) of farmers using organic fertilizer disaggregated by sex	75	100				
		Percentage (%) of male/ female famers using lime	5	20				
		Percentage (%) of male/female farmers practicing safe use of agro chemicals	14	12				
1.5 Seed Development								28,429,910,000
	Certified seed produced by priority crops increased	Percentage (%) of male/ female farmers using improved seeds	40	100 with at least 30% women				NA
		One seed company operational		1				
		MT of improved seed produced and used						
		Maize	3,044 MT(2012)	9,260MT				952,050,000
		Weat	1,428 MT(2012)	3,943 MT				557,280,000
		Rice	135 MT (2012)	570 MT				78,940,000

		Beans	12,272MT (2012)	30,680 MT				3,742,960,000
		Irish potatoes	164,779 MT(2012)	428,675 MT				23,098,680,000
1.6. Livestock development								95,483,304,556
Increased livestock Productivity	Milk production increased	Metric tons of milk produced (MT)	475,690	723,831	Annual reports of MINAGRI/RAB/, Agricultural Survey, Monitoring of District Performance Contracts.	No new outbreaks of major epidemic animal and poultry diseases in countries of the region	248,141	4,930,609,977
		No. of dairy cows distributed under the Girinka program disaggregated by sex of beneficiaries	139,204	350,000 with at least 30% women			210796	6,500,000,000
		No. of MCCs built, equipped and operational	96	200			104	10,400,000,000
	Goat milk production increased	MT of goat milk produced	NA	5000			5000	800,000,000
	Meat production increased	MT of beef produced	58,141	68,141			10,000	8,539,000,000
		MT of pork produced	17,916	37,113			19,197	
		Tons of goat meat produced	22,563	67,689			45,126	
		Tons of sheep meat	4,996	9,992			4,996	

		produced						
		Tons of rabbit meat produced	1,276	6,380			5,104	
		Metric tons produced (MT) for chicken	3,921	11,718			7,797	
		Number of feedlot installed and operational	1	25			24	
	Fish production increased	No. of fingerlings production centres installed, equipped and operationalized	1	6			5	46,150,000,000
		MT of fish production	17,000	112,000			95,000	
	Honey production increased	MT of honey produced	3,221	8,695			5,474	1,093,914,931
	Poultry industry developed	No. of hatcheries installed and operational	11	35				9,157,850,666
		MT of eggs produced	5,252	14,414			9,162	
		Reduction of the Poultry and Eggs importation		90%			90%	
		Poultry slaughterhouse implemented in Kigali		1			1	
		Livestock productivity census report completed	0	Report			1/yr	2,067,353,515
	Animal genetic improved	No. of cows artificially inseminated	78,000	500,000			422,000	3,386,000,000

		Number of cow AI offspring recorded	NA	320,000			320 000	
		No. of pigs artificially inseminated	NA	5000			5000	
		No. of pure nuclei put in place for local multiplication of exotic pig breeds	9	25			25	
		No. of pure nuclei put in place for local multiplication of Boer, Alpine and Saanen goats	3	30			27	
		No. of pure nuclei put in place for local multiplication of Merino sheep	1	4			3	
		No. of pure nuclei put in place for local multiplication of Pure Rabbits	0	30			30	
	Animal nutrition improved	MT of forage seed produced and distributed	70	100			30	1,150,000,000
		Area (ha) of range land developed(Gishwati range land, Private farms, and Public range land combined)	8423.67ha	16847.34ha			8423.67	
		No. of farms supplied with livestock water	NA	2,108 farms supplied				

		No. of demonstration units for fodder conservation installed and operational	0	30			30	
		No. of animal feed mills built and operational	0	5			5	
	The production of hides and skins increased	MT production of hides and skins	3501.3	5126.2			1624.9	800,000,000
	Animal health improved	New animal health policy		Policy document developed			Policy document developed	25,000,000
		No. of operational quarantine posts established	4	10			6	483,575,467
		No. of veterinary posts established and operational	0	10with at least 30% of female			10	
		No. of vet laboratories built, rehabilitated and equipped	4	10				
		Proportion (%) of animal disease control: CBP, BQ and LSD, FMD, deworming and acaricides spraying	N/A	100			100%	
		No. of veterinary technicians trained in different modules and equipped disaggregated by	416	2146 with at least 30% women			1730	

		sex						
		Veterinary pharmacies registered and inspected annually	0	100%			100%	
		Proportion of animal product and vet drug sellers trained disaggregated by sex		100%			100%	
		No. of laboratory technicians trained in lab animal disease diagnostics	4	20				
		Rate (%) of animal/animal product movement permits issued	70	100			30	
1.7 Nutrition and Household Vulnerability								35,450,000,000
		Number of school children gaining from one cup of milk programme	74,728 of school children	200,000 of school children				10,000,000,000
	Diversified food consumption at the household level strengthened	Percentage of rural households with functional kitchen gardens disaggregated by sex of head of HH	58% (RAB: 1,199,136 HH kitchen gardens establishe d)	80%				
		Percentage of households that reach acceptable food consumption standards (FCS)	79%	90%				

		Percentage of food insecure households that consume bio-fortified foods	No baseline	50%				
	Food accessibility for the most nutrition insecure households increased	Percentage of food insecure households	21%	14%				
		Percentage of households with poor and border-line FCS during the lean season	21% of HHs with unacceptable	15% of HHs with unacceptable				
		MT of maize and beans existing as food reserve	15,909	100,909			85,000	25,450,000,000

Programme 2: Research and Technology Transfer, Advisory Services and Professionalization of Farmers								12,835,721,082
2.1 Research and technology transfer								4,688,575,700
Transformed agriculture through research & extension programs	Agriculture research outputs increased	No. of new varieties developed	Wheat: 4 (KS Mwamba, Musama, EN161, EN48). Banana: 6 varieties in dissemination – Injagi, Mpologoma, Nkazikamwa, FHIA 17, FHIA 25, Kamaramasenge. I.Potato:Four (4) potato cultivars in the pipeline of release. Sixty four (64) potato cultivars under evaluation	Release at least five varieties for each priority crop	Annual reports of MINAGRI/RAB/	Capacity for guiding participatory trials and analyses exists in sector institutions.		
	3 technology packages validated	Number of New technology Packages for pest and diseases control developed	Wheat: 3 (resistant varieties & spraying rates and frequencies seed dressing). I.Potato:- Three technology packages against late blight - One technology package against			AB staff willing to shift their operating paradigm to a more participatory one in which farmers own fields are sites for research.		

			Bacterial wilt - Two technology package against viruses. Crop protection: 10 plant clinics are operational					
	MT of basic seed produced:							
		Maize		179MT				30,900,000
		Wheat		155MT				33,675,000
		Rice		20MT				5,850,000
		Beans		215MT				40,385,000
		Irish potatoes		8,250MT				438,000,000
		Irish potatoes(mini tube)		11,500,000				1,499,765,700
		Conventional screen houses constructed		71 cumulative			71	
		aeroponic screen houses constructed		2 cumulative			2	
	Livestock research outputs increased	No. of new forage species developed	-	At least 5 forage species released			5	400,000,000
		No. of new animal feeding technologies developed from crop residues	1	At least three technologies developed			3	200,000,000
		No of new concentrates technologies developed	1	At least 3 technologies developed			3	200,000,000

		No. of new cattle improved breeds technologies developed		At least 5 technologies			5	100,000,000
		No of new small animals (Pigs, Goats, sheep, rabbits, poultry) improved breeds		At least 5 technologies			5	400,000,000
		No of new queen rearing technologies developed		At least 2 technologies			2	100,000,000
		No of new fish and fisheries technologies developed		At least 5 technologies			5	1,240,000,000
2.2 Extension and proximity services for producers								8,064,088,382
	Ratio of farmer households to extension workers improved	Ratio of extension workers per farmer household	1/839	1/600	Annual reports of MINAGRI/RAB	Extensive training and awareness building is carried on with cooperatives and farmer associations regarded the new approach to extension		
	The scope of Farmer Field	No. of FFS Master Trainers	0	50				190,000,000

	Schools expanded	disaggregated by sex						
		No. of qualified farmer field school trainers disaggregated by sex	1,570	2,500				1,100,000,000
		No. of FFS groups	2,547	12,000				450,000,000
		No. of farmers benefitting from FFS groups disaggregated by sex	67,276	120,000 with at least 50% women				1,395,000,000
	Agricultural committees established and trained	No. of agricultural committees trained disaggregated by sex	0	2,594 with at least 30% women				3,666,918,993
	Capacity of farmer promoters Increased	No. of farmer promoters who have received training in agricultural practices disaggregated by sex	0	14,837 with at least 30% women				1,262,169,389
2.3 Farmers' cooperatives and farmers organizations								83,057,000
	Proportion of farmers in cooperatives increased	Percentage of farmers in cooperatives (%), disaggregated by sex	23%	70%	Coop. reports in MINICOM, Annual reports of MINAGRI/RAB, Agricultural Survey	Capacity building programme for cooperatives involves accompanying the cooperatives for the long term.	70%	83,057,000

Programme 3: Value Chain Development and Private Sector Investment								254 439 649 620
3.1 Creating an environment to attract private sector investment, encourage entrepreneurship and facilitate market access								1,000,000,000
	Off-farm jobs through agro processing or agricultural input market opportunities increased	Volume of annual trade flows	-	-				1,000,000,000
	Farmer incomes through links to agro-processing increased	No. of farmers linked to agro-processors	-	-				
3.2 Development of priority value chain: Food Crops								5,000,000,000
	Production of priority crops increased	Number of strategies developed	-	Development strategies for priority food crops are drafted, costed and implemented (maize, wheat, cassava, banana, beans and soya beans)				5,000,000,000
	MT of priority crops produced:							
		Maize	573,038 MT (2012)	1,696,239 MT				
		Wheat	75,913 MT	287,760MT				
		Rice	84,079 MT	188,760 MT				
		Beans	452,828MT	749,381MT				

		Irish potatoes	2,172,421MT	4,001,225MT				
		Cassava	2,716,421 MT	3,826,748MT				
3.3 Development of priority value chains: export crops								25,602,824,589
Increased Agricultural exports and value-added products	Area of coffee and tea extended	Ha to be extended for coffee	41,300	94,370	Annual reports of MINAGRI	Operation alisation of the Coffee Marketing Alliance, including systems of quality control, and the Cup of Excellence Programme.		2,213,306
		Ha to be extended for tea	20,800	38,650	Annual reports of NAEB	Research programme on high-quality tea clones maintained		28,579,465
	Revenues for traditional value chains increased	Revenue for coffee (USD)	78.7 m	157m	Annual report of BNR	More adaptive research on coffee, tea, and horticulture varieties.		10,954,589
		Revenue for tea (USD)	63 m	147m				3,375,649
		Revenue of pyrethrum (USD)	4.5 m	21.54m				2,711,235

	Revenue for emerging value chains increased	Revenue for fruit (USD)	1.27 m	25.4 m				5,253,036
		Revenue for vegetables (USD)	9.9 m	54.3 m				5,560,334
		Revenue for floriculture (USD)		225.8m				134,771,334
	Production of traditional value chains increased	MT production of coffee	16,405	35,000				104,545,780
		MT production of tea	21,886	41,873				134,471,088
		Metric tons production of pyrethrum	21	61,565				2,887,024
		Additional HA of pyrethrum planted	3,200	4,500				721,757
	Production of emerging value chains increased	MT production of fruits	2,364	9,876				7,960,552
		MT production of vegetables	4,836	42,503				8,340,502
		Stem production of flowers	244,720,000	1,795,150,000				110,308,422
	Area planted for emerging value chains increased	Additional HA of fruit production	-	7500				20,399,184
		Additional HA of vegetable production	-	1240				20,929,227
		Additional HA of flower production	-	750				27,577,105
		ha of Mulberry planted	350	5,000				24,971,265,000

3.4 Development of priority value chains: dairy and meat								5,213,289,999
	Revenue for value added products increased	Revenue for milk (USD)	33 m (yr 1)	49 m	Annual reports of NAEB	Partnership in commercial reinforced and New ones created		98,333
		Revenue for meat (USD)	6.1 m (yr 1)	10.2 m	Annual report of BNR			833,333
		Revenue for hides and skins (USD)	5 m (yr 1)	10.7 m				1,358,333
		HL production of milk, processing, storage, Trade and Consumption	196,020 (yr 1)	5,739,858				3,996,000,000
		Modern meat processing plant operational	0	5			5	715,000,000
		Modern Tanneries built and operationalized	1	5			4	100,000,000
		Wool processing plants operational	0	1			5	400,000,000
3.5 Development of priority value chains: Fisheries								46,150,000,000
	Fish production increased	No. of fingerlings production centres installed, equipped and operationalized	1	6			5	46,150,000,000
		MT of fish production	17,000	112,000			95,000	
3.6 Development of priority value chains: Apiculture								1,223,914,931
	Honey production increased	MT of honey produced	3,221	8,695			5,474	1,093,914,931

		Demonstration apiaries	0	8			8	120,000,000
		Modern apiaries	1	30			30	10,000,000
3.7 Agricultural finance								1,008,385,101
	Agricultural sector loans increased	Percentage of loans given to agriculturally related activities	8%	18%	Annual report of BNR	Banking sector responds to opportunities and incentives provided through these programs.		540,851,990
	Access to crop and livestock insurance increased	No. of farmers with crop and livestock insurance	20,236	200,000	MINAGRI report			467,533,111
3.8 Market oriented infrastructure for post-harvest management systems								194 212 500 000
Improved Post-harvest management and Agro-processing promotion	staple crop post-harvest losses Reduced	MT of capacity of storage facilities developed	Metallic Silos: 20,000 MT, Warehouse: 88,100 MT	116,500 MT in total over five years	Annual report of MINAGRI/RAB/TF PHH&S	Private investors respond to opportunities and incentives provided by government for agribusiness.	116,500 MT	14,720,000,000

					Monitoring of District Performance Contracts			
		No. of drying grounds constructed	128	150 additional drying grounds			150 drying grounds	2,100,000,000
	Post harvest equipment and tools distributed to farmers	No. of sheetings, shellers and threshers distributed	39,864 sheetings, 1728 shellers distributed to farmers	200,000 sheetings, 10,000 shellers , 500 threshers distributed to farmers in total over five years			200,000 sheetings, 10,000 shellers , 500 threshers	2,500,000,000
		% reduction of post-harvest losses	22.5% for maize, 15.7% for rice	5% for maize, rice and other crops			5%	92,500,000
	Increased number of processing plants	No. of processing plants constructed	3 rice mills established	1 Irish potato plant built, 1 animal feed plant built			2 processing plants installed	4,950,000,000
	Feeder roads network increased and improved	Km of feeder roads constructed	-	7000			7000	140 000 000 000
		Km of feeder roads maintained		2,985			2,985	29,850,000,000

Programme 4: Institutional Development and Agricultural cross cutting issues								14,227,870,630
4.1 Institutional capacity building								5,309,569,950
	Comprehensive human resource needs assessment and development plan completed	Final report	N/A	Final report completed	Annual report of MINAGRI , MINECOFIN	Political will to strengthen MINAGRI including adjustment of salary structures and stop turn over staff.	Final Report Completed	17,498,250
	Capacity of MINAGRI staff improved	No. of MINAGRI staff who have received training according to the capacity needs assessment disaggregated by sex	N/A	20%			20%	1,512,015,000
		No. of experts recruited and no. of counterparts trained	N/A	Experts recruited according to need, average 5 experts/year with one counterpart for each			25	3,780,056,700
4.2 Decentralization								2,100,360,604

	Increased capacity of para-vets	No. of para-vets who have received training disaggregated by sex	2000	2000 (annual training)	Annual report of MINAGRI	Willingness of actors (central and local government) to collaborate closely.		728,813,417
		No. of animal scientist who have received training disaggregated by sex	NA	100	Monitoring of District Performance Contracts		100	7,288,134
	Capacity of local level agronomists increased	No. of local level agronomists trained disaggregated by sex	416 at sector level and 30 at district level	446 (annual training)				162,420,266
	Community information centres established	No. of CICs established	4	9			9	1,080,000,000
	Understanding of agricultural practices and innovations improved	No. of study tours organized	90	90 (conducted annually)				
	Budget sector support consultations strengthened	No. of meetings organised		5 national level, 20 provincial level			25	121,838,788

4.3 Legal and Regulatory Framework								1,676,255,490
	Consultancy on Policy Actions held	No. of Policy Actions developed	-	-		Policy Actions developed to answer the farmers needs		1,676,255,490
4.4 Knowledge Management, Agricultural Statistical Systems and M&E								3,742,949,803
	Improved data sharing information	Level of Management Information System Framework implementation	-	100% implemented	MINAGRI Report			53,550,000

		No. of crop assessment surveys organized	2 per year	2 per year	MINAGRI reports	Sufficient technical capacity exists for identifying issues and technical experts who can address them, and for following up the work.		3,656,344,831
		No. of Food and Nutrition Security Monitoring System Surveys organized	2 per year	2 per year	MINAGRI and WFP Bulletin			
		No. of Comprehensive Food Security and Vulnerability Analysis and Nutrition Surveys organized	1 per three years	1 per three years	MINAGRI, NISR, WFP reports			
		No. of National Agriculture Surveys organized	1 per five years	1 per five years	MINAGRI, NISR report			
		No. of agricultural joint sector reviews organized	2 per year	2 per year	MINAGRI reports			33,054,973

4.5 Gender and Youth in Agriculture								634,896,229
	Gender Strategy in MINAGRI /Boards /Projects/ Districts strengthened	Level of Gender Strategy implementation	-	100% implemented			100%	634,896,229
4.6 Environmental Mainstreaming in Agriculture								763,838,553
	Enhanced implementation of the Strategic Environment Assessment (SEA) of the agriculture sector.	The level of Strategic Environment Assessment of agriculture sector (SEA) implementation	-	100% implemented (4 Quarterly field visits)	MINAGRI/RAB, REMA reports	Supervision for implementing of the Strategic Environment Assessment.	20	35,025,136
	Increased number of agriculture practitioners with knowledge in sustainable agriculture practices	The number of agriculture practitioners trainined in sustainable agriculture practices	-	2,000 agriculture practitioners			2000	728,813,417

Annex I: Strategic Documents and Consultation List

I.1. Strategic Documents Referenced During Preparation of PSTA III

STRATEGIES, POLICIES AND PLANS

EAC Secretariat. Agriculture and Rural Development Strategy for the East African Community 2005-2030

MINAGRI. Agriculture Gender Strategy 2012

MINAGRI. Animal Genetic Improvement Strategy 2012

MINAGRI. Animal Nutrition Improvement Strategy 2009

MINAGRI. Crop Intensification Programme Strategy 2007

MINAGRI. Fertiliser Strategy 2011

MINAGRI. Feeder Roads Rehabilitation Framework and Common Framework of Engagement 2013

MINAGRI. Master Plan for Fisheries 2011-2020

MINAGRI. Meat Industry Strategy 2012

MINAGRI. Mechanisation Strategy 2013

MINAGRI. National Agricultural Extension Strategy 2009

MINAGRI. National Bee-keeping Strategic Plan 2007

MINAGRI. National Irrigation Policy 2012

MINAGRI. National Post-Harvest Staple Crops Strategy 2011

MINAGRI. National Rice Development Strategy 2011-2018

MINAGRI. National Seed Policy 2007

MINAGRI. Nutrition Action Plan 2013-2018

MINAGRI. Rural and Agricultural Financial Services Strategy 2012

MINAGRI. Rwanda Irrigation Master Plan 2010

MINAGRI. Rwanda National Dairy Strategy 2013

MINAGRI. Rwanda Poultry Strategy 2012

MINAGRI. Small Animal Industry Strategy 2012

MINAGRI. Strategic Plan for the Transformation of Agriculture 2008-2012 II (PSTA II)

MINICOM. National Cross-Border Trade Strategy 2012

MINICOM. Private Sector Development Strategy 2013-2018

MINICOM. Rwanda National Export Strategy 2011

MINRENA. National Forestry Policy 2011

NAEB. National Horticulture Development Strategy 2006 - 2012

NAEB. Revised National Coffee Strategy 2008-2012

NAEB. Revised Tea Strategy 2008

Republic of Rwanda. Economic Development and Poverty Reduction Strategy 2007-2012 (EDPRS I)

Republic of Rwanda. Economic Development and Poverty Reduction Strategy 2013-2018 (EDPRS II)

Republic of Rwanda. National Agricultural Policy 2004

Republic of Rwanda. National Decentralisation Policy 2001

Republic of Rwanda. National Strategy for Climate Change and Low Carbon Development 2011

Republic of Rwanda. Seven Year Government Plan 2010-2017 (7YGP)

Republic of Rwanda. Vision 2020. MINECOFIN. July 2000

REPORTS

European Commission and HTSPE. Analysis of Rwanda's Food Security Information Systems 2012

European Commission. Review of Decentralisation, Soil Protection and Value Chain Development in Rwanda's Agriculture Sector to Inform the Sector Strategy 2013-2017

European Commission. Review of Horticultural Investment Opportunities to Leverage Pro-Poor, Non-Traditional, High Value Commodities under SPAT III 2012

European Union. Strategic Environmental Assessment Report Study Report 2012

IFDC. Crop Intensification Programme (2008-2009) Evaluation Report 2010

IFDC. Privatisation of Rwanda's Fertiliser Import and Distribution System, Work Plan 2012-2015

International Growth Centre, Understanding Rwanda's Agribusiness and Manufacturing Sectors 2012

IPAR. MDG Progress Country Report 2010

MINAGRI, NISR and WFP. Comprehensive Food Security and Vulnerability Analysis and Nutrition Survey (CFSVA) 2009, 2012

MINAGRI. Annual Report 2010-2011, 2011-2012

MINAGRI. Crop Assessments 2010, 2011, 2012

MINAGRI. Sector Wide Approach (SWAp) Group, MoU 2008

MINAGRI. Strategies for Sustainable Crop Intensification, Shifting Focus from Producing Enough to Producing Surplus 2010

MINECOFIN, BNR and RCA. Report on the Assessment of Implementation of Umurenge SACCO Programme 2011

NISR and MINAGRI. National Agriculture Survey 2007, 2008

NISR. Rwanda Demographic and Health survey 2010 (RDHS)

NISR. Third Integrated Household Living Conditions Survey (EICV 3) 2010

RAB. Integrated Watershed Management in Rwanda 2011

UNDP. Status of the Millennium Development Goals (MDGs) in Rwanda 2012

World Bank and PSCBS. Developing Sustainable Public Sector Capacity for Rwanda's Vision 2020: Enhancing Human Resource Management 2012

II.2. Stakeholders Consulted During Preparation of PSTA III

Name	Institution	Name	Institution
Hon. Minister Kalibata	MINAGRI Minister	DDG Telesphore Ndabamenye	RAB
PS Ernest Ruzindaza	MINAGRI PS	John Nzungize	RAB
DG Beatrice Uwumukiza	MINAGRI	Umuhizi Nsabimana Nicolas	RAB
DG Raphael Rurangwa	MINAGRI	Christophe Muhigira	RAB SCBI
DG Sendege Norbert	MINAGRI	Lucy Mwangi	RAB SCBI
DG Theogene Rutagwenda	MINAGRI	Eric Rwigamba	Access to Finance
Caritas Kayilisa	MINAGRI	Megan O'Donnell	ACDI/VOCA/Dexis
Claude Bizimana	MINAGRI	Edward Karangqa	Action Aid
Dr. Charles Murekezi	MINAGRI	Hagenimana Edouard	Agrodealer
Eric Manimpaye	MINAGRI	Britt Granquist	BTC
Faustin Mutabazi	MINAGRI	Raf Somers	BTC
Helen Parker	MINAGRI	Dr Jean Pierre Busogoro	BTC SPAT II
Mutabazi Faustin	MINAGRI	Amy Davis	CHF International
Ntivuguruzwa Telesphore	MINAGRI	Birahagwa Janvier	Commercant
Sylvia Salama Gata	MINAGRI	Tilaye Nigussie	Concern Worldwide
Wilson Rutagamra	MINAGRI	Janvier Afrika	CRS Rwanda
Angelique Uwimana	MINAGRI CICA	Deo Musabyimana	Dutch Embassy
Boutouta Abdellatif	MINAGRI IM TF	Esther Van Damme	Dutch Embassy
Innocent Nzeyimana	MINAGRI IM TF	Marie Nizeyimana	Dutch Embassy
Pacifique Ahishakiy	MINAGRI IM TF	Teddy Muffels	Dutch Embassy
Regis Chiwaya	MINAGRI IM TF	Douglas Kigabo	DIfD
Nickel Mgarambe	MINAGRI LISP	Greg Sullivan	DfID Consultant
Alexis Kabayiza	MINAGRI MIS	Kamarade Juste	ENAS
Bruce Smith	MINAGRI PHHS TF	Diego Zurdo	EU
Francois Nsengiyumua	MINAGRI PHHS TF	Tarik Kubach	EU
Lucia Zigiriza	MINAGRI PHHS TF	Gaetan Heri	FAO
Alfred Mutebwa	MINAGRI SPIU	Laurent Gashugi	FAO
Jean Baptiste Rwigema	MINAGRI SPIU	Jussim Ndumwami	HICDR
Marina Adrianopoli	MINAGRI/ EU	Aimable Ntukanyagwe	IFAD
Christina PioCosta-Lahue	MINAGRI/AGI	Christian Hakiba	IFAD
DG Alex Kanyankole	NAEB	Joseph Gafaranga	IMBARAGA
DDG Corneille Ntakirutimana	NAEB	Pascal Furaha	JICA
DDG Dr Ndame Nzarama	NAEB	Tatsuki Noda	JICA
Epimaque Ndanzabaganwa	NAEB	James Osore	Kenya seed Rwanda
Eric Kabayiza	NAEB	Dennis Karamuzi	Land O Lakes
DG Mbonigaba Muhinda	RAB	Frank O'Brien	Land O Lakes
DDG Christine Kanyandekwe	RAB	Anna Knox	Land Project
DDG Daphrose Gahakwa	RAB	Dr Alfred Bizuza	Land Project

Consultation List Continued

Name	Institution
Ngabonziza Augustin	M.P.F
Alistair Sussock	MINECOFIN
Manish Vasistha	MINECOFIN
Umulisa Yvonne	MINECOFIN
Aimable Rusingizandekwe	MINECOFIN NAO
Christophe Sirikari	MINECOFIN NAO
J Baptiste Ndanyuzwa	NCCR
Cor Oudes	OAF/ Tubura
Ndagijimana Silas	PAFI
Livingstone Byamungu	PSF
Yvette Mukarwemo	PSF
Anicet Taraja Mukizwa	RDB
Henri Michel Tsimisanda	RDB
Immaculee Ugirimbabazi	RDB
Kavutse Emmanuel	RDB
Modeste Nkikabahizi	RDB
Pierre Mutabawuka	RDB
Eugene Rwibasira	RDO
Narcisse Ndagijimana	RFC/PSF
Baguma Anthony	RTC
Havugimana Théodore	RWCCF
Kasaija Banage	Seed Co Rwanda
Laura Johnson	SFSA
Mugwaneza Bélise	SFSA
Paul Luedimann	STAVER
Roger Norton	Texas A and M
Emma Carine Uwantege	UN Women
Eugene Rutabagaya	UN Women
Daya Bragante	UNECA
Mutangana Simon	UNICOOPAGI
Dave Cohen	USAID
Veruste Rusharaza	Wakala EA Cons
Audace Kubwimana	Welthunghilfe
Jan Delbour	WFP
Alice Usanase	World Bank
Mark Austin	World Bank
Valens Mwumvaneza	World Bank

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