



MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES

STRATEGIC PLAN FOR AGRICULTURE TRANSFORMATION 2018-24



Planning for Wealth

June 2018

Acronyms

Agri-TAF	Agriculture Technical Assistance Facility
ALIS	Agriculture Land Information System
ASCBP	Agriculture Sector Capacity Building Plan
ASWG	Agriculture Sector Working Group
BDF	Business Development Fund
BTC	Belgian Technical Cooperation
CAADP	Comprehensive Africa Agriculture Development Programme
CEPAR	Coffee Exporters and Processors Association of Rwanda
CFSVA	Comprehensive Food Security and Vulnerability Analysis
CSA	Climate Smart Agriculture
CSO	Civil Society Organisation
CIP	Crop Intensification Programme
DFID	Department for International Development
DDP	District Development Plans
DRC	Democratic Republic of Congo
EAC	East African Community
ECCAS	Economic Community of Central African States
EDPRS	Economic Development and Poverty Reduction Strategy
EU	the European Union
FAO	Food and Agriculture Organisation of the United Nations
FDI	Foreign Direct Investment
FFS	Farmer Field Schools
GAP	Good Agricultural Practices
GGCRS	Green Growth and Climate Resilience Strategy
GHG	Greenhouse gasses
GIS	Geographic Information System
GPS	Global Positioning System
GoR	Government of Rwanda
Ha	Hectare
IA	Intervention Area
ICT	Information and Communication Technology
INDC	Intended Nationally Determined Contributions
IPM	Integrated pest management

ISFM	Integrated Soil Fertility Management
IWRM	Integrated Water Resources Management
JADF	Joint Agriculture Development Forum
JSR	Joint Sector Review
LODA	Local Development Agency
MTIS	Marketing and Trade Information System
M&E	Monitoring and Evaluation
MoE	Ministry of Environment
ME&L	Monitoring, Evaluation, and Learning
MINAGRI	Ministry of Agriculture and Animal Resources
MINALOC	Ministry of Local Affairs
MINICOM	Ministry of Trade and Industry
MINECOFIN	Ministry of Finance
MIDIMAR	Ministry of Disaster Management and Refugee Affairs (MIDIMAR)
MIFOTRA	Ministry of Public Service and Labour
MINILAF	Ministry of Land and Forestry
MT	Metric Tonnes
MYICT	Ministry of Youth and ICT
NAEB	National Agricultural Exports Board
NAIP	National Agricultural Investment Plan
NAMA	Nationally Appropriate Mitigation Actions
NAP	National Agricultural Policy
NAPA	National Adaption Programme of Action
NFNCS	National Food and Nutrition Coordination Secretariat
NSA	Nutrition Sensitive Agriculture
NST	National Strategy for Transformation
PA	Priority Area
PPD	Public Private Dialogue
PPP	Public Private Partnerships
PSF	Private Sector Federation
PSTA	Strategic Plan for Agriculture Transformation
RAB	Rwanda Agriculture Board
RCA	Rwanda Cooperative Agency
RDB	Rwanda Development Board

REMA	Rwanda Environmental Management Authority
RYAF	Rwanda Youth in Agriculture Forum
RWF	Rwandan Franc
RWFA	Rwanda Water and Forestry Authority
SACCO	Saving and Credit Cooperative
SAS	Seasonal Agriculture Survey
SAIS	Smart Agriculture Information System
SDG	Sustainable Development Goals
SEA	Strategic Environmental Assessment
SIDESS	Sustainable Intensification Decision Support System
SME	Small and Medium Enterprise
SPS	Sanitary and Phytosanitary
SSIT	Small-Scale Irrigation Technology
SSP	Sector Strategic Plan
SSWG	Sub Sector Working Group
S3A	Science Agenda in Agriculture for Africa
USAID	United States Agency for International Development
VHS	Veterinary Health System
WB	The World Bank

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1. EXECUTIVE SUMMARY

Rwanda's Strategic Plan for Agriculture Transformation phase 4 (PSTA 4) outlines priority investments in agriculture and estimates required resources for the agriculture sector for the period 2018-2024. It is the implementation plan of the National Agricultural Policy (NAP) and represents the agriculture sector's strategic document under Rwanda's National Strategy for Transformation.

The PSTA 4 builds on the achievements of the PSTA 3, while envisaging a transformation of agriculture from a subsistence sector to a knowledge-based value creating sector, that contributes to the national economy and ensures food and nutrition security. Throughout the PSTA 4 there is a strong focus on private investments, as it recognises that agriculture growth must be driven by investments of private actors. The PSTA 4 therefore emphasises a stronger role of the private sector, including farmers, with the government becoming a market enabler rather than a market actor. For example, direct government involvement in production, processing and marketing will be reduced. Besides creating an enabling environment, the government will provide public goods, otherwise undersupplied by the private sector, including infrastructure, research, social protection, and emergency response.

Rwanda's main limiting production factor is land. Agriculture growth requires an increase in profits per hectare and capture of productivity gains along the value chain. To raise profits per hectare means increasing agricultural yields and switching to higher value agricultural commodities, such as horticulture, vegetable, poultry, pork, and fisheries. PSTA 4 focuses on facilitating private sector investment in fruit and vegetable production through upgrading provision of SPS/quality standards as well as supporting demonstration of better technologies such as green houses, hydroponics, and other small-scale irrigation solutions.

As changes in weather and climate patterns are becoming more acute, PSTA 4 seeks to build resilience through on-farm measures and enable actions to increase productivity. PSTA 4 emphasises alternative land management to complement terracing with comprehensive climate smart soil and integrated watershed management. PSTA 4 also introduces better weather and climate information and early warning, and seeks to ensure all investments are climate smart.

Markets and value chain development play a central role in driving the transformation of the Rwanda's agriculture sector. This requires investments and inputs from a broad range of private actors and stronger linkages between market-oriented production systems and efficient end-markets. Priority will be given to attract investment to enhance market-oriented production and aggregation while reducing post-harvest losses.

Despite impressive growth in agriculture production over the past 10 years, food security and nutrition remain concerns. PSTA 4 adopts a food systems approach for enhanced nutrition and household food security. It proposes approaches and interventions to ensure the nutrient quality of commodities is preserved or enhanced throughout the entire value chain. In addition, resilience and risk mitigation strategies will continue to be developed, particularly at the household level.

Agriculture transformation will require research and innovation - introducing new crop varieties, disease mitigation, etc. – as well as farmers' knowledge and skills to support specialization, intensification, diversification, and value addition. ICT is promoted to increase the impact of extension and improve market information, service delivery, financial inclusion, climate risk adaptation, and farmer feedback. Farmer's organizations are strengthened to exert their bargaining power and provide services to their members in developing modern agri-businesses. In order to reach more women, and thus generate rural jobs and income, skills development and incentives for agribusiness entrepreneurship will be fostered.

The PSTA 4 is designed to achieve four strategic impact areas that are in accordance with the CAADP framework. Namely, A) Increased wealth contribution; B) Increased Economic Opportunity; C) Improved Food Security; D) Increased Resilience. Impact will be measured by 8 specific indicators presented in the table below.

No	INDICATOR	Unit	BASELINE	TARGET	TARGET	TARGET	TARGET	TARGET	TARGET
			2016/17	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Increased Contribution									
A1	Percentage of agricultural production growth measured by production volumes and fixed 2014 prices	Per cent growth	TBD from 2017 Agricultural Survey	10%	10%	10%	10%	10%	10%
A2	Export value: 356 (Million USD)	USD Million	378	403	432	461	501	537	
Increased Economic Opportunity									
B1	Rural Households living below poverty line (gender disaggregated)	Per cent	43.3%	39.0%	34.7%	30.3%	25.9%	21.6%	17.0%
B2	Number of jobs related to agriculture compared to baseline (gender disaggregated)	Number	N.A.	60,000	120,000	180,000	240,000	300,000	360,000
B3	Average income per smallholder farming household (gender disaggregated)	Annual income growth for small holder farmers (real RWF)	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%	3.7%
Improved Food Security									
C1	Percentage of food insecure households	Per cent	20%	19%	18%	16%	14%	12%	10%
C2	kcal production per capita	kcal production per capita	1,934	2,180	2,340	2,525	2,764	2,919	3,094
Increased Resilience									
D1	Share of agriculture land under Sustainable Land Management practices	Per cent	56%	60%	64%	68%	73%	78%	83%

To achieve the envisioned impact, PSTA 4 is structured around 4 Priority Areas.

Priority Area 1: Innovation and Extension provides the knowledge base for Priority Area 2 and 3. The focus is on improving agronomic knowledge and technology in terms of basic research and innovation, especially aimed at developing improved varieties and breeds. Innovative projects will be promoted through PPPP and developing innovative networks and beneficial partnerships with research institutions and the private sector. Such PPPP are the planned tools for developing land for green house testing facilities and for testing hydroponics and well as promoting private sector providers of extension services.

Priority Area 2: Productivity and Resilience focuses on promoting sustainable and resilient production systems for crops and animal resources. This component of the strategy contains heavy investment in improving land productivity and animal production. Significant investment will go into irrigation with plans to increase the irrigated areas from 48,508 ha to 102,284 ha. Moreover, there will be a continued focus on fighting land erosion with radical terracing going from 110,906 ha to 142,500 ha and progressive terraces from 923,604 ha to 1,007,624 ha. Finally, biological soil control measures will be promoted to protect another 150,000 ha by 2024. Furthermore, fertilizer usage is planned to go from 39 kg/ha providing access to improved seed utilization to 75% of farmers. To increase animal production, there will be a focus on animal feed production through PPPs, and animal health through enhanced access to veterinary services and vaccinations. Furthermore, a national registry for livestock will be established. For fisheries and aquaculture, the focus will lie on feed and fingerlings production. To increase animal production, social security, and mitigating protein deficiency at the household level, the Girinka model will be extended to include small-stock animals: 5,400,00 chickens and 1,250,000 pigs are to be distributed alongside 189,000 cows. Finally, nutrition sensitive agriculture will be promoted through mainstreaming in programmes as well as increasing kitchen garden and school gardens and promoting the production and consumption of highly nutritious fruits and vegetables.

Priority Area 3: Inclusive markets and value addition seeks to improve markets and linkages between production and processing. This includes key input markets such as fertilisers, insurance, and finance as well as upstream activities such as aggregation, promotion of value addition, market infrastructure and export readiness. In collaboration with the private sector through productive alliances, this strategy envisions the establishment of hard and soft infrastructure along the value chains. This includes, for example, to increase storage facilities from 295,495 MT to 350,431 MT, to establish 240 drying grounds and 40 local cold room facilities, and to promote a fully operational cold-chain. Specifically to dairy, the GoR envisions that fully functioning Milk Collection Centres will increase from 56 to 77 over the strategy period. Emergency food storage facilities should increase from 184,814 MT to 260,052 MT by 2024. Moreover, market information is to be endorsed through e-soko plus. Market access for farmers is to be promoted through enhanced analysis for marketing, but more so, through promotion access to standards and SPS certification. Finally, innovative products for agricultural insurance and finance will also be supported.

Priority Area 4: Enabling Environment and Responsive Institutions provides the regulatory framework by defining and coordinating public sector involvement. PSTA 4 aims to improve evidence-based policymaking through better collection and handling of information and enhanced capacity for analysis and policy development. To improve the planning process, coordination between stakeholders will be addressed. This will primarily require organisational reform, to enhance the capacity to deliver on the strategy and moving the institutional focus from market actor to market enabler. For example, the strategy envisions a study to development mechanisms for funding agriculture, which serves to increase public private partnerships and incentives to invest in delivering the strategy. Moreover, enhanced focus will lie on policy analysis and enhancing capacity to gather information and convert it to evidence-based policy. New technologies such as satellite imagery and electronic farmer feedback will be applied to collect information. Agri-PPD will be promoted at local level, the central level as well as coordinated closely with partner organisations in the GoR and external stakeholders. Finally, there will be increased focus on external communication both to enhance the profile of the sector as well as to ensure accountability toward stakeholders on delivering each goal of this strategy.

Costing of each components over the 6-year period is expected to be:

Priority Area	Outcome	Costs (RWF bn.)
1. Innovation and Extension	Technological upgrading, capacitated farmers and rural value chain actors are able to make informed decisions and profitably engage in off-farm activities	399
2. Productivity and resilience	Increased productivity, nutritional value and resilience through sustainable, diversified, and integrated crop, livestock, and fish production systems	1,708
3. Inclusive markets and value addition	Improved productivity and inclusiveness of agricultural market systems and increased value addition and competitiveness of diversified commodities for domestic, regional, and international markets	528
4. Enabling environment and responsive institutions	Effective and efficient public and private sector services in the agriculture sector	140
Total		2,777

The private sector can contribute to the strategy in areas where there is a positive expected financial return. Through incentives and partnerships, they are expected to contribute with 15% of the total PSTA 4 investment envelope, increasing their share from 1% in the first year to 28% in the final year.

A Computerised General Equilibrium model suggests that with full implementation of the strategy, average economic growth would be 10% per year and the poverty rate could drop from 39.1% to 15% over 6 years. In contrast, if funding stays similar to the recent past, growth is expected to be 4.4% per year and the poverty rate would fall to 21.8% by 2024.

Though the PSTA 4 is a holistic strategic plan for the agriculture sector, which goes beyond the scope of Ministry of Agriculture and Animal Resources (MINAGRI), the costing of PSTA 4 includes only public capital investments associated with activities led by MINAGRI, its associated agencies and the private sector.

MINAGRI is the leading institution to deliver on the implementation of the four priority areas of PSTA 4 in partnership with its agencies, concerned line ministries, districts, and the private sector (including farmers and their organization). Collaboration with local governments is essential for successful implementation of various activities.

Given the multi-sectoral nature of the agriculture sector, there are clear strategic overlaps and complementarities with other sector ministries and institutions. PSTA 4 seeks to increase the capacity of MINAGRI to cooperate and coordinate with these institutions, moving towards joint planning and budgeting, as well as better information on implementation and impact through enhanced data collection. Furthermore, PSTA 4 promotes a strengthened dialogue with relevant civil society organisations in the agricultural space – especially representing farmers, youth, consumers, and private sector organisations.

The Monitoring and Evaluation (M&E) system of PSTA 4 has a dual objective of capturing the transformational strategic outcomes, as well as capturing lower-level outputs and interventions. Therefore, the PSTA 4 has a two-tiered monitoring structure: A Strategic Results Framework and a Linked Operational Framework. The overall responsibility for M&E of PSTA 4 lies with MINAGRI.

2. INTRODUCTION

2.1 NATIONAL POLICY CONTEXT

PSTA 4 is the Sector Strategic Plan for Agriculture under Rwanda’s National Strategy for Transformation (NST 1)¹. It will guide public investments in agriculture during the period 2018-24 and sets out the estimated required resources for the agriculture sector in those 6 years, contributing to the three NST Pillars of economic, social, and governance transformation toward the aspirations of Vision 2050. Under this vision, Rwanda aspires to attain upper middle-income country status by 2035 and high-income status by 2050 with the intention of providing high quality livelihoods and living standards to Rwanda citizens. Vision 2050 stresses the importance of agro-processing and technology-intensive agriculture with a commercial focus under its Pillar III: Transformation for Prosperity.

Furthermore, the PSTA 4 is an implementation plan under the National Agricultural Policy (NAP), which sets the policy framework for a productive, green, and market-led agriculture sector towards. The NAP responds to the rapid changes experienced in the sector and anticipates key trends and concerns including pressure on land, the need to feed the cities², the absorption of rural youth into the labour market and the need to raise productivity of smallholder farmers. In addition to the overarching policy documents, the PSTA 4 considers a range of agriculture subsector policies and strategies. For example, the more recent National Agribusiness Investment Promotion Strategy (2017); National Feeder Roads Policy and Strategy (2017); National ICT for Agriculture Strategy (2016-2020); and the National Fertilizer Policy (2014).

PSTA 4 encompasses agriculture development activities across all relevant institutions and implementing agencies. While MINAGRI and its implementing agencies RAB and NAEB play the central role, other institutions hold significant mandates under this strategy. PSTA 4 is therefore a guiding document for stakeholders beyond MINAGRI and its agencies, as reflected in the focus on joint planning and budgeting for PSTA 4 implementation. This strategy is built on achievements and introduces new ways of improving crop and animal resources productivity and production to increase wealth in the agriculture sector.

2.2 INTERNATIONAL POLICY CONTEXT

At the continental and regional level, the PSTA 4 constitutes Rwanda’s commitment to the African Union’s Comprehensive African Agriculture Development Programme (CAADP). Under this framework, the Malabo Declaration 2014³ sets specific targets on the agriculture sector’s contribution to economic growth, economic opportunities, nutrition and food security, and resilience. Moreover, the Malabo Declaration emphasises private sector involvement and inclusive public-private partnerships.

PSTA 4 targets the achievement of the Sustainable Development Goals related to agriculture, and Rwanda is strongly committed to hosting the SDG Centre for Africa⁴. The agriculture sector will contribute to the achievement of several SDGs, particularly: SDG 1 (end extreme poverty), SDG 2 (zero hunger, improved nutrition, and sustainable agriculture), SDG 8 (decent work and economic growth), SDG 13 (climate action) and SDG 15 (terrestrial ecosystems, forests, and land);

Moreover, the PSTA 4 aligns to the EAC Vision2050 of Increased investment and enhanced agricultural productivity for food security and a transformation of the rural economy.

Through its Intended Nationally Determined Contributions (INDCs) on agriculture⁵, Rwanda is backing its commitment to the 2015 Paris Climate Change Declaration.⁶ Moreover, the planned project interventions are closely aligned with the

¹ The NST follows the Economic Development and Poverty Reduction Strategy 2 (EDPRS 2, ending in June 2018) and will implement the last years of Vision 2020 and the first four years of the Vision 2050.

²The NST targets urbanization to reach 35% by 2024 from 17.3% in 2014.

³ <https://au.int/en/documents/31247/malabo-declaration-201411-26>

⁴ sdgcafrica.org/

⁵ Rwanda communicated its INDCs to the United Nations Framework Convention on Climate Change on 26 November 2015.

⁶ A multilateral agreement that sets out a global action plan to avoid dangerous climate change by limiting global warming below 2°C.

national priorities for low-emission and climate-resilient development. The National Adaptation Plan of Action (NAPA) submitted to the UNFCCC in 2007 articulates Rwanda’s strategy to reduce vulnerability to climate change particularly from the main climatic hazards. The main NAPA priority addressed by the proposed project is the promotion of “non-agricultural income generating activities” which is considered critical to strengthen resilience of rural communities to climate threats. Moreover, Rwanda’s NAMA (2015) established an institutional, legal and policy framework for Nationally Appropriate Mitigation Actions (NAMAs). Finally, PSTA 4 furthers Rwanda’s goal, as part of the Common Market for Eastern and Southern Africa (COMESA), to expand regional market opportunities thereby aiding trade and agricultural growth.

2.3 METHODOLOGY AND FORMULATION PROCESS OF PSTA 4

To build ownership and future commitment to the plan, the PSTA 4 formulation process involved a broad array of public and private actors, including farmers’ organisations, Private Sector Organisations, and Civil Society Organisations.

A Taskforce was established under MINAGRI leadership to guide the development of PSTA 4, including membership from RAB and NAEB and a nucleus of Development Partners (EU, FAO, World Bank, DFID, and USAID). Technical support was provided by FAO, through an EU grant, with support from Agri-TAF⁷. The broader Agriculture Sector Working Group (ASWG) was consulted regularly and development partners provided inputs and recommendations throughout the process.

Between April and June 2017, stakeholder consultations took place to form the design and results framework of PSTA 4. These included: a national consultative workshop on PSTA 4 with agricultural CSOs, a civil society analysis of the agriculture sector budget 2017/18, a consultation of beneficiary communities report by International Alert in partnership with *Pro-Femmes Twese Hamwe*, and private sector public private dialogue event.

In June, a three-day Knowledge Seminar was held in Kigali, bringing together hundreds of individuals and organisations with national and international expertise and experience⁸ to inform the development of this strategy. As a next step, workshops were held internally with MINAGRI and its implementing agencies as well with key sector ministries and agencies, to consult, coordinate further define interventions, activities, and results framework of PSTA 4.

PSTA 4 inputs were also proposed by the gender, environment and climate change agriculture sub-sector working groups. An expert group on nutrition-sensitive agriculture provided valuable inputs on nutritional analysis and mainstreaming. A private sector dialogue, including farmer organizations, was held in October 2017 to validate the draft document and provide final feedback. In November 2017, the PSTA 4 document was approved by the ASWG and used for the 2018/19 planning cycle. Following this internal validation, and the NEPAD Independent Technical Review, the PSTA 4 was finalized in January 2018.

⁷ Ref Agri-TAF

⁸ http://www.minagri.gov.rw/index.php?id=469&L=0&tx_ttnews%5Btt_news%5D=1501&cHash=d5c3dfb8e7e4cdab49d16f61650d126a

3. SOCIO-ECONOMIC CONTEXT

3.1 AGRICULTURE SECTOR PERFORMANCE

3.1.1 NATIONAL DEVELOPMENT AND THE ROLE OF AGRICULTURE

Rwanda is on a transformation path from a low-income to a middle-income country. Between 2000 and 2016, Rwanda's economy grew by 7.9 per cent per year on average, so that by 2016 it was more than 3.5 times larger than in 2000⁹. In the same period, GDP per capita increased from \$242 to \$729¹⁰, and the poverty rate¹¹ fell from 60.3 to 39.1 per cent¹². Life expectancy at birth has increased from 48.2 years in 2000 to 64.5 years in 2015¹³, while the child mortality rate dropped from 183/1000 to 42/1000¹⁴. The youth literacy rate increased from 77 per cent in 2010 to 85 per cent in 2015¹⁵. Financial inclusion increased from 48 per cent in 2008 to 89 per cent by 2016¹⁶, while mobile phone ownership increased from 6 per cent to 65 per cent between 2006 and 2014¹⁷. Exports have seen rapid growth from a low base, with 13.2 per cent growth p.a. between 2000 and 2016, while imports grew on average by 10 per cent p.a.¹⁸, such that imports and exports increased their combined share of the economy from 31 to 48 per cent.¹⁹

As Rwanda modernises into a knowledge-based economy, agriculture remains the backbone for sustained economic growth, providing high quality livelihoods, and living standards for the population. The historical experience from Western Europe, the United States, Japan, and later in Taiwan, South Korea, China, and India, suggest that agricultural development was the precursor for subsequent industrial and service-based growth²⁰. Arguably, agricultural surplus underpinned human development and economic factors necessary for subsequent economic and social development²¹. In this perspective, Rwanda's agriculture is central for creating growth, jobs, exports, and livelihoods necessary to transform the economy to a knowledge based middle-income economy.

3.1.2 CONTRIBUTION TO ECONOMIC GROWTH

With 5.3 per cent average annual growth, the agriculture sector has more than doubled in value from 2000 to 2016 (Table 1). The period of highest growth was 2008 to 2012, while growth has slowed since 2013. Food crops is the dominant sub-sector accounting for 58 per cent of the sector in terms of GDP contribution, followed by Forestry (21 per cent of total), Livestock (12 per cent), traditional export crops (7 per cent), and Fishery (1 per cent)²². All sub-sectors are currently

⁹ NISR, National Accounts (2016)

¹⁰ Ibid.

¹¹ The NISR Rwanda Poverty Profile Report (2015) based on EIVC 4 data defines the poverty rate as the share of the population whose total consumption is below the total poverty line (RWF 159,375 in January 2014 prices of which RWF 105,034 is for food items). Poverty is defined as the share of the population that cannot afford to buy a basic basket of goods (food and Non-food).

¹² NISR, EICV 1-4

¹³ World Bank Indicators: http://data.worldbank.org/indicator/SP.DYN.LE00.IN?locations=RW&name_desc=true

¹⁴ Ibid.

¹⁵ Ibid

¹⁶ NISR, FinScope (2016) financial inclusion is defined as access to formal financial institutions and the uptake and usage of financial products and services.

¹⁷ NISR, EICV4

¹⁸ NISR, National Accounts 2016, resource balance

¹⁹ Ibid.

²⁰ The World Bank: World Development Report 2008: "Agriculture for Development".

²¹ Ibid.

²² NISR, National Accounts (2016)

growing. Food crops saw an immediate growth spurt with the introduction of the CIP programme in 2008, after a period of lower growth. However, recent years have seen a slight decline in the food crop growth rate. Export crops have seen average growth of 3.8 per cent p.a. between 2000/2016, marked by high year-to-year volatility due to global price variations in the dominant crops, tea, and coffee. Livestock has seen accelerating growth with an average of 5.2 per cent p.a. and is currently the fastest growing sub-sector, growing 8.3 per cent p.a. between 2012 and 2016.

Table 1: Average annual Growth in Agricultural Sub-sectors (% p.a.)²³

Sub-sector	2000-2004	2004-2008	2008-2012	2012-2016	Average 2000-2016
Food crops	5.5%	4.9%	6.6%	4.7%	5.4%
Export crops	12.9%	-1.4%	1.8%	2.3%	3.8%
Livestock & livestock products	4.8%	3.6%	4.2%	8.3%	5.2%
Forestry	8.7%	5.9%	2.9%	3.4%	5.2%
Fishing	5.3%	1.5%	1.4%	3.9%	3.0%
Total	5.9%	4.6%	6.0%	4.7%	5.3%

3.1.3 CROP PRODUCTION AND PRODUCTIVITY

Total cultivated land was 1,371,602 ha during Season A and B in 2016²⁴. Crop yields increased significantly with the start of the CIP in 2007 and the beginning of land consolidation²⁵ in 2008. Total production quantity for CIP priority crops grew by more than 150 per cent between 2007 and 2013 in CIP supported plots, and yields of all the targeted commodities improved.²⁶ Additional gains since 2013 have been harder to achieve: while a few crops are currently performing above their 2013 level (paddy rice and climbing beans), most priority crop yields in 2016 were similar to the 2013 level (Figure 1)

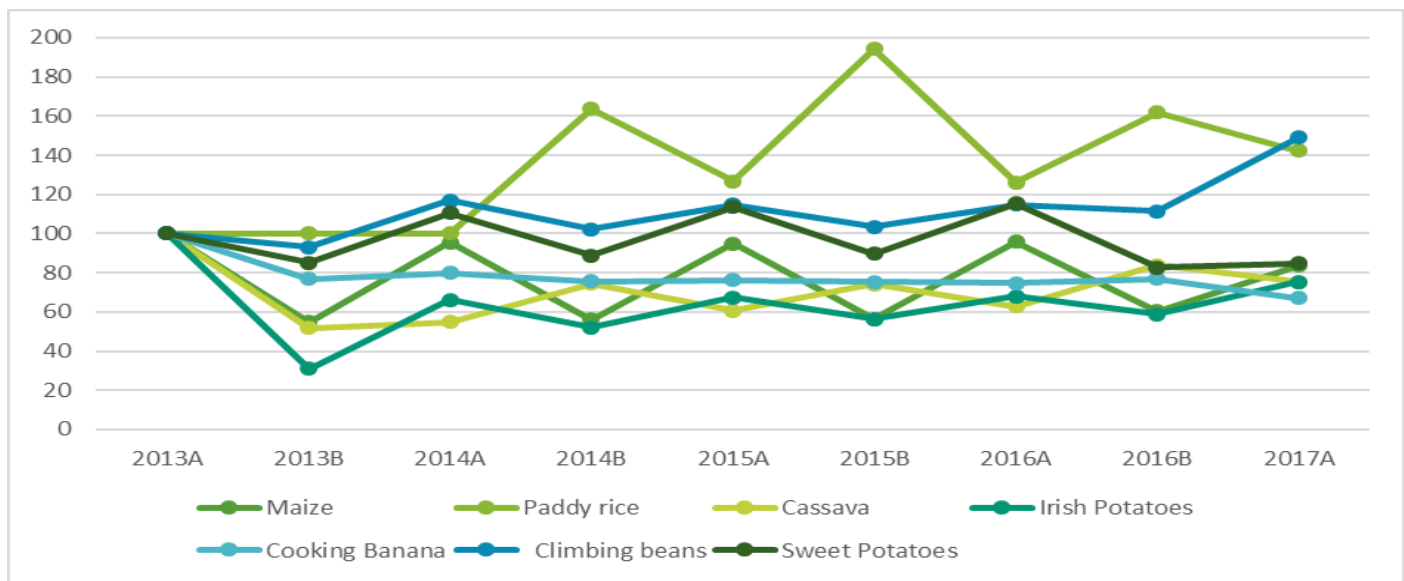
²³ Calculation based on NISR, National Accounts

²⁴ NISR, Seasonal Agricultural Survey, 2016

²⁵ Land consolidation implies that farmers voluntarily put together their farms, produce certain crops of their choice and are linked with agro processors through for example contract farming arrangements. The role of the government focuses on developing and implementing conducive policies, strengthening farmers to make good choices, and making sure contract farming agreements are respected. Once farmers consolidate their plots and become organized into cooperatives, PSTA 4 foresees to provide support in acquiring productive and modern assets and equipment. It should be noted that farmers will continue to have rights on their lands and that no one will force them to consolidate their farms.

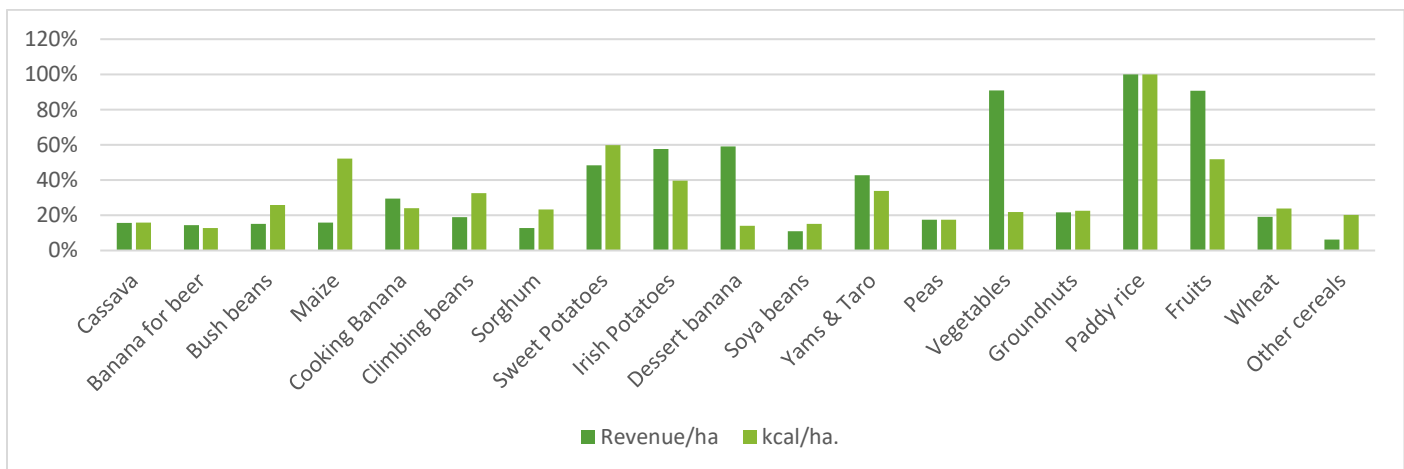
²⁶ MINAGRI Data

Figure 1: Yields development for selected crops 2013A-2017A (2013A = 100) ²⁷



Based on data from 2014-2017, paddy rice has been the best performing crop in terms of revenue per hectare (in e-soko consumer prices) and kcal per hectare²⁸ (Figure 2) followed closely by fruits and vegetables in terms of revenue per hectare. Other high performing revenue crops are dessert banana, sweet potato, and Irish potato. For kcal per hectare, the top performers after paddy rice are sweet potato, maize, fruits, and Irish potato.

Figure 2: Crop revenue and kcal/ha 2016²⁹



3.1.4 ANIMAL RESOURCES PRODUCTION

The thrust of recent policy and investment has been to raise livestock productivity by increased adoption of improved breeds. Rwanda has made efforts to reduce the number and proportion of local cattle compared to cross breeds, for

²⁷ Seasonal Agricultural Survey 2013A-2017A

²⁸ Rice is only suitable for limited wetland areas. Moreover, it may not be the most competitive crop considering cheaper rice available from Asian countries

²⁹ Yields are averages from 2014-2017 from NISR Seasonal Agricultural Survey; Prices to calculate revenue are from e-soko 2016, kcal/kg are from NISR, Household Survey (Poverty Profile report)

example through introducing cross-breed cows through the Girinka programme. Productivity gains through improved breeds can be substantial, as evidenced by the fact that the contribution of local cattle breeds to total milk production is only 9 per cent, though they represent 43 per cent of the national cattle herd. However, breed improvements need to be backed by complementary investments such as in animal feed, feeding practices and animal health.

Forty-six per cent of the meat comes from cattle while 21 per cent comes from pigs³⁰. However, the numbers and importance of pigs, poultry, and goats have been increasing. Given that small-stock is less feed-intensive, they are expected to have higher growth potential in the future³¹. Sixty-eight per cent of the chicken meat now comes from specialized broilers and layers, while 66 per cent of the eggs come from specialized layers. The improved breeds for both chicken and cattle have achieved an annual proportion of 19 per cent and 16 percent respectively and are expected to grow further³².

In 2016, fisheries and aquaculture contributed approximately RWF 23 bn to GDP³³. Capture fisheries was about 25,013 MT while aquaculture was 1,579 MT³⁴. Volume production in aquaculture has been growing by about 16 per cent p.a. over the past four years and substantial growth is expected in the coming years. About 20 aquaculture concessions are currently under implementation for the coming 3 years, which are expected to increase volume production to about 15,000MT by 2021³⁵. Moreover, three fish-feed factories are under construction, which are expected to address the main inhibiting factor on aquaculture growth. A comprehensive feasibility study estimates that production in aquaculture could increase to 95,000 MT over 5 years with public investments of about RWF 5.8 bn and private investment of RWF 12.7 bn³⁶. Capture fisheries have been growing by about 2 per cent in volume per year, over the past 4 years³⁷. Further growth is contingent on restocking lakes and preventing overfishing.

3.1.5 AGRICULTURE CONTRIBUTION TO FOOD SECURITY AND NUTRITION

Despite substantial growth in agricultural production over the past 10 years, food security and nutrition remain concerns, especially when looking at the vulnerability to shocks at the household level. Consequently, food security and nutrition are important areas for which agriculture can accelerate its efforts. While stunting and undernourishment have been reducing at a steady pace, overall stunting rates remain high by international comparison (38 per cent)³⁸, and 17.8 per cent of 6-23 month-olds do not meet the Minimum Acceptable Diet³⁹. By the CARI measure, 20% of Rwandan households are food insecure⁴⁰. The Food Consumption Score has improved from 65 per cent in 2006 to 74 per cent by 2015⁴¹, but a large share of the population remains dependent on rain-fed agriculture and auto-consumption. Hence, people's ability to adequately feed themselves is vulnerable to shocks to the domestic harvest, such as periodic droughts and floods⁴². Maintaining food security requires designated safety nets, such as a strategic grain reserve. This would help align actions for short term seasonal food assistance and long-term resilience strategy, like the distribution of small stock to most vulnerable households which have tiny plots. Primarily, agriculture plays the role of availing food through ensuring that

³⁰ MINAGRI, Livestock Masterplan (2017)

³¹ Ibid.

³² Ibid.

³³ NISR, National Accounts (2016)

³⁴ MINAGRI statistics

³⁵ MINAGRI/RAB

³⁶ RAB (2015) "Feasibility study on the development of aquaculture and fisheries project in Rwanda: Fisheries and aquaculture development project (FADP)" (investment in 2015 prices).

³⁷ MINAGRI statistics

³⁸ NISR, Rwanda Demographic and Health Survey (2014/2015)

³⁹ Ibid.

⁴⁰ NISR, Comprehensive Food Security and Vulnerability Assessment (CFSVA), (2015)

⁴¹ Measured by the percentage of households that had an "Acceptable" Food Consumption Score in the CFSVA (2015)

⁴² Ibid.

production meets the diverse dietary needs of the population. Indeed, macro, and micro nutrients are both essential for good nutrition. Despite the growth in production over the past 10 years, staple food production remains below the targeted consumption and is compensated by importation. It is estimated that the national production of kilo calories from crops currently stands at 1950kcal/person/day⁴³, while the official food poverty line is defined as access to 2500kcal/person/day⁴⁴.

Secondly, agriculture plays an indirect role with respect to food accessibility, stability, and use. Agricultural production is a determinant for farmers' incomes and their access to food. Rural households that produce a greater number of different types of food have a better diet, on average⁴⁵. Opportunities to introduce more diversified household production exist for the most easily available sources of protein, such as eggs and fish (the least resource intensive sources of animal proteins apart from algae and insects) and for fruits and vegetables. A study undertaken by CRS⁴⁶ shows that home garden produce, for example from kitchen gardens, is primarily consumed at the household level, rather than sold. Furthermore, home gardening is a useful source of income through the sale of surplus production.

In addition, well-functioning food commodity markets are an important factor to secure favourable prices for consumers and farmers. However, relatively large price differences in markets across the country⁴⁷ indicate current inefficiencies in food commodity markets, and hence untapped potential gains of trade for consumers and farmers alike.

3.1.6 AGRICULTURE EXPORTS

Agriculture plays a central role in traditional exports and can also be a fruitful area for export diversification. In 2016, exports of agricultural and agro-processed goods were about \$252 million, roughly 52 per cent of total goods exports (formal and informal) (Figure 3). About 65 per cent of agricultural exports are formal and 35 per cent derive from informal cross-border trade, mainly with the Democratic Republic of Congo.

Figure 3: Exports composition 2016⁴⁸

	USD million	Percentage
Formal agriculture	135	28%
Formal agro-processing	30	6%
Other formal	210	43%
Informal Agriculture	57	12%
Informal Agro-processing	30	6%
Other informal	26	5%
Total	488	100%

In 2016, formal exports continued to be dominated by coffee and tea, representing respectively 35 and 39 per cent of formal exports by value. Agro-processing exports (predominantly milled products) constituted 18 per cent of formal exports. Other agriculture exports were predominantly vegetables, with flowers emerging as a new commodity.

⁴³ Calculations based on NISR, Season Agricultural Survey 2016; and NISR, Population Census Projections 2012.

⁴⁴ NISR, EICV4, Poverty Profile Report

⁴⁵ FAO MAFAP (2017) Measuring the impact of land consolidation on consumption patterns and nutrient availability: evidence from Rwanda

⁴⁶ Catholic Relief Services (2016) To Consume or to Sell: A mixed-methods study on household utilization of home garden produce in Muhanga and Karongi Districts in Rwanda

⁴⁷ MINAGRI, E-soko data 2016. For instance, over the course of 2015, the median price of fresh milk in Rutsiro District was 137 per cent below the median price in Rusizi District while median prices of Irish potatoes were roughly 50 per cent lower than in Rusizi District. These figures are medians over the year, hence disregard short-term local price shocks.

⁴⁸ BNR, Formal Exports and Informal Cross-Border Trade Statistics

Export diversification beyond traditional coffee and tea is essential for improving resilience against international commodity price shocks. The Government is promoting non-traditional export crops such as horticulture and animal products. To tap into international markets, it will be important to increase the scale of production both through private investment and through improving market linkages and logistics services, as well as the volumes and quality of supply from small-scale producers. Additionally, informal cross-border trade remains an opportunity for further export diversification, offering established supply chains and fewer requirements for market access.

3.1.7 AGRICULTURE AND JOB CREATION

In line with the Vision 2020, there is an on-going structural shift in the economy from subsistence agriculture towards non-farm sectors. To this end, the share of agriculture in employment has decreased from 88.6 per cent in 2001 to 68 per cent by 2014. The majority of the labour force in agriculture is composed of independent farmers (65 per cent), while hired wage farmers represent 35 per cent. Women constitute 66 per cent of the agricultural work force.⁴⁹ In general, men occupy more paid jobs in agriculture (25 per cent) than women (19.7 per cent), while there are more women (42.1 per cent) than men (40 per cent) in paid non-farm employment⁵⁰.

The 2016 Seasonal Agriculture Survey notes that the majority (26.1 per cent) of farming households in Rwanda were headed by a person in the age group of 55 years and above; and that women are overrepresented in this age group. At the same time, farming remains the single largest source of employment for young people. More than 50 per cent of the rural youth (16-24 years) are still working exclusively in agriculture today, and many of them are under-employed due to small farm size⁵¹ and the seasonality of labour demands.

Beyond agriculture, the agri-food system provides employment for traders, input and service providers, and other interlinked sectors. Most new jobs are generated off the farm as well as outside the agri-food system in general,⁵². Over the period 2011 – 2014, business establishments in Rwanda overall increased by 24.4 per cent. In rural areas, the increase was 38.1 per cent compared to 7.3 per cent in urban areas. During the same period, 34.5 per cent of new jobs were created by businesses (47.9 per cent in rural areas compared to 22.4 per cent in urban areas).⁵³

3.1.8 EFFECT ON EMPLOYMENT

Decelerated job creation in agriculture is part of the ongoing the structural transformation from subsistence-farming toward off-farm sectors and increased mechanization in agriculture. With higher productivity in agriculture, relatively less labour will be required in agricultural production. Increased yields will have different effects on employment in various crop-varieties. For example, with the projected productivity effects, export crop production will employ 20 percent more labourers, rice and wheat 30 – 40 percent more labourers, and livestock sector 30 percent more labourers. On the other hand, tubers and banana production will employ 20 percent fewer labourers. However, in general productivity growth cause decelerated creation of on-farm jobs.

On the other hand, increased agricultural production generates jobs along the agricultural value chains and in the wider economy: increased agricultural production leads to more jobs in food processing, food trade, and food preparation. It will also (all else equal) put downward pressure on the price of food, which in turn have positive effect on job-creation in the non-farm economy.

⁴⁹NISR, EICV 4

⁵⁰ Ibid.

⁵¹ Ibid.

⁵² Michigan State University (2016) Agri-food Youth Employment and Engagement Study

⁵³ NISR, EICV 4

Consequently, in the PSTA 4 scenario⁵⁴ with significant productivity growth in agriculture, it is projected 45,000 jobs will be created within the agri-food system and this number represents 21% of the jobs projected in NST1; 214,000 jobs per year. Further, of the jobs in agri-food system, 28,000 jobs will be created in agricultural production, while the remaining 17,000 jobs will be created in the agriculture-linked value chains: agro-processing, agro-inputs, trade in agri-products, and hotels& restaurants using agro-products) as depicted in the below table.

Table 2: Annual job creation resulting from PSTA 4

Sector	000 Jobs per year
Agri-food system	45
Agriculture	28.3
Agro-processing	5.1
Agro-inputs	0.8
Trade in agr. Products	10.3
Hotel & restaurants using agro-prod.	0.4

3.1.9 IMPACTS OF CURRENT CLIMATE VARIABILITY AND CLIMATE CHANGE

There is an increasing impact of Climate Change on agricultural performance. Rwanda has a relatively moderate climate, with average annual temperatures of around 20°C. The country has two rainy seasons (with two dry seasons in between) and average annual rainfall of 1,250 mm. However, there are large differences across the country with cooler, mountainous regions in the north, and warmer, low-lying south-western valleys and drier Eastern flatlands. There is also a strong discrepancy in rainfall from west to east. Rwanda experiences high year-to-year differences in rainfall and is affected by El Niño - Southern Oscillation (ENSO) events (El Niño and La Niña). Consequently, the country experiences periodic floods and droughts.

Agriculture is dominated by small-scale, subsistence, rain-fed farming, relying on traditional technologies and practices, which renders the sector vulnerable to rainfall variability. According to the 2015 SAS, in season A and B⁵⁵, between 1.1% and 1.5% of all agriculture operators practiced irrigation, while the shares for large-scale operators was between 24% and 28% during season A and B. Moreover, the combination of rain dependent small-scale agriculture, high rainfall levels, and steep hillsides also leads to very high soil erosion rates. The livestock sector is furthermore affected by drought, which limits the availability of water and feed particularly in the east and parts of the south, and increases vulnerability to diseases. Production losses to the dairy value chain are most significant in major drought years. Hence, while subsistence farmers are most adversely affected, climate variability affects all agriculture sectors and lowers the annual production, value addition, and exports.

Future climate change could exacerbate the impact of climate variability in Rwanda and lead to new risks (though also some potential benefits). Rwanda's climate is already warming, with observational data showing that the average temperature has increased over recent decades to higher levels than the global average⁵⁶. Climate change models⁵⁷ project an increase in temperature of ~1°C to 2.5°C by the middle of the century. There are projected increases in the number of hot days and increasing heavy precipitation. The projected changes in rainfall (annual and seasonal, as well as

⁵⁴ This scenario accounts productivity growth in agriculture only. Annual productivity growth in other sectors are set conservatively at 1%.

⁵⁵ Season A starts in September and ends in February of the following year; season B starts in March and ends in June of the same year; season C starts in July and ends in September of the same year.

⁵⁶ MINIRENA, 2012, Second National Communication.

⁵⁷Future Climate for Africa (2014). Report Rwanda.

droughts) are less certain, though current levels of variability will continue. These changes could have potentially large impacts on agriculture in Rwanda, from the combination of rising temperatures and changing rainfall, shifting agro-climatic zones, increased variability and shocks as well as indirect effects from fostering the development of pest and other diseases. Increasing the resilience of Rwanda's productive system, including to climatic risks, is a key determinant for sustainable production, productivity increases and greater food and nutrition security.

3.1.10 THE BUSINESS ENVIRONMENT FOR AGRICULTURE

Rwanda is currently ranked 41st in the world and 2nd in Africa for the overall business environment⁵⁸. This is a result of numerous reforms undertaken over the past several years aimed at creating an enabling environment for businesses such as improving the ability to open a business, trading across borders, and increasing transparency.

With respect to agriculture, the World Bank's "Enabling the Business of Agriculture"⁵⁹ assesses the regulatory environment for private agricultural operators across countries. Based on 2016 data, Rwanda was ranked 62 out of 189, and first in East Africa. The country ranks above average in the areas of finance, transport, and water. On the other hand, the country performed below average in the indicators on seed, fertilizer, machinery, markets, and ICT. Challenges identified by the report include obstacles affecting the timely release and production of high-quality seed by the formal seed supply system; regulatory bottlenecks limiting access to fertilizer, including fertilizer registration, import and quality control; regulatory barriers limiting access and use of agricultural machinery by farmers, in particular, requirements for tractor import, registration and inspection, testing and standards; and lastly laws and regulations that discourage smallholder producers and agribusinesses from accessing domestic and foreign markets. Rwanda has made significant headway with land tenure and administration, with far-reaching institutional and structural changes. It is the only African country to conduct a successful nationwide systematic Land Tenure Regularization (LTR) program, having demarcated, adjudicated and registered nearly all individual land holdings between 2004 and 2012. This LTR has afforded Rwanda the 12th position globally on the registering property indicator of the World Bank's Doing Business report⁶⁰. Furthermore, the Law on Matrimonial Regimes and Inheritance of 1999 granted women the right to inherit land and gave them equal rights to matrimonial property. This has resulted in both male and female-headed households owning farmland at almost the same percentage (89 per cent in 2013/14⁶¹). Land is the principal asset for most Rwandan households.

MINAGRI and further institutions in the agriculture sector remain committed to the continuous improvement of the business environment in the sector; more precisely by acting as market enablers. This includes improving procedures and access to information for investors, promoting public-private partnerships, and mitigating fiduciary risks through continuous institutional upgrading and reforms.

3.1.11 CHALLENGES

Small plot size and limited land availability act as constraints on productivity and profitability for most farmers. Rwanda is a small country, with arable land estimated to be 48 per cent of the total area of 26,338 km². About 96 per cent of rural households rely directly or indirectly on agriculture for their livelihoods.⁶² Although agricultural plots are generally small (average plot size is 0.6 ha often divided into three-four sub-plots) this masks a wide range. About 30 per cent of the households cultivate less than 0.2 ha (accounting for about five per cent of total arable land), while about 25 per cent cultivate more than 0.7 ha (accounting for 65 per cent of the national farm-land). 15 per cent of rural household farm less than 0.1ha (Figure 9), many of which are female-headed households who cultivate only 1.32% of national cultivable land.

⁵⁸ World Bank (2017): "Doing Business"

⁵⁹ World Bank (2017) Enabling the Business of Agriculture 2017. Country Profile: Rwanda

⁶⁰ AfDB, Rwanda Land Reform (2016)

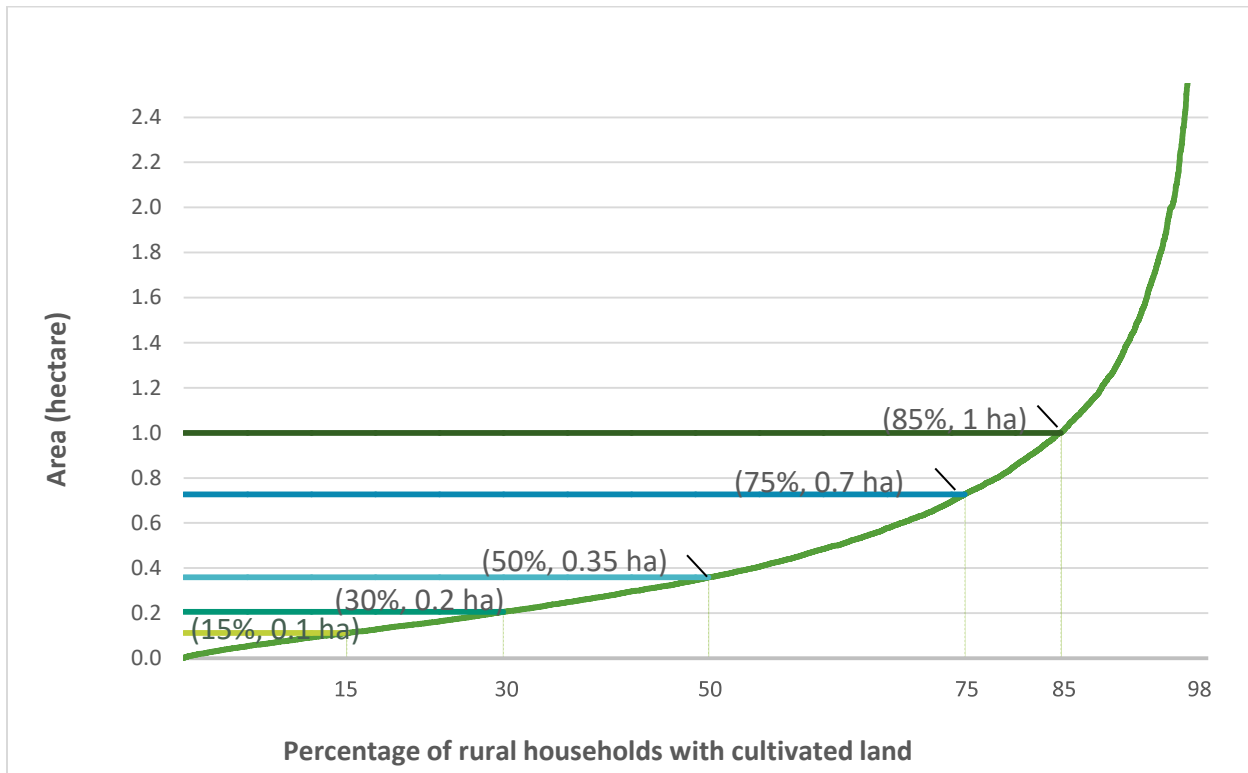
⁶¹ NISR, EICV 4, Gender thematic report (2014)

⁶² NISR, EICV 4

⁶³ For many of these farmers, farms are simply too small to produce a marketable surplus and as a consequence they cannot farm their way out of poverty or malnutrition. Some may find off-farm employment, but they will still require support through social protection programmes.

Land fragmentation has distinct geographic characteristics. In 10 districts in the Western, Northern, and Southern provinces, 40-50 per cent of farmers have farmland covering less than 0.2ha (46.4 per cent of the national total of farms covers this size). Extremely small farms are concentrated in the Western Province (31 per cent of national total). In Rubavu, Western Province, almost 70 per cent of farmers have plots smaller than 0.2ha.⁶⁴

Figure 9: Distribution of rural households by cultivated land size⁶⁵



With this level of land fragmentation, Rwandan agriculture is predominantly subsistence farming of staple crops for self-consumption. Subsistence farmers face a complex set of challenges that suppress yields below potential, such as limited access to finance, insurance, technology, skills, irrigation, mechanisation, seeds, fertilizers, and other key inputs. Land fragmentation also leads to underemployment in the agriculture sector: median hours worked for independent farmers were estimated at 20 hours/week in 2013/14⁶⁶, as farms are too small to provide full employment.

Given Rwanda’s land constraints, land degradation represents a threat to agriculture performance. Notable progress has been made towards the prevention and reduction of soil degradation through terracing and other measures, but topographic conditions combined with high and often intense rainfall lead to erosion and soil degradation. Soil acidity negatively influences the availability and uptake of several essential nutrients and restricts root growth and access to

⁶³ IPRI calculations, based on EIVC 4 data 2013/2014

⁶⁴ Ibid.

⁶⁵ Ibid.

⁶⁶ NSIR, EICV4 2013/2014

water and nutrients, making land less productive. According to the government's state of environment report (2015), about three-quarters of Rwanda's soils are acidic, with a pH below 5.5 and a deficiency in nitrogen or in phosphorus.

Agriculture's performance needs to match rapid population growth, to feed the cities and provide rural employment.

Despite declining fertility rates, the population is projected to grow significantly: half of Rwanda's population is younger than 20 years old and the working-age population is projected to increase from around 5.6 million to almost 10 million by 2032⁶⁷. While agriculture's share of total employment will continue to fall (given structural transformation), there are still projected to be around 60 – 80,000 new entrants each year into agriculture.⁶⁸ Rural-urban migration is expected to quadruple the number of urban households from 0.4 million households in 2012 to 1.6 million households by 2032. Meanwhile, rural areas are expected to absorb 1.3 million new households between 2017 and 2032 where agriculture will likely be the expected primary source of income⁶⁹. However, Rwanda's severe land constraints limit further agricultural land expansion. Thus, population growth adds pressure on farm incomes and increases the risk of accelerating on-going processes of land fragmentation and soil degradation. To counter this, it is necessary to generate rural off-farm jobs and increase sustainable agricultural land productivity. A new agricultural strategy is therefore required to foster innovation and land productivity growth to engage young people and create productive jobs, both on and off the farm.⁷⁰

Further inhibitors in the ease of doing business limit agriculture from reaching its commercial potential.

In 2017, Rwanda ranked second in Africa and 56th worldwide on the World Bank's Doing Business Indicators (up from 59 in 2016).⁷¹ Particularly in registering a business and accessing credit, Rwanda is among the top performers. However, there are still topics to be addressed. The Agribusiness Investment Promotion Strategy (2017) targets improved investors' access to information, e.g. on regulations, soil and climatic conditions, market information, costs of inputs and labour and information on processes and key institutional stakeholders for investment. In addition, government seeks to improve its ability to respond to investor needs by strengthening the coordination between government agencies. Finally, to strengthen public-private dialogue in agriculture, which is essential for resolving operational issues, having a strong PPD framework for existing investors in place is an effective avenue for attracting new investment and retaining profitable local businesses.

Imperfect agricultural commodity markets and value chains affect both farm profitability and food security.

There are many constraints in value chains, which inhibit the flow of agricultural products from the farm gate to processors, export markets, and consumers. These relate to issues of market infrastructure, market access, SPS, market information, logistics, and regulations in trade. Well-functioning markets and value chains would ensure that both consumers, farmers, and traders are better off, and food commodity prices would be similar across the country – only separated by the cost of transferring commodities from one local market to another. Moreover, local areas would be more resilient against local production shocks, as variety and access to food from other areas would be increased.

Limited access to agricultural finance products constrains subsistence farmers' ability to take measured risks to increase productivity and/or profitability. The agriculture sector has specific financing needs, which are different from most of available commercial banking products that target urban real estate markets and the formal sector. Agricultural financing needs to follow a seasonal pattern with a peak at the time of acquiring inputs and at the post-harvest stage, so the required amortization period is shorter than real estate and longer than most microfinance products. Products matching these needs are still in early stages, with collateral requirements that often go beyond the loan-size, and interest rates as high as 21 per cent⁷². Compared to men, women have limited access to formal finance and are more likely to be financially

⁶⁷NISR, Population Census, 2012 (mid-case scenario)

⁶⁸ IFPRI, CGE modelling, using EIVC 4 data

⁶⁹ Ibid.

⁷⁰ Michigan State University (2016) Agri-food Youth Employment and Engagement Study

⁷¹ <http://www.doingbusiness.org/data/exploreeconomies/rwanda#starting-a-business>

⁷² USAID/PSDAG. Internal Assessment of Access to Finance for Agriculture. July 2015.

excluded⁷³. Only 25.5% of loan beneficiaries are women according to the data from the Gender Monitoring Office⁷⁴ Showing that more financial products addressing women’s needs are desired.

Sustainable increases in agricultural performance require farmers to be supported to improve resilience to production, climate, and market risks. Agricultural risks, especially pest and other diseases but also erratic rainfall and periodic droughts (particularly in the east), limit national productivity and can have very serious consequences for individual farmers and rural communities. According to the CFSVA 2015, 27 per cent of households have experienced a shock (35 per cent for poor households)⁷⁵. The most prevalent shocks were weather-related; ranging from drought or irregular rains to serious illness and accidents in the household followed by reduced employment/income. Risk assessment results need to feed into regular policy development processes and practices. Potentially affected stakeholders need access to risk-related data to inform their decisions.

The skills gap in agriculture limits productivity and profitability. Formal education levels among farmers are generally low. The 2016 SAS (Season B) notes that in Rwanda, 66 per cent of agricultural operators had attended primary level education, 26 per cent had no education, 6.6 per cent attended secondary level education and only 1.4 per cent had attended tertiary level education, noting a gender difference (71.5 per cent of male farmers versus 53.8 per cent of female farmers received only primary education). However, beyond formal education, farmers require a range of agronomic and “farming as a business” skills to optimize land and cropping practices and to make well-informed investment choices for greater production and/or profitability. For example, farmers require a certain level of skills and capacity to successfully switch from low input/low output staple crops to high value crops such as horticulture. The ambition of the agriculture sector to transform to a modern, green, and high value-added sector can only be achieved if farmers are equipped with the right skills to upgrade their production systems.

Besides strengthening the capacities of farmers, there is a need to build the skills of rural value chain actors at large, targeting specifically women and youth, to promote agribusiness development and to ensure a stream of competent employees to meet the labour demands of larger agricultural investors and agro-processors.

The agriculture sector currently fails to maximise the contribution of, and benefits to, women and youth. Women have a higher propensity to work in agriculture than men (92 per cent compared to 77 per cent⁷⁶). About 25 per cent of rural households in Rwanda are headed by women while working age youth (ages 15-34) are 77 per cent of the rural population⁷⁷. Women and men farmers in dual households are generally characterized by unequal power relations, leaving women with very limited decision-making powers. This affects their control over agricultural assets, inputs, produce and capacity building opportunities, resulting in low agriculture productivity. Due to their limited access to inputs, women farmers’ plots are typically less productive than those operated by men. Additionally, women in agriculture are more vulnerable to climate change and land degradation because they generally have no other alternatives to earn their family’s living. Women’s relatively low inclusion in formal financial services⁷⁸ limits their participation in agribusiness and thus their earning potential compared to men.

The engagement in, and contribution of the Rwandan youth to the agri-food sector can be improved. Young people’s reluctance to engage in the agriculture and agri-food sector is perpetuated by a general perception that farming is unprofitable and unattractive, and not desirable for those with higher education levels. Attracting qualified youth is critical for ensuring entrepreneurship, to drive the Rwandan agri-food sector to deliver more added value high-quality produce and food processing.

⁷³ NISR, FinScope (2016)

⁷⁴ Gender and Agriculture, 2017

⁷⁵ Comprehensive Food Security and Vulnerability Analysis (2015)

⁷⁶ NISR, Population Census 2012.

⁷⁷ Ibid.

⁷⁸ NSIR, FinScope (2016)

3.1.12 OPPORTUNITIES

High economic growth is creating domestic and regional markets for an expanding array of Rwandan agricultural products. Growth in East Africa is amongst the fastest in the world⁷⁹ and Rwanda's budding reputation for quality, sustainably produced agriculture products fits well with growing demand across Africa's urban centres for processed food and sustainably produced food products. Domestically, opportunities exist for import substitution, specifically for high value nutritious foods to cater to the demands of a growing urban middle class. There are opportunities for export and domestic strategies focused on high-quality niche products competing in higher-price and lower-volatility markets, catering to a middle-class consumer who demands product quality and food safety.

The Rwandan economy is becoming more open with regional and international trade taking up an increasingly larger share of the economy⁸⁰. Since 2000, imports and exports have increased their combined share of the economy from 31 to 48 per cent⁸¹. Exports have seen rapid growth from a low base, with 13.2 per cent growth p.a. between 2000 and 2016⁸². Consequently, the export base is 7.2 times larger in 2017 than it was at the turn of the century, increasing its share of the economy from 6 to 15 per cent. Services exports have seen growth of 16.3 per cent p.a., while goods exports grew by 10.6 per cent p.a.⁸³ over the same period. Total imports grew on average by 10 per cent p.a., increasing their share of the economy from 25 to 33 per cent⁸⁴ between 2000 and 2016. Growth in external trade is primarily a result of Rwanda's intensified collaboration with regional partners through the EAC, COMESA, Northern Corridor Initiative, and ECCAS leading to improved trade procedures and significantly reduced time and cost of maritime trade. The time to import and export a standard container through Mombasa Port fell from 95 days and 60 days in 2007 to 27 and 26 days in 2015⁸⁵. Recent reforms, such as the Single Customs Territory, have seen the times drop even further reaching 6.3 days⁸⁶ by 2016 while costs reduced from about \$5000 per container in 2014 to \$3,633⁸⁷. Rwanda is well placed to exploit regional opportunities, with its EAC membership (meaning producers can import and export tariff-free) and its location at the crossroads of the Northern and Central trade corridors and status as the main gateway to Eastern DRC. Rwanda is strategically located for regional air traffic and thus export opportunities to countries such as Gabon, Congo Brazzaville, and Nigeria abound.

While the economy overall benefits from international trade, increased openness creates both winners and losers. Consumers gain from a greater choice of goods and services. Producers of goods and services where Rwanda has a comparative advantage will also gain and new opportunities in such sectors will emerge. In contrast, producers of goods and services in which Rwanda does not have a comparative advantage are likely to lose from increased market integration in the short and medium term, facing increased competition. Therefore, the increased openness is likely to push agricultural production toward its comparative advantage.

A relatively young population⁸⁸ will be incentivized towards entrepreneurship. While population growth is a challenge for agricultural development, it is also an opportunity. In combination with a business-friendly environment, Rwanda's young population can be an asset to generate new businesses and take advantage of new agricultural technologies⁸⁹. Rwanda has been investing in facilitating young entrepreneurs to enter modern farming and agribusiness, including through exchange programmes for graduates to learn about modern farming and agribusiness abroad, and financial

⁷⁹ IMF, World Economic Outlook (2016)

⁸⁰ NISR, National Accounts 2016, resource balance

⁸¹ Ibid.

⁸² NISR, National Accounts 2016, resource balance

⁸³ Ibid.

⁸⁴ Ibid.

⁸⁵ World Bank Doing Business, 2015

⁸⁶ NCTTCA Observatory report (November 2016)

⁸⁷ Ibid.

⁸⁸ Based on the Population Census 2012, roughly half of the Rwandan population is younger than 20 years old.

⁸⁹ The International Youth Foundation (IYF) in its "Rwanda Labour Market and Youth Survey" (2011) found that use of ICT can attract youth in SMEs and stimulate agricultural entrepreneurship.

support programmes such as through the Business Development Fund (BDF) and Private Sector Federation (PSF). Likewise, the National Employment Programme⁹⁰ also recognizes the agribusiness sector as offering potential for job creation, especially among university graduates. The Rwanda Youth in Agribusiness Forum (RYAF)⁹¹ promotes youth entrepreneurship in agribusiness by offering a platform aimed at establishing business linkage opportunities and changing the youth's mind-set on agribusiness.

Agricultural innovation can help improve food security, increase farmers' incomes, and protect natural resources. The Crop Competitiveness Assessment 2016⁹² found that yields for several crops are less than half of their potential, taking agro-climatic conditions into account. Furthermore, post-harvest losses were recorded as high as 30 per cent in some value chains. Opportunities also exist to improve livestock productivity. Productivity gains can be realized by improving availability and access to good quality (forage, feed, feed formulation, composition) and quantity of animal feed, upgrading genetic animal resources, and enhancing knowledge regarding animal husbandry, animal health and disease management. Upgrading of animal resources, including through improved breeding practices of local breeds, offers real potential as traditional breeds have low genetic potential and low levels of milk, egg, and meat production.

One route to alleviate pressure on land is to increase yields through a package of productivity-enhancing measures, involving research, extension, inputs systems and credit. In addition, opportunities exist to add nutritional and economic value by reducing post-harvest losses through investing in handling, storage, and processing. More pluralistic partnerships with universities, farmer organizations and the private sector can produce innovations in science, technology, extension, policy, and social learning to meet Rwanda's agricultural development goals. Home-grown innovative solutions can serve as a catalyst to Rwanda's agriculture transformation. Recognizing this, Rwanda has embraced the Science Agenda in Agriculture for Africa⁹³ (S3A), which emanated as a framework for realising the Malabo targets. The S3A cites high rates of return on investments in science for agriculture, in the order of 40-60%, shown consistently in several global studies carried out in different countries at various stages of development.⁹⁴

Effective application of ICT can help accelerate productivity and efficiency in the sector and is key to reaching people at a large scale. ICT can support agricultural growth by providing appropriate, timely information to farmers and other stakeholders. Core services where ICT can make an impact are⁹⁵: development of a common user interface and a repository for farmer and farm information; increasing farmers' skills and knowledge through online learning; contributing to job creation among youth in agriculture and peripheral services; improving access to agricultural information, knowledge, and markets; and expanding access to, and uptake of, rural and agricultural financial services.

⁹⁰ MIFOTRA (2014) http://www.mifotra.gov.rw/uploads/media/NEP_Document_Design_Final_Aproved_01.pdf

⁹¹ <http://www.ryaf.rw/>

⁹² Rwanda Crop Competitiveness Assessment, MINAGRI, 2016

⁹³ www.scienceagenda.org

⁹⁴ Alene & Coulibaly 2009, Beintema & Elliot 2009, Nin-Prat & Fan (2010)

⁹⁵ As identified by the ICT4Ag Strategy

4. INSTITUTIONAL OVERVIEW OF THE AGRICULTURE SECTOR

MINAGRI coordinates activities by state and non-governmental actors in the agriculture sector. Its mission is to ensure food and nutrition security and the contribution of the sector to the national economy by initiating, developing, and managing programmes that will transform and modernize agriculture in Rwanda⁹⁶.

Given the multi-dimensional nature of agriculture and in line with the Comprehensive African Agriculture Development (CAADP) and Malabo Declaration Commitments as well as the Sustainable Development Goals (SDGs), close coordination with relevant ministries, the private sector, and civil society organisations (CSOs) is critical. This interdependency is reflected in the NAP's emphasis on agriculture's important interfaces with other sectors, notably infrastructure, environment, private sector development and youth employment, land management, education, social protection, and health. This interdependency makes it important that, in fulfilling its policy mandate, MINAGRI pursues complementarities and synergies with other sectors, under an implementation structure in which interventions are aligned to maximize benefits to beneficiaries and the nation (see section 10 for more details on implementation arrangements).

MINAGRI has two implementing agencies: the Rwanda Agriculture and Animal Resources Development Board (RAB) and the National Agricultural Export Board (NAEB). RAB's mission is to develop agriculture and animal resources through research, agricultural and extension services to increase productivity.⁹⁷ NAEB focuses on the implementation of policies and strategies to facilitate the growth of business to diversify agriculture and livestock commodity export revenues. As of 2017, NAEB is a commercial public institution⁹⁸.

The on-going decentralization of the Rwandan public administration empowers local governments to deliver agricultural services to farmers and, more broadly, serve as the focal point in representing the needs of the local communities and coordinating multi-sector responses. The PSTA 4 is the principal instrument for mainstreaming the government's decentralization policy into the agriculture sector.

Local governments have absorbed the functions of the previous local branches of MINAGRI and rely on an evolving partnership with the central government (see section 10). Each district has a district agricultural unit with a director, agriculture officer, cash crop officer, forester and natural resources officer and a livestock officer. At the sector level, there are an agriculture officer and a livestock officer, while at cell level there is a social economic development officer responsible for agriculture. Reorganizations are on-going within RAB, which will likely entail decentralization of certain functions and a transfer of staff to districts under MINALOC.

In addition to central and local government actors, there are private sector actors (farmers, agribusinesses, and financial institutions), public (research institutes, schools, and universities), non-governmental and international stakeholders playing key roles in serving farmers.

Farmers in Rwanda have the tradition of organizing themselves locally in membership-based organisations around common interests like agricultural production or marketing to pool their resources and facilitate access to credit and farm inputs. The Rwanda Cooperative Agency (RCA) was established to enhance the management capacity of cooperatives and facilitate their development as self-reliant and economically viable organizations. The RCA in its online database⁹⁹ has as of October 2017 registered 8145 primary cooperatives, 141 unions and 15 federations (a three-tiered system of cooperatives), as well as 486 Savings and Credit Cooperatives (SACCO's). According to the 2016 SAS results, 15.1 per cent

⁹⁶ Prime Minister's Order No. 40/03 of 27/02/2015 determines the mission, functions, and organisational structures of MINAGRI.

⁹⁷ Law N°14/2017 of 14/4/2017 establishing Rwanda Agriculture and Animal Resources Development Board (RAB) and determining its mission, organisation, and functioning.

⁹⁸ The law No. 13/2017 (ratified on 14 April 2017) establishes NAEB as commercial public entity, including a new structure.

⁹⁹ <http://www.rca.gov.rw/?article13#>

of agricultural operators are members of a cooperative across the country. However, among large-scale farmers¹⁰⁰, 66.7 per cent are members of agricultural cooperatives, indicating that they are relatively better organized than small-scale farmers. In addition, several farmer organizations exist in Rwanda drawing their membership from individual farmers and (mostly) informal farmer groups.

Cooperatives and farmer organizations play a key role in providing services to farmers, for example capacity development and training, credit provision, market information and linkages, creating economies of scale, policy dialogue, lobbying and advocacy. The government collaborates with cooperatives in activities such as value chain development, research, and extension. Building cooperatives' professional management and human resources and strengthening the engagement of members will enhance these efforts and ensure the pass-through of benefits to members¹⁰¹.

The Rwandan agribusiness sector, in line with other countries in the region, is characterised by a very small number of large enterprises and many micro enterprises and/or informal sector, with a predominantly 'missing middle'. Micro and small enterprises in Rwanda comprise approximately 98 per cent of the total businesses in Rwanda and account for 41 per cent of all private sector employment. The large number of agricultural micro-enterprises and actors in the informal sector¹⁰² mainly include traders, transporters, and agro dealers, who are often the direct market partners of commercializing smallholder farmers. The Crop Intensification Programme (CIP) has increased private sector agricultural investment at the farm level, in both input and labour from smallholder and larger farms, thereby increasing farm level productivity. With the liberalisation of input markets, the government has worked with the private sector on privatising fertiliser importation and distribution to farmers, through fertiliser auctions and the development of agro dealer networks. Currently, there are over 800 agro dealers working with private sector input suppliers to supply fertiliser, seeds, and micronutrients. However, farmers continue to face difficulties in accessing and/or affording seeds and fertilisers as was clearly articulated during farmer consultations in the preparation of PSTA 4.

The Rwanda Private Sector Federation (PSF) promotes and represents the interests of the Rwandan business community, while at the same time providing business development services. It groups nine professional chambers, out of which agriculture is one. However, overall organisation of the private agribusiness sector remains weak, partially due to the diversity of actors in terms of size and interests, and the loosely structured sub-sectors/value chains. Other relevant trade associations in Rwanda include the East African Business Council and specific sectoral associations namely the Coffee Exporters and Processors Association of Rwanda (CEPAR), Rwandan Horticulture Exporters Association and the Dairy Processors Association of Rwanda.

¹⁰⁰ A large-scale farmer is defined as one growing crops on ten hectares of land or more, or any farmer raising 70 or more cattle, 350 goats and sheep, 140 pigs, 1,500 chickens or managing 50 bee hives.

¹⁰¹ National Policy on Promotion of Cooperatives (2006)

5. STRATEGIC FRAMEWORK OF PSTA 4

5.1 MISSION, VISION, AND OBJECTIVE OF PSTA 4

PSTA 4 seeks the “transformation of Rwandan agriculture from a subsistence sector to a knowledge-based value creating sector, that contributes to the national economy and ensures food and nutrition security in a sustainable and resilient manner.”

PSTA 4 is the strategic plan for implementing the NAP. As such it shares the NAP vision: “a nation that enjoys food security, nutritional health, and sustainable agricultural growth from a productive, green and market-led agriculture sector”.

PSTA 4 supports the overarching objective of the Economic and Social Transformation Pillars of the NST to ‘accelerate inclusive economic development founded on the private sector, knowledge and Rwanda’s natural resources’, and to ‘develop Rwandans into a capable and skilled people with quality standards of living and a stable and secure society’.

5.2 NEW STRATEGIC ORIENTATION

PSTA 4 is a continuation of PSTA 3 and builds on its successes and lessons learned. To better respond to emerging and structural challenges, it presents a shift from PSTA 3 in the following ways:

Stronger role of the private sector (including farmers) with government shifting from market actor to market enabler.

PSTA 4 emphasises the provision of public goods while diminishing direct government involvement in production, processing, and marketing. Moreover, the GoR will explore new models to engage private sector investment in transformational activities such as infrastructure provision and management, innovation, and improved agricultural markets.

Focus on farm profitability and commercialisation. Given Rwanda’s limited land resources and growing population, increasing economic land productivity will be the key to increased returns on capital and labour. Economic land productivity and incomes will increase by the introduction of “land-saving technologies” aiming to (1) increase yields, (2) improve logistics and diminish post-harvest losses (3) access new markets and (4) adopt crops and animal products generating higher returns on investment and labour.

Use the ‘food systems approach’ for enhanced nutrition and household food security. In the PSTA 4, MINAGRI will collaborate with other stakeholders to improve food availability, accessibility, stability, and utilization. Resilience and risk mitigation strategies for food production systems will continue to be developed, particularly at the household level. Making agriculture and food systems nutrition-sensitive necessitates acting to ensure the nutrient quality of each commodity is preserved and or enhanced throughout the entire value chain. Key issues addressed include input quality (catering to food preferences and needs), improved production practices, post-harvest handling, storage and processing (to increase safety and nutrition quality, shelf-life etc.), increased value added (greater income and employment resulting in greater food security), retailing (catering also to an increasing urban population) and consumption (awareness raising and hence demand for nutritious diversified food) to deliver safe, healthy, and nutritious foods all year round to both rural and urban consumers.

Enhance climate smart production. PSTA 4 seeks to build resilience through on-farm measures and enabling actions to increase productivity. Firstly, maintaining and promoting farmers’ practices of mixing crop varieties mitigates certain risks, including the spread of pest and diseases as well as ensuring dietary diversity. Secondly, PSTA 4 emphasises alternative land management to complement terracing with comprehensive climate smart soil and integrated watershed management. PSTA 4 builds on Rwanda’s long experience in these interventions, considering that the most successful approaches are those that involve local communities. PSTA 4 also introduces better weather and climate information and early warning and seeks to ensure all investments are climate smart by developing the research and information to enable integration.

Focus on diversified higher value agricultural products (horticulture, vegetable, poultry, pork, fisheries). PSTA 4 focuses on facilitating private sector investment in fruit and vegetable production through upgrading the provision of SPS/quality

standards as well as supporting the demonstration of better technologies such as green houses, hydroponics, and other small-scale irrigation solutions. Solving specific micronutrient malnutrition through the production of nutrient dense fruits and vegetables within a value chain framework will be prioritized. PSTA 4 will furthermore focus on productivity per animal ratios to close the country's large protein dietary gap. This will be done by addressing the feed deficit (both quality and quantity), animal health, genetics, and markets. While interventions in the milk/cow value-chain will be continued, there will be increased focus on poultry and pork¹⁰³ as well as fisheries and aquaculture where there is increasing private sector interest.

Strengthen Innovation and Extension. Agriculture transformation will require research and innovation at the central level - introducing new varieties, disease mitigation, etc. – as well as farmers' knowledge and skills to support specialization, intensification, diversification, and value addition. ICT can increase the impact of dissemination and improve market information, service delivery, financial inclusion, climate risk adaptation, and farmer feedback. Strong and well-organized farmer's organizations can exert their bargaining power and provide services to their members in developing modern agribusinesses. Skills development will be responsive to market developments and demand and will make specific provisions to reach women and youth. Skills development and incentives for agricultural entrepreneurship, specifically for women and youth, will be essential in generating rural jobs and income.

Improve GoR coordination and stakeholder engagement. Recent years have seen the emergence of a joint Imihigo between institutions (public and private). In the agriculture sector, there are clear strategic overlaps with the Private Sector Development and Youth Employment Sector for investments, commercialisation, value addition, and trade - with Environment, Land and Forestry sectors in land and water management and agroforestry; with the Health Sector and MINALOC on nutrition and food security; and with Infrastructure for feeder roads, irrigations, and market infrastructure. Collaboration with local governments is essential for the successful implementation of various activities. PSTA 4 seeks to increase the capacity of MINAGRI to cooperate and coordinate with these institutions, moving towards joint planning (and budgeting), as well as better information on implementation and impact through enhanced data collection. Furthermore, the GoR encourages strengthening of and dialogue with relevant civil society organisations in the agricultural space – especially representing farmers, youth, consumers, and private sector organisations.

5.3 INVESTMENT PRINCIPLES

Rapid transformation in agriculture for economic growth and farm level food security will require strategic investment in production, value chains and supporting infrastructure. PSTA 4 sets the guiding principles for public investment in the sector, aiming to increase the quality of public investments and attract private investment to achieve the policy objectives in the NAP, NST and Vision 2020/50.

The following principles will be used to determine the line between public versus private investment:

Firstly, the public-sector acts as a market enabler to leverage private sector investment and to harness its full potential. The public sector as market enabler will focus on:

- (i) Ensuring the provision of targeted, quality public goods, which benefit society but would be undersupplied by the private sector (e.g. infrastructure, research, education, social protection, emergency response etc.);
- (ii) Ensuring a conducive enabling environment, through predictable and stable agricultural policies and regulatory and legislative frameworks with rules-based market interventions;
- (iii) Addressing market failures through appropriate instruments and incentives, improved coordination, and information management, and through capacity building.

In guiding the execution of these functions, PSTA 4 will ensure:

¹⁰³ Identified as major opportunities in the Livestock Masterplan (2017) partly thanks to their lower feed requirements.

- **Targeting of interventions**, recognizing the needs and ambitions of different farmers, with flexibility in implementation to maximise impact.
- **Subsidiarity**, enabling districts to lead local level planning and frontline service provision, complementing and supporting District Development Plans.
- **Joint planning and budgeting** in areas where success depends on other sectors (namely nutrition, social protection, agroforestry, the environment and private sector development and trade), promoting the use of information systems and analysis, institutional capacity development and enhanced cross-sector coordination, to maximise the impact of public investments.

Second, investment will be private sector-driven: The GoR recognises the central role the private sector will play in transforming Rwandan agriculture from subsistence-based to competitive and market-led¹⁰⁴. The change will be driven by investments of private actors ranging from smallholder farmers and cooperatives to commercial farms in primary production, input and support service providers, traders/exporters, agro-processors, and agro-producers.

5.4 MARKETS AND VALUE CHAINS

Prioritizing markets and value chains allows an efficient use of resources and institutional capacity, with government services and safeguards focused on the prioritised value chains to improve economic and social development. To improve the management of the value chains, their platforms will be created and supported to function and thrive.

5.4.1 MARKETS

There are three market categories:

- 1) **The domestic market** is dominated by food crops and it remains a priority that the domestic agri-food system meets the dietary needs of the population. Improving aggregation and consumer markets (infrastructure, logistics, and market information among others) is important both for food consumers and producers. There is a limited but growing market for higher value niche products in urban supermarkets, restaurants, and hotels. Therefore, standards certification of food products is expected to play an increasingly important role.
- 2) **The regional market** is also primarily dominated by basic food. Currently, DRC is the main market for Rwanda's cross-border trade - especially, livestock, potatoes, dairy, flour, and edible oils¹⁰⁵. Within the EAC, continued market integration will expand the Rwanda regional market and tailored products to EAC consumers will be prioritised in the PSTA 4. There is a growing urban market in regional cities, and Rwanda's opportunity may be in selling higher quality products.
- 3) **International markets** have traditionally been concentrated on exports of coffee and tea. In these traditional value chains, the focus is on improving branding and quality such that the products can fetch higher prices on the global market. In addition, horticultural exports are growing. Currently, the main market is Europe. However, opportunities have been identified elsewhere – especially West Africa. Emphasis for horticulture will be to improve aggregation, standards compliance, and logistics in the domestic segment of the supply chain. Animal products are the subsequent emerging export sector. Here, there is a need for ensuring animal health to meet standards. For example, a tagging system and livestock database will be required to access larger international markets.

¹⁰⁴ Rwanda National Agribusiness Investment Promotion Strategy, MINAGRI, 2017

¹⁰⁵ BNR, Informal Cross-Border Trade Statistics, 2016

5.4.2 VALUE CHAINS

The key categories of value chains include:

Food crops for sustainable livelihoods, food security and nutrition, including bananas, maize, cassava, sweet and Irish potato, and beans. Low, stable prices for staple food will be achieved through increased harmonisation between agricultural and trade policies so that food crops in which Rwanda does not have comparative advantage can be cheaply imported allowing farmers to use scarce land resources for higher value products, resulting in higher incomes to buy staples.

Production of food crops at the household level remains crucial for a large number of households that grow their own food rather than selling produce and buying food at the market. Certain food crops have commercial potential for agro-processing to outcompete imported products. Where processors already exist, aggregation and value addition are relevant to stimulate a nascent market. Commercialisation efforts are better directed toward products where Rwanda is likely to achieve comparative advantage rather than those in which imported raw materials remain substantially cheaper or of higher quality.

Traditional Export Commodities: including tea, coffee, and pyrethrum remain important and still have significant growth potential. The private sector in these value chains is relatively mature and suitable for engagement toward increasing export revenues and household incomes.

PSTA 4 will continue to support food crops and traditional exports, though it will give increasing focus and support to specific high-impact commodities¹⁰⁶.

High Impact commodities are those agricultural goods in which Rwanda's long-term comparative advantage is likely to be in largely labour-intensive products with a high-value per hectare and/or a substantial contribution to food and nutrition security. Commercialisation in these value chains has higher probability of recapturing the domestic market, diversifying exports, and increasing farm profitability. However, substantial public and private investments will be needed to address current bottlenecks and mitigate farmer risks.

Focus will be given to:

- **Animal resources:** including dairy (and related processing), meat and milk from small livestock, poultry (meat and eggs), and fisheries and aquaculture. In the dairy sector, total production has increased nearly fourfold in the last 10 years¹⁰⁷, and the demand for dairy products consumption has outstripped the local production. Fisheries (both capture and aquaculture) remain a large untapped potential, catering to changing consumption patterns. Investments in poultry¹⁰⁸ and fisheries have the greatest potential to close the projected meat / protein consumption gap as well as enable exports¹⁰⁹.
- **Horticulture:** to serve growing global, regional, and local markets as well as close dietary gaps. Value chains in which Rwanda has competitive advantage include: beans and peas, specialties such as baby corn, chilli, mini leek, African eggplants, mushrooms, and herbs; exotic fruits, such as Tamarillo (tree tomato), apples, bananas, passion fruit, avocados, and flowers. Furthermore, fruits and vegetables play an important role in food and nutrition security for the urban and rural Rwandan population and will be promoted for household consumption as well.

¹⁰⁶ Selected based on the following criteria: agronomic and climatic factors: suitability to the 3 altitudinal zones and ¹² agrological zones (for both current and future climate), and responsiveness to inputs; market and growth opportunities: job creation, livelihood, and income opportunities; value addition potential; regional and international export opportunities; social and development opportunities; food security and nutrition; poverty and inequality reduction; and political and strategic factors: domestic market recapturing, exports, and investment opportunities.

¹⁰⁷ MINAGRI statistics

¹⁰⁸ Master Livestock Sector Strategy (2017)

¹⁰⁹ Small ruminants are not expected to contribute significantly to closing the meat gap due to their low numbers, in addition to limited feed resources and low genetic potential of indigenous breeds.

As PSTA 4 implementation begins, value chain selection will be fine-tuned, based on assessments guided by the above criteria while additional value chains may be included as new market opportunities.

5.5 PSTA 4 IMPACT AND THEORY OF CHANGE

PSTA 4 is a tool to achieve the targets of the following Malabo Declaration targets:

1. Increased contribution to wealth creation
2. Economic opportunities and prosperity - jobs and poverty alleviation
3. Improved food security and nutrition
4. Increased resilience and sustainability

5.5.1 IMPACT AREA 1: INCREASED CONTRIBUTION TO WEALTH CREATION

Rwanda's limiting production factor is land. Economic growth requires an increase in profits per hectare and capture of productivity gains along the value chain. Raising profits per hectare means increasing agricultural yields and switching to high value agricultural commodities, which in turn requires infrastructure such as irrigation and terracing, adoption of technologies (improved varieties, seeds, fertilisers etc.) and relevant market information. It will also require improved farmer skills and better models for commercial and contract farming.

Productivity gains are to be made by reducing weather related and post-harvest losses and strengthening value addition and processing. This requires investment in skills, information and technology and infrastructure to increase access to markets. Improved profitability and commercialisation will lead to more products being competitive for export markets. Gaining access to export markets will require public investment in Sanitary and Phytosanitary (SPS) and quality standards infrastructure.

5.5.2 IMPACT AREA 2: ECONOMIC OPPORTUNITIES AND PROSPERITY - JOBS AND POVERTY ALLEVIATION

Improving land-productivity and market opportunities for farmers is expected to lead to higher incomes and livelihood opportunities. Household incomes are expected to be fuelled through increasing the value of production at the farm-level, which leads to higher value added per agricultural worker. Household incomes are also expected to increase by strengthening value chains, leading to off-farm job-creation. In combination, higher incomes, increased resilience to market and production shocks at the household level, and targeted interventions and asset building for vulnerable households will contribute to poverty reduction. By providing them with skills and access to finance, women will be empowered to engage in productive income generating activities.

5.5.3 IMPACT AREA 3: IMPROVED FOOD SECURITY AND NUTRITION

Increasing incomes and improving nutritional outcomes will address a wide range of diet-related malnutrition, especially micronutrients and the prevalence of stunting in children – a key aspiration of PSTA 4. Impacts to food security and nutrition will be addressed and measured by combining supply side and demand side actions using the four pillars of food security:

Availability and increased supply of high quality, diverse food products to local and regional markets will be achieved through increasing diversity and productivity at the farm-level, together with productivity gains along the value chain.

Accessibility of food will be enhanced through higher household incomes combined with greater resilience to market and production shocks. Improved resilience to production and market risks will further contribute to improved accessibility of food through improved storage, early warning and market information and insurance schemes.

To increase food **stability**, more work needs to be committed towards low and stable prices for nutritious commodities. An efficient decentralised strategic grain reserve system will serve as a resilient tactic against climate and market shocks.

Utilisation - increased production of diverse nutritious crops will increase *access* to diverse nutritious food but will only improve *nutrition* when combined with a strategy to create demand through improved awareness on consuming nutritious food and safe handling and storage at the household level. PSTA 4 also addresses consumer training, awareness, and women’s empowerment to improve knowledge, attitudes, and practices around nutrition.

5.5.4 IMPACT AREA 4: INCREASED RESILIENCE AND SUSTAINABILITY

Increasing productivity and diversification and generating off-farm income will increase household resilience to **production risks**. This needs to be matched by reducing weather-related losses, adaptation to climate change and mainstreaming climate smart practices in all activities, coupled with adoption of sustainable land and husbandry management to increase ecosystem and household resilience, reduce climate risks, and further enhance productivity.

Resilience to **market risks** for food crops in domestic markets is addressed through better insurance and financial services and other risk management and transfer tools, increased diversification at the household level, improved market information and strengthened contract farming models. These activities need to be complemented by a more decentralised, better managed grain reserve to mitigate large hikes in local food prices.

Macro-economic resilience is improved with diversification towards non-traditional exports, expanding vegetable production and developing niche markets that are less susceptible to international price fluctuations.

Table 4 shows how the outcomes of the four Priority Areas of PSTA 4 contribute to the four Impact Areas of the CAADP. As indicated in the Table, many outcomes contribute to several impact areas, while some are more specific and contribute to one area. This reflects the interconnectedness between CAADP Impact Areas, and the fact that specific areas of intervention within the PSTA Priority Areas will contribute to several of them.

Table 4: PSTA 4: Theory of Change: How the outcomes of the different Priority Areas of PSTA 4 contribute to the CAADP Impact Areas

Priority area outcome	Contribution to wealth creation	Economic opportunities and prosperity, jobs, and poverty alleviation	Improved food security and nutrition	Increased resilience and sustainability
1. Innovation and Extension	Improved practices and technology; improved skills and services for agribusiness value addition	Knowledge, skills development and incentives for farm and off-farm jobs, in particular for youth and women	Innovative technologies, capacity and skills for diversification and production; bio-fortified varieties	Adapted technologies and knowledge available to increase resilience
2. Productivity and Resilience	Increased yields and on-farm productivity; diversification into high value commodities	Increased income through productivity; asset building of vulnerable households,	Production of nutritious food with household access and utilisation	Increased resilience to climate change and sustainable land and husbandry management
3. Inclusive Markets and Value Addition	Reduction in post-harvest losses; increased volume and value of trade and recapturing of domestic market	Value chain development for value addition, increased farm, and off-farm jobs; Reduction of production factors and transaction cost	Enhanced stability of commodity prices; insurance and risk management mechanisms	Household income and export diversification; insurance and other risk management and transfer mechanisms,
4. Enabling Environment and Responsive Institutions	Increased public investment, Effective and efficient delivery of services	Conducive enabling environment for private investment; joint coordination; targeted interventions	Increased coordination of responsible line ministries	Increased coordination of responsible line ministries; evidence-based policy and planning

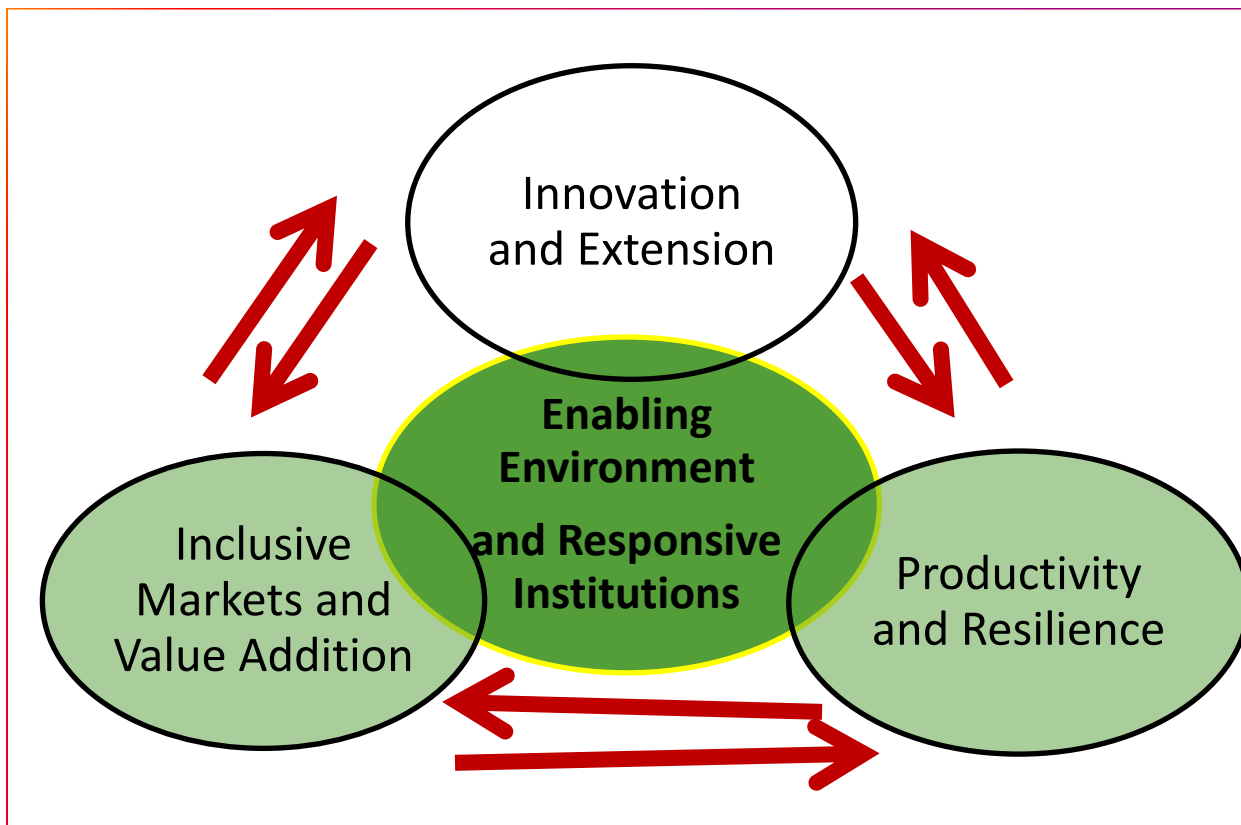
6. PSTA 4 PRIORITY AREAS

6.1 PRIORITY AREAS OVERVIEW

Error! Reference source not found. shows the PSTA 4 Priority Areas and how they are linked and complementary.

- ▶ **Priority Area 1: Innovation and Extension** is the knowledge base for Priority Area 2 and 3. The focus is to improve agronomic knowledge and technology in terms of basic research and innovation, development of good extension services, as well as knowledge and information further down the value chain.
- ▶ **Priority Area 2: Productivity and Resilience.** The traditional core responsibility of MINAGRI is to increase production of crops and animal resources. PSTA 4 will see increased attention to ensuring that production is nutrition sensitive, sustainable, and resilient. Priority Area 2 feeds the value chains in Priority Area 3.
- ▶ **Priority Area 3: Inclusive markets and value addition** improves markets and linkages between production and processing. This includes key input markets such as fertilisers, insurance, and finance as well as upstream activities such as aggregation, promotion of value addition, market infrastructure and export readiness.
- ▶ **Priority Area 4: Enabling Environment & Responsive Institutions** provides the regulatory framework and defines public sector involvement. PSTA 4 aims to improve evidence-based policymaking through better collection and handling of information and enhanced capacity for analysis and policy development, and to improve the planning process, particularly by addressing coordination between stakeholders.

Figure 4: Overview of PSTA 4 Priority Areas



6.2 PRIORITY AREA 1: INNOVATION AND EXTENSION

6.2.1.1 CONTEXT

Demand-driven and innovative research and development (R&D) is an important public function in support of agriculture development¹¹⁰. The Science Agenda in Agriculture for Africa (S3A) highlights a consistent rate of return between 40-60 per cent rates for investments in science for agriculture carried out in several global studies in different countries at various stages of development. There is scope to enhance agricultural R&D in Rwanda, as under PSTA 3 it attracted only 0.7 per cent out of a target of 7.1 per cent¹¹¹. Increased R&D triggers agricultural innovations, boosting performance and reducing susceptibility to risks including from climate change.

In terms of extension outreach, Rwanda is making significant progress. The 2015 household survey shows a positive increase in outreach of agricultural extension services. In 2012, 32 per cent of surveyed households received advice in the year prior, whereas in 2015 this had increased to 69 per cent (54 per cent of which were female). The *Twigire-Muhinzi* (for crop farmers) and *Twigire Mworoz*i (for livestock producers) extension models¹¹² give access to advisory services, appropriate agricultural technologies, and knowledge. The aim is to build farmers' capacity to identify problems, test possible solutions and adopt appropriate practices and technologies in a changing environment. This approach has created favourable conditions for technology adaptation and adoption, and information exchange among producers, farmer organizations and different partners¹¹³. *Twigire Muhinzi* complements the services delivered by public extension officers and is implemented by MINAGRI (responsible for technical support) and MINALOC (responsible for day-to-day coordination and planning through the districts). PSTA 4 puts a great emphasis on increasing the role of the private sector in the delivery of extension services.

There is still great potential to improve the skills and capacities of farmers and farmer organisations. On-going investment in this area is needed to achieve the transformation to a market-led agriculture sector requiring different skill sets and capacities of Rwanda's agriculture sector actors. As underlined by the NAP, vocational education and training (VET) can provide cost-effective access to knowledge and specific job-related skills in agriculture value chains. As reflected by the EIVC 4, unemployment among university graduates stood at 14 per cent and special efforts are needed to promote agribusiness development among them.

OUTCOME 1.

The outcome of Priority Area 1 is technological upgrading and capacitated farmers and rural value chain actors who make informed decisions and profitably engage in off farm activities.

This will be achieved through (1) strengthening demand-driven locally-adapted research and technology transfer via strengthened and coordinated partnership; (2) providing demand-driven and customised extension services tailored to farmers' needs with a broad range of items like nutrition, gender, business orientation through both technical as well as management/business skills development; (3) enhancing the role and services offered by private service providers including farmer organisations, and (4) providing training and capacity development for rural value chain actors.

¹¹⁰ Alene & Coulibaly (2009); Beintema & Elliot (2009); Nin-Prat & Fan (2010)

¹¹¹ Agriculture Expenditure Review (2016)

¹¹² Rwanda's adaptation of the Farmer Field School (FFS) approach

¹¹³ A *Twigire Muhinzi* Reflection Paper (2016) by MINAGRI and BTC notes that by the end of 2015 2,300 FFS facilitators supported 8,500 FFS in almost 50% of the villages. Farmer promoters numbered 14,200 by the end of 2015 and had created approximately 75,800 *Twigire* groups, reaching an estimated 1,100,000 households

IA 1.1 RESEARCH AND INNOVATION DEVELOPMENT

Objective: To build a strong and demand-driven research sector that develops and disseminates locally-adapted inputs, technologies and innovations to improve productivity and mitigate risks.

Agriculture research to develop and disseminate improved varieties and breeds as well as new approaches and technologies in areas like irrigation plays a key role in improving crop and land productivity, promoting sustainable land use and intensification, and mitigating and adapting to environmental degradation and current and future climate risk. Research emphasis under PSTA 4 is placed on areas such as soil health and fertility, pest, and diseases (including IPM), the development of resistant varieties and animal genetic improvement, integrated farming systems - including climate smart agriculture and crop/livestock integration - and on previously under-exploited areas; specifically fisheries and aquaculture.

PSTA 4's research agenda responds to farmers' needs and national priorities. Demand-driven research will be ensured through better feedback loops and links to extension and an increased private sector involvement. This will also lead to wider and more rapid adoption. Public funds allocated to agriculture research will focus on areas where the private sector has little incentive to invest but are believed to bring significant benefits and positive externalities.

To better manage proposed research networks and be able to benefit from private initiatives, at the Ministry level, a full-fledged department in charge of research and extension will be created.

1.1.1 AGRICULTURE RESEARCH INFRASTRUCTURE

Investments are required to upgrade and maintain Rwanda's national and decentralized agriculture research infrastructure. This includes upgrading and building of new laboratories, research stations, greenhouses, hydroponic facilities, and post-harvest research facilities. Investments will also be made in gene banks to collect, conserve germplasms (seed and animal genetic resources). Investments are proposed to upgrade ICT facilities and equipment and information and documentation systems will be revamped.

1.1.2 HUMAN RESOURCE CAPACITY DEVELOPMENT

Capacity building of research staff will focus on several areas that have become more pertinent in the face of a changing context in which Rwanda's agriculture sector is operating. This includes research on long-term trends in climate and its impact on agriculture (including shifts in agro-climatic zones and crop, livestock, and value chain suitability), and socio-economic gender-sensitive research on impact of technologies. Staff capacity development on GMOs is another priority and MINAGRI targets that by 2020, its researchers will have capacities to detect GMOs while in 2022, Rwanda will be able to produce GMOs.

To extend the practical use of ICT in agriculture research, investments are foreseen to support ICT4 Agriculture innovations and initiatives.

1.1.3 COLLABORATION AND RESEARCH NETWORKS

To improve current and to ensure future research capacity, stronger collaboration with research institutions and universities is promoted. Activities include the development of university curricula for researchers, joint supervision of post graduate students and researchers and attachment and internship programmes at RAB and NAEB's research. Similarly, joint research activities, an exchange of research results as well as contracting universities to do research or to carry out extension activities will be encouraged. The purpose of these activities will contribute to bridging the gap between universities and agriculture sector researchers and extensions.

To facilitate more public-private research initiatives, a Research Window will be established under the Agricultural Development Fund (see 4.3.3) to support joint research projects and promote development and testing of innovations developed under partnerships/PPPs. To ensure the research responds to demands from the field, a more participatory approach with extension workers and farmers is promoted (see also 1.2.1).

Strengthened regional and international research collaboration can leverage a greater impact from a relatively small national research system, enriching local knowledge. Rwandan scientists and researchers will be stimulated to access international research facilities and undertake exchange visits to develop regional or international research networks. Funds will also be made available to acquire patents and licenses through research networks. In that way, technologies developed in other countries will be easily available in Rwanda for the good of sector beneficiaries.

1.1.4 ACTION ORIENTED RESEARCH TO IMPROVE SOIL HEALTH AND FERTILITY

Challenges to Rwanda's soils include nutrient losses through erosion, soil acidity, low organic matter, and the emerging problems of salinity that is constraining crop productivity in marshlands. Specific nutrient management packages must consider climate variability and future climate change. PSTA 4 prioritizes soil diagnostics using the latest high-resolution GIS technologies as well as mobile soil testing equipment to refine the soil typology profiles. Research will be conducted to develop recommendations for location-specific interventions, including fertilizer use. Soil maps will be updated, and special equipment used in dosing fertilizers according to the soil type will be acquired and tested and a strategy for farmer dissemination, including production of the equipment will be developed. In addition to the soil diagnostics, a research project will be undertaken to determine the best ways of efficiently protecting soil against erosion. The results will be spread throughout the country.

Emphasis is also placed on developing Integrated Soil Fertility Management (ISFM) and Integrated Pest Management (IPM) technologies. Research on bio-fertilisers technologies (e.g. vermi-composting, organic fertilizer, enriched compost) will be a priority given the need and demand for greater organic fertilizer use among farmers.

1.1.5 INNOVATIVE RESEARCH ON CROP IMPROVEMENT AND HUSBANDRY TECHNOLOGIES

Crop inputs and technologies suitable to Rwanda's various agro-climatic zones need further improvement. At present, the availability of high quality improved seeds remains a constraint. The largest proportion of improved seeds is imported, and research remains limited. The development of varieties resistant to biotic and abiotic stresses (e.g. disease, drought, and pests), and early maturing and high-yielding crops, is promoted. Nutrient-rich crops will be developed through research in bio-fortification, with strong private sector involvement in order to position Rwanda as a trusted source of bio-fortified food for the region. In addition to crop improvement, research efforts will focus on preserving local crop varieties.

In terms of crop husbandry, research will be undertaken on water use efficiency, post-harvest and nutrient preservation and enhancement technologies.

In the field of biotechnology, the country will have a proper legislation to handle GMOs (Genetically Modified Organisms) on that topic by 2018 and staff capacities in this area will be built (see 1.1.2).

1.1.6 INNOVATIVE RESEARCH ON ANIMAL RESOURCES IMPROVEMENT AND TECHNOLOGIES

To reduce Rwanda's dependence on importation of improved breeds there will be investment in a nationally adapted animal breeding program for animal genetic improvement and conservation. Research on animal genetic resources, animal diseases, vaccines, drugs, fodders, feeds and animal products specifically will be enhanced to increase the number of species conserved not only in vitro but also in vivo.

To address the challenges of limited feed resources for livestock, research efforts will be geared towards finding solutions for expansion and commercialization of animal feed value chains for both ruminant and non-ruminant livestock. To combat (transboundary) animal diseases, investments are proposed to strengthen disease diagnostic capacity in national veterinary, satellite laboratories, strengthen capacity for animal research and upgrade the outreach system for animal technology dissemination.

1.1.7 INNOVATIVE RESEARCH ON AQUACULTURE AND FISHERIES

Research efforts on fisheries and aquaculture development focus on developing fish breeding materials, including the diversification of fish species and breeding techniques. Furthermore, fish feed production technology development is

prioritized, extending to include research on post-harvest loss reduction and fish quality and value addition. Finally, limnology studies will be undertaken.

1.1.8 INNOVATIVE RESEARCH ON AGRO-FORESTRY

Integration of agroforestry in crop production can contribute significantly to soil health and fixation. Research efforts will concentrate on tree/crop/soil interfaces and developing suitable models and technologies to increase agroforestry. The research undertaken in this area will support the implementation of the new agroforestry strategy (currently under development). A pilot will be undertaken to explore opportunities for promoting urban agriculture through introducing fruit trees in urban areas.

1.1.9 RESEARCH ON MARKETS AND FOOD SYSTEMS

To successfully tap into market opportunities, research on domestic, regional, and overseas markets is crucially important. Market research and product development, including data analysis on primary information (e.g. production volumes, consumption) and processed data (e.g. market trends, forecasts), is required to expand exports and sales to domestic, regional, and international markets. Research on the domestic market will be geared toward meeting the needs of consumers as well as producers, such as identifying dietary gaps, mapping consumption patterns and the links with production, trade analysis, impact of regulations etc. For regional markets, research is focused on identifying Rwanda's comparative advantage in the region and where regional trade can benefit Rwandan food producers and consumers with inputs/raw materials and final products. Furthermore, research assists identifying relevant non-tariff barriers in regional trade. This is to support the mandated GoR institutions in regional trade negotiations in areas relevant to the agri-food system. For overseas markets, market entry studies have been conducted for several markets over the past few years¹¹⁴. The common conclusion of these studies is that Rwandan producers can supply niche products mainly in horticulture and animal products, but the key issues are in reaching a critical mass of domestic production¹¹⁵ and meeting requirements for logistics and standards. Therefore, research from the agriculture sector perspective for international markets will be focused on the identification of niche products and finding cost-effective and sustainable solutions to logistical challenges while meeting quality and safety standards at all stages of the value chain.

To coordinate these research efforts, a marketing department or "Market Research Hub" will be established to identify, which varieties are preferred by consumers depending on targeted markets (rural/urban, regional), and which types will perform positively under current and future agro-climatic zones.

IA 1.2. PROXIMITY EXTENSION AND ADVISORY SERVICES

Objective: To capacitate producers to make informed decisions and adopt agricultural innovations which increase, diversify, specialize, and intensify agricultural production.

While smart farmers generally make smart choices, different farmers have different support needs and require context-specific approaches. PSTA 4 promotes a more pluralistic extension and service delivery system that is flexible enough to consider different production systems, farms size, capacities, and social status, among others. Private sector engagement in agriculture service delivery is promoted.

1.2.1 INSTITUTIONAL CAPACITY DEVELOPMENT

In line with on-going decentralization to ensure more efficient extension delivery, MINAGRI will remain responsible for providing strategic guidance and oversight, while the extension services will be delivered ever closer to the field level allowing for better targeting, greater outreach, and impact. To ensure coordination, regular interactions are foreseen at sector, district, and national level. Technical capacities of staff will be built in specific areas where specialized extension is

¹¹⁴ MINICOM have conducted market entry studies for: Gabon, Rep. Congo, Dubai, and Nigeria,

¹¹⁵ Ibid.

in demand, such as livestock and fisheries. “Research-into-use platforms” will be established to improve dialogue and links between research and extension.

1.2.2 QUALITY PROXIMITY EXTENSION SERVICES TO FARMERS

Continuous support from public extension officers and other partners will focus on building capacity of farmer promoters (FPs), FFS facilitators and their cooperatives. A performance evaluation and incentive system are proposed to improve the level and accountability of the advisory services delivered. This includes more emphasis on technical backstopping and supervision and provisions for transport and communication. In addition, FFS facilitator cooperatives will be strengthened and supported. Provisions will be made to provide financial incentives to FFS facilitators and FP through the financing mechanisms (see 4.3.3). On a technical level, capacity building efforts are continued targeting a range of extension workers, including RAB staff, Master Trainer, FFS facilitators and Farmer Promoters. Technical areas for capacity development include gender responsiveness and targeting, veterinary extension, fisheries and aquaculture extension.

Extension messages will be revised to evolving realities and priorities, introducing issues such as nutrition, gender, and savings, using weather and climate information, IPM and climate smart agriculture. Options for extension delivery methods are becoming more pluralistic with the widespread use of mobile phones and ICT. With that in mind, an extension communication system will be built to allow direct feedback from extension workers to farmers for questions and queries. Consideration is given to vulnerable households (e.g. those recently graduated from social protection programmes or with no or limited literacy skills) in extension schemes. Most of the implementation will be at the local government level, so considerable emphasis will be on coordination between MINAGRI, agencies, local government, and other stakeholders.

1.2.3 TAILORED AND DEMAND-DRIVEN SERVICES BY PRIVATE SECTOR

Complementing the *Twigire Muhinzi* system - which targets all farmers including small subsistence farmers - specialized private sector extension and service delivery systems for high quality, consistent and market-oriented extension, and advisory services to farmers are promoted.

At present, private sector extension is provided in some high-value commodities. Relationship and trust building between commodity-specific value chain actors is crucial and will be supported, specifically for high-end value chains that are prioritized under PSTA 4. During the first years of the strategy period, public sector investment at the district level will be required to display the value of private extension services to commercial farmers. A dual approach will be adopted to extend private service provision to farmers. The capacity of private service providers will be strengthened to meet farmers’ demands while demand will be stimulated, including through a farmer voucher system through the Extension Window of the Agricultural Development Fund.

IA 1.3. SKILLS DEVELOPMENT FOR AGRICULTURE VALUE CHAIN ACTORS

Objective: To support and empower rural value chain actors to profitably engage in farm and off-farm activities in the agri-food sector.

Farmers’ organizations, unions and commodity associations are central to achieving sustainable and inclusive agricultural development. They need to develop into well-organized, well-managed financially independent institutions, able to provide services to their members to exploit economies of scale for improved bargaining power and to engage in (policy) dialogues with other stakeholders. Farmer organizations require support in a range of management and entrepreneurial capacity-building activities, depending on their level of maturity and mandate. Through improved management and business skills, these organisations will be able to provide better services to their members and will become less dependent on Government and development partners support.

Skills development should go beyond producers and producer organizations. Skills are also required for new SMEs, ancillary services, or new jobs in agriculture value chains, including labour-intensive activities in food processing. PSTA 4 fosters economic growth to create productive, poverty-reducing jobs for youth, both on and off the farm. Women and the

youth's access to decent employment or to substantive income-generating activities in the rural areas requires specific attention and tailored approaches in skills development and training

1.3.1 SUPPORT TO COOPERATIVES AND FARMER ORGANIZATIONS

Support will focus on the establishment of effective, transparent, and accountable management systems, and building an entrepreneurship culture that encourages market-oriented production. Farmer organizations, including cooperatives, unions, and federations, will be strengthened and trained in management, organizational and business skills while support will be provided to increase member awareness and engagement. Farmer organizations' management capacities will be strengthened through training and the provision of temporary contractual management staff.

Market-oriented technical training to farmer organizations will support value addition, diversification or specialization, specifically focusing on high-end value chains. Equal representation of women in these trainings is promoted and the participation of women in leadership positions in farmer organizations is encouraged. Some of the more mature cooperatives will benefit from exchange visits and knowledge sharing with neighbouring countries. More recently established cooperatives will be supported to undertake exposure visits to more mature cooperatives within Rwanda.

Provisions are made to strengthen cooperatives in building their physical assets, for example for post-harvest or value addition, through the Agricultural Development Fund (see 4.3.3).

1.3.2 SKILLS DEVELOPMENT IN AGRICULTURE VALUE CHAINS

Skills development in agribusiness development will focus on business skills and market orientation (e.g. entrepreneurship training and accounting). Entrepreneurs in SMEs and clusters of agri-food system businesses require assistance to analyse market potential for their products and services and to comply with regulatory requirements. Youth need to access specialized training and assistance to address issues such as meeting local and international food safety standards and developing appropriate, low-cost packaging and labelling. In addition, specific efforts will be placed on skills development for domestic production of equipment and technologies, particularly targeting the youth.

Improved agri-food training programmes and curricula are needed for specific job-related skills, drawing on Rwanda Development Board recommendations. Private sector engagement in this area will be increased to ensure the training meets skill requirements. Training will be delivered through traditional VETs as well as E-learning. New approaches in training delivery will be piloted, including private sector professionals to teach content through multi-media programs focusing especially on out-of-school youth. Curricula will also be developed that are accessible and relevant to women and young people with minimal formal education.

1.3.3 WOMEN EMPOWERMENT AND SKILLS DEVELOPMENT

Women empowerment is crucial for both women's own and national socio-economic development and is therefore a core component in most intervention areas. It is linked to many positive spill-over effects on the overall economy, household members' health, food security and nutritional status, and reduction of gender-based violence and discrimination. Empowerment of women in PSTA 4 focuses on training and capacity development in leadership and management skills for women to actively participate in decision-making at the household, cooperative, community, and institutional level. In parallel, women economic empowerment will be fostered through provision of technical skills and promoting access to inputs. This includes for example, providing targeted support to women to access suitable financial products for income-generating activities, productive and off farm. To directly support women entrepreneurship through the Agribusiness Window of the Agricultural Development Fund (see 4.3.3) seed funding will be provided to women to start or grow their agribusiness enterprises or engage in income generating activities.

1.3.4 YOUTH AGRIBUSINESS DEVELOPMENT

Rural youth receive special attention under PSTA 4 as job creation is a high priority as per highlight in the NST1. A youth incubation programme will provide a wide range of services for start-ups as well as support for the development of shared

infrastructure. This will build on on-going initiatives such as the grant fund for start-ups launched in 2016 by BDF and PSF, by establishing an Agribusiness Window under the Agricultural Development Fund (see 4.3.3) which gives priority to women and youth. MINAGRI will assist in facilitating dialogues with districts, local communities, and the private sector to dedicate underutilized land for youth groups working specifically, but not exclusively, on intensive, high-potential agriculture enterprises.

Additional support will be provided to youth beneficiaries to get hands-on skills in agriculture and livestock production techniques as well as the development of bankable business plans. Partnerships will be built with private sector and local governments to assist with internships, apprentice positions and incubator programmes to provide young entrepreneurs and employees with on-going mentoring. It is worthwhile to notice that the incubation program will benefit young people who attended agriculture or livestock schools at university or at the secondary school level.

Beside the incubation programs, young women and men who did not attend the agriculture or livestock related schools will benefit from agriculture and livestock skills through practical trainings and study tours to be engaged in the agriculture. The tactic will be to consider youth with at least 18 years and who did 12 or 9 years of secondary school and a training of trainers' system will be used. Once equipped with agricultural techniques, support fostering engagement in crop or livestock production, value addition and commercialisation will be granted.

CONTEXT

Crops are the main agricultural commodities in Rwanda. They are central to food security and the main source of income for most farmers. The government has made concerted efforts to increase farmers' use of quality seed and inorganic fertilizers, including through the provision of subsidies on seeds and fertilizers. In recent years, a shift in government policy was implemented, moving from predominant public procurement of fertilizer and seeds (2007-11) to the progressive privatization of importation and distribution (2012-16). In the existing fertilizer subsidy program under the crops intensification programme (CIP), prices are reportedly subsidized between 50 – 85 per cent.

Despite efforts, the yields of most crop commodities are still way below their potential and the crops most farmers grow have a low market value. As a result, land productivity and farm income remain low. The reasons for this are manifold and vary from one region to another. They include timely access and the appropriate use of quality inputs, knowledge, finance, technologies, and markets. The scarcity of land pushes farmers to cultivate on increasingly steep hill slopes, clearing natural vegetation and leaving the soil idle for a part of the year.

Weather variability affects productivity in Rwanda. Inter-annual variability and periodic shocks have a major impact on the sector. This is recognised in the NST, which identifies the need for increased climate resilience and vulnerability management to avoid losses from weather or climate risks. Moreover, the climate of Rwanda is already changing, and future climate change has the potential to exacerbate current risks. There is therefore a need to ensure that productivity increases are resilient, with sustainable soil and water management, and to start preparing for future climate change.

Rwanda has 589,711 ha of irrigation potential out of which 47 per cent is on marshlands and 63 per cent is on hillsides¹¹⁶. About 7.5 per cent of this potential has been successfully developed to date covering a total of 48,508 ha¹¹⁷. To promote the development of affordable and sustainable irrigation technologies, the Government of Rwanda introduced the Small-Scale Irrigation Technology (SSIT) project for improved productivity and commercial farming. There is great potential and demand for investment in small-scale irrigation systems to complement the large-scale irrigation investments undertaken to date. As Rwanda is implementing an Integrated Water Resource Management (IWRM) policy to ensure efficient, effective, and sustainable agricultural development, irrigation projects need to align with it.

Notwithstanding the importance of crops, the government recognizes the position of animal resources and their contributions to the national GDP, reducing poverty, ensuring nutritional security, and boosting export earnings. This is most clear in the achievement registered primarily by the dairy sector, but also by various meat commodity chains. Livestock plays an important role in providing assets and income to rural households living below the poverty line, for example through the Girinka programme, but also through the distribution of various small-stock and other animals. The inclusion of livestock diversifies and increases total farm production and income, provides year-round employment, and disperses risk. Sales of livestock products provide funds for purchasing crop inputs and for financing farm investments. Livestock often form the major capital reserve of farming households and, in general, enhance the economic viability and sustainability of a farming system. Issues related to the livestock sector include the sustainable provision of quality feed and animal nutrition, animal health, and enhanced animal genetic resources. Addressing these issues helps increase animal productivity and reduces negative environmental impacts like soil degradation and, in the case of ruminants, high levels of greenhouse gas emissions.

However, animal resources go beyond livestock and more emphasis is placed on developing and expanding fisheries and aquaculture in the next few years. Rwanda is endowed with an extensive hydrological system, suitable for fisheries and aquaculture, characterised by a dense network of lakes, rivers, and wetlands, with about eight percent of the country (210,000 ha) covered by water bodies. Limited private sector investment results in fisheries being less than 10 per cent of

¹¹⁶ Irrigation Master Plan (2010)

¹¹⁷ Imihigo report FY 2016/17,

the estimated production potential. Fish feed has been the binding constraint for aquaculture development. With several aquaculture investment projects planned and underway, the sector is expected to grow substantially in the coming years.

OUTCOME 2:

The outcome of Priority Area 2 is increased productivity, nutritional value and resilience through sustainable, diversified, and integrated crop, livestock, and fish production systems.

This will be achieved through investment in sustainable and climate-resilient development of infrastructure and technologies needed to boost production and productivity (land, water, mechanisation), production and improved quality, availability and application of agriculture production factors adapted to different categories of farms, the promotion of agricultural diversification and integrated production systems, specific actions to ensure food and nutrition security and the promotion of more resilient and sustainable farm systems at ecosystem and household level.

This Priority Area builds on the experiences from the crop and livestock intensification programmes and complements them with innovative ways of increasing profitability, resilience, food security and nutrition at farm and household levels, which are presented in more detail in the intervention areas below. Enhancing agricultural productivity and resilience does not only rely on investments and technologies. It requires skills development, efficient markets and the right policy and institutional environment. It will therefore be the result of combined efforts of PSTA 4 across all Priority Areas.

As 30 per cent of farmers have less than 0.2 ha and exploit 5.4 per cent of arable land in Rwanda, increasing labour and land productivities on those tiny plots will require special tactics. High value commodities like horticulture or poultry will be prioritized. Once farmers are organized in strong cooperatives, they will be able to benefit from support to invest in hi-tech equipment like green houses and hydroponics. Furthermore, farmers on small plots will be supported to consolidate their land to increase the scope for service delivery and mechanisation.

IA 2.1 SUSTAINABLE LAND HUSBANDRY AND CROP PRODUCTION INTENSIFICATION

Objective: To enhance the productivity of crops cultivated in Rwanda in a sustainable and climate smart way.

In Rwanda, land is the scarcest production factor for agriculture, and its use needs to be optimised. This requires investments in soil and water conservation and sustainable land husbandry. Furthermore, investments in productive infrastructure are needed to gradually expand irrigated agriculture (within a IWRM approach), to secure production and allow for multiple production cycles per annum. Specific actions to promote a sustainable intensification of agriculture and strengthen its resilience are needed to counter environmental degradation and mitigate risks associated with the impact of climate and other shocks. Such actions must be put in place at different levels and in planned coordination to maintain sustainable agricultural growth.

By combining good agricultural and conservation practices and focusing on agricultural commodities that offer a good return and good market opportunities, a sustained increase in agricultural production and productivity can be achieved.

2.1.1 SUSTAINABLE LAND HUSBANDRY AND CLIMATE SMART PRACTICES

Sustainable agricultural land management practices aim to protect resources and enhance the productive capacity of land and soil. This is done by reducing soil erosion, improving soil water infiltration, and holding capacity, enhancing nutrient supply, and increasing soil biodiversity. PSTA 4 promotes developing soil and water conservation as part of integrated watershed management programmes, considering that the most successful approaches are those involving local communities, especially in reconciling the use of crop, livestock, and trees. PSTA 4 also encourages the use of a wide range of cost-effective erosion control measures, whereas the focus in previous strategies was mainly on terracing.

Investments in hill slopes soil and water conservation consist of structures development (e.g. radical and progressive terraces, check dams, soils or water detention trenches, cut off drains, waterways), erosion control measures (tree belts, contour belts, grass strips, contour bunds, planting of fodder grasses on bunds/ridges, use of permanent, perennial vegetation on contours, etc.) and agro-forestry (intercropping, integration of trees on farm plots, tree belts, protective

forests, food production and nitrogen fixing, erosion control, etc.). PSTA 4 recognizes the potential of agroforestry to contribute to sustainable land husbandry. The Agroforestry Strategy and Action Plan, aligned to the NST outcome on 'Sustainable and productive forestry management, for sustainability and economic profitability', should be the interface and interaction between agriculture and forestry, involving farmers, livestock, trees, and forests at multiple scales while noting that this will require joint programming. The Agroforestry Strategy estimates a baseline of 22 trees per hectare in 2017 and has indicated 78 trees per hectare as a possible target.

Complementing investments in land husbandry infrastructure, farmers are trained in sustainable land management practices. Climate smart agriculture – involving both on-farm measures but also supporting and enabling actions (as described in PA4) - has the potential to increase productivity, build resilience to current climate variability and future climate risks and reduce greenhouse gas emissions. These include inter-cropping, cover crops, conservation agriculture (particularly reduced or zero tillage, maintaining crop residues/mulching and crop rotation), crop residue retention, use of improved vegetated fallows and crop rotation. PSTA 4 foresees widespread training of farmers in climate smart agriculture practices to improve adoption rates. The Agricultural Development Fund (see 4.3.3), provides incentives, under the Productivity Window, for private sector investment in climate resilience.

2.1.2 EFFICIENT AND SUSTAINABLE USE OF INPUTS

Activities in this area focus specifically on the timely access of farmers to crop production inputs, and their efficient and sustainable use. These are combined with the adoption of climate smart agriculture practices (2.1.1) to enhance productivity and resilience as well as input-use efficiency (input/cost-efficiency) without adverse effects on natural resources.

PSTA 4 emphasises the adoption of integrated soil fertility management which combines agri-environmental practices, resource recovery and the reuse of fertilizer-enriched products through incorporating manure, crop residues and composting in current farming systems. PSTA 4 supports the increase in organic fertilizer production and utilization as part of integrated soil fertility management practices in conjunction with the gradual liberalization of fertilizer supply. Organic fertilizers are more sensitive to conserving soil quality. Support and training is provided to farm level production and the application of organic fertilizer. Although the application of inorganic fertilizers can bring marked increases in crop production in the short term, farmers will receive training on the proper management of soil organic matter to reduce and reverse soil degradation and soil fertility loss. Training will also be provided on the efficient and sustainable use, and disposal, of pesticides and other agro-chemicals.

Efforts will be made for domestic production and duplication of quality/certified planting material. This will improve the availability of seeds for cereals, fruits, and vegetables as well as seedlings for agroforestry trees. While continuing to comply with the open market, MINAGRI will strive to have Rwanda become self-sufficient in seed production. It will undertake regular seed needs assessments and will provide support to cooperatives to multiply seeds.

2.1.3 INTEGRATED PLANT PROTECTION AND PEST MANAGEMENT

Achieving enhanced productivity requires the monitoring of crop health and timely control of pests and diseases. It is recognised that in addition to existing risks, climate change will alter the range and prevalence of current challenges, as well as potentially increasing the emergence of new risks. To mitigate these existing and future risks Integrated Pest Management is promoted, considering all available techniques to control the development of pest populations. Efforts focus on maintaining pesticides and other interventions to levels that are economically justified and minimize risks to human health and to the environment. Natural pest control mechanisms are promoted to the extent possible, with the least possible disruption to the agro-ecosystem.

Farmers are trained in safe pesticide handling, and awareness-raising campaigns are organized on risks associated with pesticide use. Pest and pesticide management and the safe disposal of obsolete pesticides are guided by the principles

and recommendations from the International Codes of Conduct on Pesticide Management and on the Distribution and Use of Pesticides.¹¹⁸

2.1.4 MECHANIZATION AND TECHNOLOGY

Mechanization is crucial for increasing for labour and land productivity. With just a hand-hoe, a farmer can manage not more than one hectare whereas with mechanization a farmer can service up to 200 hectares¹¹⁹. Mechanization and technology programmes are context-specific and must respond to the specific needs of a country. As noted by the NST1, the percentage of mechanized farm operations is expected to increase from 25 per cent (2017) to 50 percent in 2024. To achieve this target, various instruments will be applied including the setting up of a Productivity Window, under the Agricultural Development Fund (see 4.3.3). This will permit private investors to access credits on good terms. In addition, PPP projects will be undertaken, and hi-tech equipment will be subsidized for a certain period of time. To support operation and maintenance of the equipment, mechanization service centres will be set through PPP arrangements.

The promotion and dissemination of adapted technologies will reduce burdens and enhance land and labour productivity. To enhance its impact, attention will be given to adapting technology programmes to local conditions and farmers' needs and capacities, considering the specific needs of women, the youth, and vulnerable households. Where possible, labour-saving technologies, especially for rural women (e.g. agriculture mechanization, water reserve tank, cooking stoves, cooking briquettes, etc.) will be promoted to reduce women's workload and allow them to allocate more time to other productive activities and child feeding and care.

2.1.5 INCREASING PRODUCTION OF COFFEE, TEA, AND HORTICULTURAL PRODUCTS

Coffee and tea are of strategic importance being the main traditional export crops. While the government has gradually stepped away from productive activities since the privatization process started in 1996, there is still a role to play in ensuring increased production and exports.

In coffee, the yield per tree is currently 2.8kg, which could increase up to 5kg/tree. The stock of trees is ageing, and the government will subsidize re-stocking such that 30% will be new by the end of the strategy period. Fertilizer application should increase significantly from 4700MT to 18,750MT through government support. The land area under cultivation should gradually increase from 37,500 ha to 50,000 ha, while introducing drought and disease resisting varieties. The percentage of mulched coffee should increase to 80%. These interventions would increase export volumes by 71%.

In tea, the yield should improve from 7 MT/ha to 9 MT/ha through increasing fertilizer application from 7000 MT/year to 10,000 MT/year and investing in high-yielding clones. Moreover, the land area should be augmented from 26,879 ha to 45,000 ha. These interventions would increase export volumes by 73%.

Horticultural products present a number of high-value value chains that suit Rwanda's wet climate and limited land resources well. The government plans to support the private sector expanding the area for flowers from 20ha to 500ha; the area for vegetables from 20,000 ha to 100,000 ha; and the area for fruits from 6,500 ha to 9,000 ha.

IA 2.2 EFFECTIVE AND EFFICIENT IRRIGATION UNDER IWRM FRAMEWORKS

Objective: To develop water resources to enhance the sustainable and resilient productivity of agriculture and enable the development of new value chains.

Irrigation allows farmers to move from rain-fed, to diversified, high value crops, thus increasing cropping intensity and land productivity. A recent study in Rwanda estimates that in the first dry season of irrigation adoption, plots just inside the command area are: 16% more likely to be cultivated relative to those just outside the irrigated area and 8-27% more

¹¹⁸ <http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/code/en/>

¹¹⁹ Mazoyer & Roudart in Histoire des agricultures du monde du néolithique à la crise contemporaine

likely to use improved fertilisers. Moreover, they are 9-38 percent more likely to grow horticultural crops. In line with these changes in crop choice and input use, the value-weighted yields increase by 31-77%, while sales per hectare increase in response. Considering that only about 1/3 of farmers are cultivating in the dry season, the point estimates suggest that revenues could be going up by 210000-300000 RWF for cultivating farmers in that season¹²⁰.

While developing irrigation is a priority, the irrigation systems need to be efficient and sustainable, both in terms of its provision of water resources as well as the development and management of the irrigation systems. In line with the Irrigation Master Plan (IMP), and based on principles of Integrated Water Resources Management, the PSTA 4 develops both medium-scale irrigation systems (hillside and marshland), as well as small scale irrigation systems. These are to be developed considering water catchment plans and water governance arrangements, with efficient water-use through improved application techniques, new varieties, adaptation of crop physiological responses, and improved scheduling to match plant growth with high water availability across seasons in line with the IMP.

2.2.1 WATER RESOURCE DEVELOPMENT

The development of new irrigated land and the sustainable mobilization of water for agriculture involves a series of actions. These include marshland irrigation, hillside irrigation, protected (green house) irrigation, small scale irrigation and water development. Small scale irrigation and water development offer the advantage to be easily adopted by farmers and be simple to manage. They include small ponds and check dams (water harvesting), reservoirs for fish (aquaculture), livestock watering and other productive activities. The success of these investments depends in large part on their adaptability to local condition, local ownership (level community participation), technical design and construction quality. For medium-scale irrigation schemes (on hillside and marshlands), flexibility and the cost of operation and maintenance (O&M) are the key criteria since they are mainly gravity irrigated. On the contrary, most of the areas for hillside irrigation require pumping and hence higher O&M costs, and their acceptability and financial sustainability need to be carefully assessed.

The development of the irrigation systems, will be based on needs determined by agro-climatic zones and market requirements. Owing to the high investments required for irrigation, investments will be preceded by market surveys and developing support services and market linkages. Incentives will be provided for direct private sector investment in irrigation development and service provision (e.g. irrigation equipment and O&M services) where feasible (e.g. tax cuts, access to concessionary loans, revolving funds). One key instrument to provide incentives for private sector investment in irrigation development, under the Productivity Window of the Agricultural Development Fund (see 4.3.3). This fund will facilitate the establishments of PPPs and provide incentives for the private sector to invest. This fund will also provide incentives for small-scale irrigation to be developed. Through this fund MINAGRI will subsidise a percentage of the investment costs, with larger consolidated land receiving higher subsidy rates, hence encouraging farmers to consolidate land.

The development of new irrigated land will adopt the principles of integrated water resources management and use water accounting approaches. These will ensure coordinated action at river basin level, avoid conflict on water between users, mitigate negative impact on fragile water-based ecosystems and allow efficient monitoring. To this end, volumetric-based irrigation water charge systems are introduced that will increase water saving and provide an incentive to users paying only for the volume used. Furthermore, any irrigation project will undergo a complete environmental impact assessment including the analysis of its impact on water resources for sustainable purposes.

2.2.2 PROMOTION OF INNOVATIVE IRRIGATION TECHNOLOGIES

Drip irrigation, hydroponic and aquaporin systems are innovative technologies that can be instrumental in overcoming challenges related to land scarcity and fertility, save water, while improving water efficiencies, and boosting high-value crops production (e.g. vegetables). Initially associated with hi-tech irrigated agriculture, these technologies are now being

¹²⁰ DIME (2017): "Impacts and Sustainability of Irrigation in Rwanda" – Mid-term evaluation report

used by a much wider range of farmers in emerging and developing countries. A technical and socio-economic study will be carried out to assess feasibility and develop customized Rwandan standards. PSTA 4 supports, as an incubation initiative, the introduction of modern production infrastructure such as greenhouses for vegetables and flowers and hydroponics under PPP arrangements in specific sites to showcase their potential. The aim is to attract more private sector investment in these areas in future.

2.2.3 INNOVATIVE MECHANISMS FOR THE MANAGEMENT OF IRRIGATION INFRASTRUCTURE

The management of irrigated infrastructure requires skills, technologies and cash flow which are currently beyond the capacities of most farmers and farmers' organizations. On the other hand, the model of state-led management of irrigation schemes represents a heavy burden on public finances. New models of irrigation scheme management are promoted, including the establishment, and strengthening of producers/water users' associations and the piloting and scaling up of public-private partnership models for managing irrigation infrastructures.

IA 2.3 ANIMAL RESOURCES AND PRODUCTION SYSTEMS

Objective: To increase productivity of animal resources, aquaculture, and fisheries in Rwanda in a sustainable way, and improve availability and accessibility of animal products.

Regional and domestic market opportunities and projected returns provide the main rationale for expanding livestock in the country. The livestock sector has become increasingly productive over the past years and the aim is to sustain this growth under PSTA 4. In animal production efficiency will be considered. Cows will be promoted for milk, while small-stock, poultry, and aquaculture will be raised mostly for meat due to lower feed requirements. Small livestock also contributes to farm income, resilience, and enhanced nutritional status of farming families. Substitution of surplus chicken and pig meat for domestic red meat consumption would also reduce domestic meat prices and enable an increase in meat export. Taking advantage of the potential of poultry and pig sectors would require substantial investments in promotional activities to change consumer preferences¹²¹.

Ensuring animal and public health is the core mandate of Rwanda's veterinary health system (VHS). It focuses on disease prevention, diagnosis, response/control measures and veterinary public health. Animal health services need to expand dramatically, especially in remote areas where pastoralists predominate. Where private investments are too risky and returns too low, private-public partnerships will be enhanced to reduce mortality and morbidity.

As with other livestock products, demand for fish is outpacing domestic production. A highly nutritious food, fish is identified as a sub-sector with great untapped potential, both to improve rural incomes but also to provide important micro-nutrients and proteins to people's diets. Support is required to introduce and upgrade aquaculture and promote sustainable capture fisheries. Bees and commercial insects' production systems can provide an opportunity for income diversification, specifically for women, youth, and smallholders. The poverty reduction and safety net potential of these activities can be substantial when people receive the right support and access to markets.

2.3.1 SUSTAINABLE ANIMAL NUTRITION, FEEDING AND HUSBANDRY PRACTICES

Availability of sufficient animal feed is a crucial element in promoting livestock development Rwanda. Further analysis is needed on resources, specifically land, required for animal feed production, and feed conversion rates. There is a need for an integrated approach to livestock feed security at household and national levels. Interventions in this area focus on improving animal feed practices and optimizing on-farm crop-livestock integration. Farmers engaging in mixed farming systems (e.g. livestock integrated with crops and agro-forestry) are supported to enhance nutrient recycling and to reinforce pest and disease management.

¹²¹ ILRI (2017) DRAFT Livestock Situational Analysis for the Livestock Master Plan

Community level production and processing of improved fodder crops is promoted to increase food conversion efficiency and reduce input costs. Access to and information on fodder seeds and materials will be provided to improve communal feeding schemes and commercial improved fodder production. Improved grass and leguminous feed production¹²² is promoted in all accessible areas including backyard, hedge, and live fence development. Fodder banks at community/household level are promoted as well as the production of seasonal grasses/perennial fodder trees in community forest and fallow lands. The Sustainable Intensification Decision Support System (SIDESS) planning tool for existing ruminant livestock is targeted to be scaled up to the national level¹²³.

Water systems for livestock development are promoted in selected areas through the construction of communal water catchments. Producers will be trained to design their production system including housing and pasture management suited to their own context. Providing flexibility to livestock owners to choose animal type and grazing or stall feeding ensures maximum animal comfort and production.

2.3.2 ANIMAL DISEASE CONTROL AND HEALTH MANAGEMENT

PSTA 4 addresses the main factors impacting disease incidence in Rwanda, notably related to cross-border animal movement, the breed-improvement programme¹²⁴ and other factors such as the prevalence of ticks, a predominant vector of livestock diseases. The focus of the interventions is on prevention (including vaccination) and surveillance linked to early detection, warning and rapid response to disease emergencies making use of appropriate technologies while noting that the changing climate is likely to affect prevalence and incidence of current pest and diseases as well as increasing new ones. The capacity of the VHS for disease surveillance and vaccination will be enhanced for both emerging as well as endemic diseases and the diagnostic capacity of veterinary laboratories will be strengthened. National guidelines will be established for disease control, vaccination and surveillance and a digitalized system will be set up to share animal health information. A one health system will be promoted reduce the impact of disease emergence events on humans and livestock and to mitigate any future emergence through improved cross-sectoral coordination.

2.3.3 IMPROVED AND HIGH-QUALITY ANIMAL GENETIC RESOURCES

Improved and high-quality animal genetic resources are key determinants of animal productivity and GHG emission mitigation. By increasing production and consumption of chickens and pigs, and dramatically regulating the higher greenhouse gas emitters, the climate resilience of the sector could be improved substantially. Improving local breed development will enable drought survival and disease resistance.

Priority activities for improving animal genetic resources will differ across livestock and farming systems. Interventions will support community breeding practices and animal selection to improve animal genotype, as well as genetic diversity to achieve resilience through maintenance of local varieties and breeds. In addition, breed performance will be improved through crossing with improved breeds, which requires investments in artificial insemination (AI) and livestock conservation and breeding centres - linking closely with research activities (see 1.1.6). For cattle, the focus will be on promoting genetic advances that increase dairy and meat production and are more feed efficient. In the poultry sector, interventions will include improved family poultry with semi-scavenging crossbreds and substantial increases in the scale of specialized layer and broiler operations. Operation procedures for hatcheries and animal breeder farms will be developed and rolled out.

¹²²Based on the works of González *et.al* (2016) in countries including Rwanda, adoption rate of improved forages technology is expected to reach 60%, and 80% in the first 5, and 10 years, respectively.

¹²³ SIDESS tool is currently being implemented in Rwanda by the World Bank and Princeton University

¹²⁴Improved breeds of dairy cows are distributed to vulnerable households through the Girinka program. However, these cows with exotic bloodlines are more susceptible to endemic diseases (e.g. tick-borne diseases) than local cows.

2.3.4 KNOWLEDGE-BASED FISHERIES AND AQUACULTURE DEVELOPMENT

PSTA 4 focuses on developing knowledge-based fisheries and aquaculture and creating the institutional capacity to manage and develop fishery resources in Rwanda. Interventions focus on availing access to knowledge, training, and inputs essential for farmers to successfully engage in fisheries and aquaculture. Expansion of dam aquaculture will be encouraged. To ensure food safety, investments are proposed on improving food quality and safety standards (see 3.3).

On the input side, support activities include supporting community level fingerling and feed production and making suitable equipment and technologies more widely available and accessible - linking closely with research activities in this field (see 1.1.7). In addition, selective and strategic restocking of lakes and ponds will be undertaken. Cooperatives will be supported in establishing and managing fish processing and storage facilities.

Related to institutional capacity development, PSTA 4 envisages capacity development for fisheries monitoring, control and surveillance for key stakeholders involved in the subsector and fisheries information and statistics development. Rwanda will comply with the “Voluntary Guidelines for Securing Sustainable Small-scale Fisheries” under the FAO framework as well as the “Ten-year Action Plan for Small-scale Fisheries Development in Africa” under the AU.

2.3.5 BEE PRODUCTION SYSTEMS AND INSECTS FARMING

Beekeeping and insect farming has the potential to provide income for rural households, particularly for small-holder women farmers. Activities in this area include training and improved access and availability of inputs, specifically of species and hives. Emphasis will be placed on promoting the integration of beekeeping and insect farming with other agricultural activities. The interventions particularly target the youth and women organized in cooperatives. The sector managers will foster the collaboration between cooperatives for honey production and those for crop and animal resources to agree when to let bees outside and when to keep them inside the bee hives after spraying products which can kill bees. Honey production will also be increased by the projected growth in number of agroforestry trees.

IA 2.4 NUTRITION-SENSITIVE AGRICULTURE

Objective: To ensure agriculture contributes to enhanced dietary diversity and quality at national and household levels.

Given the high momentum for reducing stunting rates in Rwanda, nutrition considerations are central to the implementation of PSTA 4. Nutrition-sensitive agriculture (NSA) is accountable for specific food related nutritional outcomes, such as reductions in micronutrient malnutrition and stunting. Using MINAGRI’s new NSA Guidelines, concrete initiatives under PSTA 4 will directly impact the availability of, access to and utilization of nutritious foods.

MINAGRI will harmonize its activities closely with the National Nutrition and Food Program Coordination Secretariat, responsible for the overall coordination of nutrition interventions across the sectors. MINAGRI will work in partnership with MINISANTE and MINALOC to identify and address specific dietary gaps through district investments in agriculture and rural development.

2.4.1 MAINSTREAMING NUTRITION

NSA’s mainstreaming approach is to multiply agriculture’s impact without multiplying costs by adding value to field programmes. In PSTA 4, production and consumption of nutrient dense foods, especially iron-fortified beans, receives special attention. Pilots will take place in selected districts where evidence of diet-related iron deficiency is significant. Households will receive explicit nutrition guidance on specific dietary gaps and practical skills training from their local Farmer Promoter and Community Health staff and through Farmer Field Schools. Targeting is key to ensure this support benefits rural vulnerable households with young children and mothers.

Major agriculture and livestock programmes which could potentially have adverse effects on nutritional outcomes will be identified and mitigated through a nutrition responsiveness checklist. For example, in areas where cash cropping will be promoted, provisions will be made to support inter-cropping, off-season home gardening coupled with nutrition

education. MINAGRI will also collaborate with MINISANTE to prevent risks associated to homestead livestock rearing and irrigation (e.g. water and food contamination, environmental enteropathy and zoonoses) through appropriate measures.

To focus resources, the iron-fortified beans intervention also concentrates on building capacity of different actors, including MINAGRI, RAB staff, and farmer promoters (see also 1.2.2). As iron-fortified beans are one of the priority crops under CIP, such capacity encompasses how to incorporate specific agricultural actions to close specific dietary gaps in their area of responsibility. Selected district committees will receive NSA training on how to use local resources to address specific malnutrition issues in their district.

2.4.2 UP SCALING OF KITCHEN GARDENS PROGRAMME AND HOME-GROWN SCHOOL FEEDING PROGRAMME

The Kitchen Garden programme will be expanded and revised to promote more diversified diets at household level, following recommendations from ongoing impact assessments. Improvements will focus on promotion of nutritious foods production: vegetables, fruit trees and small livestock. To focus resources, a targeted campaign for the 3 P's (pumpkin, papaya, passion fruit) and other tree fruits is envisioned by MINAGRI/RAB that will promote production and consumption of micronutrient dense foods. This will be executed in coordination with social protection programmes (see 2.5.2).

In collaboration with MINEDUC and its agencies as well as other stakeholders, PSTA 4 will promote local procurement for school meals. Farmer cooperatives will be capacitated to become sustainable suppliers of diversified nutritious foods such as fruits, vegetables, and milk for school meals, thereby creating a structured and stable market while increasing diversification of household income. Furthermore, school gardens will be expanded or established to grow micronutrient-dense crops. The "Garden as Classroom" initiative is a behavioural change communication strategy to improve daily nutrition, agriculture, and dietary diversity at school and at the family home. In collaboration with other stakeholders, MINEDUC and its agencies, the initiative will support NSA capacity-building at schools.

IA2.5 MECHANISMS FOR INCREASED RESILIENCE

Objective: To develop and promote resilience to mitigate and adapt to climate variability and shocks through enhanced weather and climate services.

The activities are closely linked to Intervention Areas 2.1 (Sustainable land husbandry and crop production intensification) and 2.3 (Animal resources and production systems) and support activities promoting sustainable and climate smart production and productivity. They encompass better early warning systems, combined with a greater focus on preparedness rather than response. This requires the development of weather and seasonal forecasting, monitoring (hazards) and surveillance (pest/disease) for early warning, and effective disaster response through compensation schemes for vulnerable farmers.

2.5.1 WEATHER AND CLIMATE SERVICES AND EARLY WARNING

Any activity to reduce hazard-related losses or optimise gains, demands better weather and climate services. PSTA 4 promotes partnership development in this area by establishing a joint unit for weather and climate services developed in partnership with MoE and Meteo Rwanda comprising capacity building and data collection, processing, and analysis. Services foreseen comprise short-term weather forecasting, seasonal forecasts, yield and post-harvest loss modelling, and logistics disruption anticipation, among others. Having this information available supports decision-making by farmers (informing farm management cycle, planting, harvesting, etc.) and agricultural institutions (planning and programming). To best respond to information and service needs, an assessment of weather and climate service needs will be undertaken, and improved services for users will be developed and implemented for farmers (including information generation and validation, information technology dissemination, etc.) as well as for government (for planning, crop calendars, extension curriculum, etc.).

Weather and climate services will also be developed and implemented to improve early warning and disaster response (see 2.5.3). This will include seasonal forecasting (linked to the activities above) but also the necessary monitoring (including crop-water balance). National capacities for early warning and monitoring will be strengthened. Improved early

warning and monitoring promotes farmers' use of: seasonal climate predictions, (extreme) weather information, crop calendars, pest and disease information, and water-related alerts, as well as Government preparedness for disaster risk response, management, and reduction.

2.5.2 ASSET BUILDING OF VULNERABLE GROUPS

Vulnerable farmers are also those most exposed to shocks, including climate-related shocks and food price volatility. They are exposed to land degradation and own too little land to farm their way out of poverty. The focus is on strengthening the linkages between existing agricultural support and the VUP social protection programme (which includes flexible employment to labour-constrained households, year-round public works, and an asset transfer scheme - mainly small livestock). Productive asset transfers will be continued, building on the lessons learned from the Girinka programme implemented under PSTA 3 while broadening the focus from cows to distribution of small livestock.

The linkages between agriculture and social protection programmes ensure that extension services, veterinary services, etc., from agriculture are targeted towards the asset building programme to enhance opportunities for food production and income. Stronger linkages also create potential to refocus towards 'green' public works (increasing the sustainable and climate smart measures in 2.1.1) and to encourage the introduction of greater shock responsiveness through advocating for direct transfers.

2.5.3 EFFECTIVE RESPONSE TO DISASTERS FOR FARM COMMUNITIES

When disasters hit, the response must be effective and timely. Activities proposed focus on developing the capacity to respond to food and agriculture threats and crises. These include tools for prediction (see 2.5.1 above), rapid needs assessment and response, development and updating of preparedness plans and linking relief and rehabilitation to sustainable development. The activities will be aligned with the new MIDIMAR sector plan to help provide more effective response, and to further investigate the potential for joint disaster risk management and reduction. Supplying farmers with farm tools and inputs, and restocking the animal herd, will be combined with community-based support for rehabilitation, promoting sustainability and resilience. Climate-related production risks are also being addressed through compensation schemes and insurance packages (see 3.2.2) tailored to the specific needs and capacities of different categories of farmers.

6.4 PRIORITY AREA 3: INCLUSIVE MARKETS AND VALUE ADDITION

CONTEXT

The GoR recognises the central role that markets and the private sector play in driving the transformation of Rwanda's agriculture sector from a subsistence-based farming economy to a competitive market-led agriculture sector. This entails investments and engagement from a broad range of private sector actors¹²⁵ and stronger linkages to productive and efficient end-markets, as well as to well-functioning input, services, and other intermediary markets. As private investment contributes the largest share of investment to agriculture sector development, optimising this investment is integral to ensuring sustainable and inclusive growth. In addition, the GoR plays an important role in providing relevant information on investment opportunities, facilitating the investment service including availability and provision of land, and ensuring the quality and inclusiveness in terms of optimising the investment.

The GoR will strengthen its role as a market enabler, pulling back as an actor in the sector, to permit the private sector to thrive. The agriculture sector in Rwanda remains largely fragmented, with many smallholder farmers, and weak market linkages to agribusinesses, input providers, processors, and traders. Market-oriented production and aggregation is weak, and producers lack basic data and market information, including standardised quality criteria required by the processors

¹²⁵ Private sector includes smallholder farmers and cooperatives –key players in the sector - and larger commercial farms in primary production, input and support service providers, traders, and exporters, and those engaged in processing and value addition beyond farming.

and traders. One of the major constraints agribusinesses face is stable procurement of appropriate raw material supply from cooperatives and farmers, with high post-harvest losses being experienced.

Some value chains are better organised than others. Export-oriented value chains, namely tea and coffee, and increasingly horticulture, are more organized and provide more secure market opportunities to farmers than staple crops, that are largely traded through informal channels characterised by heterogeneous processors and traders.

Substantial productivity gains can be made by addressing significant post-harvest losses. Agricultural commodities vastly vary in terms of their losses ranging from beans at 15 per cent, milk at 33 per cent, cassava at 43 per cent¹²⁶, to potatoes as high as 45 per cent¹²⁷. Food losses and waste occur along the entirety of the value chain, from post-harvest handling (e.g. spillage, crop damage), including distribution and processing stages (e.g., aflatoxin contamination during storage), to the consumption level (e.g. spoilage, household waste). This is due to a combination of lack of skills and technology, limited post-harvest handling infrastructure, including suitable storage, and drying spaces, as well as imperfect transaction processes between value chain actors.

Infrastructure development has remained problematic for Rwanda due to limited financial capacities and relevant technical knowledge but also limited investment from the private sector. Therefore, a significant proportion of Rwanda's rural population lack access to transport facilities, including feeder roads. In 2015, only 13,350 km of roads were in a good or passable condition, but Rwanda targets to have 30,000 km of passable roads by 2028¹²⁸.

Agriculture finance services remain a national priority to achieve greater financial inclusion. Rwanda has achieved tremendous progress over the past ten years with 88 per cent of the adult population financially included; primarily through SACCO membership¹²⁹. Yet, only 7 per cent¹³⁰ of credit goes toward agriculture, and commercial agricultural financing is still embryonic¹³¹. The informal sector plays an important role in extending the overall levels of financial inclusion, particularly in rural areas and among women.¹³² Though agricultural insurance has been available on the market since 2012, less than half per cent¹³³ of farmers report using agricultural insurance.

Many value chains lack the stringent quality and standards necessary to access international markets and most foodstuffs are traded through informal channels and to regional markets where regulations are less stringent. Aflatoxins and other mycotoxins remain a real threat to food safety and human health in Rwanda.

OUTCOME 3.

The outcome of priority area 3 is improved productivity and inclusiveness of agricultural market systems and increased value addition and competitiveness of diversified agricultural commodities, for domestic, regional, and international markets.

This will be achieved by strengthening market-oriented production, productivity, and processing of diversified agricultural commodities, through increased engagement of the private sector. This will be achieved through the promotion of the competitiveness and inclusiveness of prioritised value chains, reinforced linkages between markets, agri-businesses, farmers and other value chains actors through strengthened aggregation, out-grower schemes and market information systems. Further actions include the promotion of value addition of agricultural commodities, the development of market-

¹²⁶ "Rwanda Agricultural Markets, Private Sector Development, Supply and Competitiveness Study", CAADP Background Paper, 2014.

¹²⁷ MINAGRI statistics on post-harvest losses

¹²⁸ National Feeder Roads Policy (April 2017)

http://www.mininfra.gov.rw/fileadmin/user_upload/NATIONAL_FEEDER_ROADS_POLICY_AND_STRATEGY_FOR_RWANDA.pdf

¹²⁹ NISR, FinScope (2016)

¹³⁰ BNR Statistics

¹³¹ Collateral requirements are often larger than the loan-size, and interest rates are as high as 21 per cent. Furthermore, transaction costs are high relative to loan size, with commercial banks having limited outreach to rural areas.

¹³² NISR, FinScope (2016)

¹³³ Ibid.

oriented infrastructure (including feeder roads, collection centres and storage systems), strengthened inclusive financial services, transparent, market-oriented pricing mechanisms and improved quality assurance regulation and certification for safety with strengthened compliance and enforcement capacities.

IA 3.1 MARKET LINKAGES AND INCREASE PRODUCTION FOR EXPORT

Objective: To facilitate market access and strengthen inclusive and competitive value chains thereby capturing the domestic market, ensuring supply to domestic food systems, and tapping into the growing regional and international markets.

Agricultural commodity markets are inherently risky and competitive, linked with surpluses and shortages in international, regional, and national markets, and characterized along the entire value chain by tight margins, in particular for staples. Profits are made by efficient handling (and processing) of large volumes, and adept risk management. Inefficient and weak value chains impede market signals between end users and producers. Strong and stable market signals, principally price, can stimulate supply and investment in improved quality or expanded capacity. Promoting infrastructure development and harmonized policies will enable a free flow of agricultural commodities primarily driven by market forces.

There is the need to structure trading systems and to strengthen the role farmer cooperatives and private collection centres play in aggregating and marketing crops and animal resources. This is done through improved market information, promoting out-grower schemes, and strengthening the enforcement of contracts. Large productivity gains can be made by reducing post-harvest handling losses - where an average of up to 30 per cent loss is experienced during the post-harvest stage in Rwanda¹³⁴.

In addition to benefit mainly from the niche markets, branding and promotion of Rwanda agriculture products will be carried out and efforts will continue to be deployed to benefit from the regional and international markets.

3.1.1 POST-HARVEST HANDLING AND AGGREGATION

Post-harvest handling is strengthened through the development of adequate capacities, technology, and infrastructure. In line with the National Post-Harvest Strategy, interventions include improved information and data on post-harvest losses along the entirety of prioritised value chains, improved market information to facilitate efficient trading (compare 3.1.3), technical capacity building at producer and first aggregator level, upgraded post-harvest technology, i.e. mechanization, industrial shelling and drying, logistics and management.

In addition, PSTA 4 supports increased value addition through pre-processing and processing of prioritized value chains, in particular in the cases of tea and coffee, horticulture, and the dairy sub sector¹³⁵. These include technical assistance (and promotion of relevant technology) to strengthen the value addition and marketing of these products and ensure a greater share of in-country value added. This includes Made in Rwanda branding, as well as sub-sector specific marketing. Through an Agribusiness Window (in 3.1.2), under the Agricultural Development Fund under Pillar 4, the PSTA 4 aims to facilitate private sector investment in processing and value addition of agricultural commodities in selected value chains.

To strengthen access to markets, market requirements will be met by ensuring sufficient volumes of agricultural products, maximising economies of scale and the bargaining power of farmers. This intervention is closely linked to 3.1.2, which promotes a structured trading system by promoting registered collection centres to aggregate and synchronize supply utilising innovative formal contract mechanisms with a local network. Successful contract farming and aggregated commodity trade hinges on mutual trust among value chain stakeholders and transparent business practices. Aggregation support by cooperatives to members includes physical aggregation services, logistical support, market information dissemination and marketing and distribution services. Technical capacities of farmer cooperatives need to be enhanced in providing weather information and climate smart agriculture uptake, marketing, and aggregation services to their

¹³⁴ "Rwanda Agricultural Markets, Private Sector Development, Supply and Competitiveness Study", CAADP Background Paper (2014)

¹³⁵ Under the direct purview of MINAGRI

members. Out-grower schemes offer the potential to increase climate smart agriculture uptake, as well as providing better information to reduce climate risks, either through extension support or information provision. Improved systems of grading, promotion of standards and cold chain capacities are also incorporated. Furthermore, 'loyalty schemes' will be promoted, whereby producers receive services (e.g. training, veterinary) in exchange for selling to registered collection centres.

3.1.2 PRODUCTIVE ALLIANCES

PSTA 4 promotes the development and scaling up of productive alliances, focusing on small holder farmer market integration, not only to intermediary and end markets, but also input and service markets necessary to ensure increased productivity and profitability.

Central to this is to facilitate the scaling up of out-grower schemes, together with contract enforcement and loyalty incentives. In support of activities under 3.1.1, for improved post-harvest handling and improved aggregation, strengthened contract farming will promote structured trading systems where producers find secured markets at pre-agreed fair and transparent prices. In combination with embedded services, including finances, they will be ensured to fulfil market requirements. It also ensures that buyers have sufficient and reliable volumes of supply of agro-produce while complying with market requirements. The PSTA 4 refines the current zoning policy, to ensure market-driven sourcing and contracting. To curb side-selling and enhance farmers' adherence to delivery contract commitment, it is essential that buyers and value chain stakeholders also adhere to contract terms such as timely payment to farmers. Furthermore, producers will be encouraged to benefit from the commodity exchange and to use appropriate financial services. The warehouse receipt system will also be strengthened in the next 6 years. PSTA 4 uses incentives to encourage participation in out grower schemes and link farmer cooperatives to agribusinesses. As one of the main constraints faced by agribusinesses is the lack of suitable and reliable quality supply of raw material, incentives (in the form of matching grants among others) will be provided to cluster MSME agribusinesses and develop productive alliances with cooperatives including the participation of relevant research and quality agencies to ensure quality and compliance with standards. This also applies to input and service agribusinesses. PSTA 4 also promotes productive alliances between the (increasingly private sector) input suppliers, through their network of agro-dealers, with farmer cooperatives.

With the liberalisation of the inputs markets, the PSTA 4 aims to promote and ensure outreach and linkages of quality inputs to farmers. Hence, the PSTA 4 supports the facilitation of alliances between local input producers and importers, and distributors through the network of agro-dealers. Voucher schemes and targeted subsidies for both seeds and fertilisers will ensure that these are accessible and affordable to all farmers. PSTA 4 provides targeted packages of subsidized seeds and fertilisers for a variety of agro-ecologic contexts and farming systems and combine those with complementary services to raise farmers demand (e.g. extension and research). With the targeted packages, procurement and distribution of subsidized fertilizers aim to enhance and not inhibit input market development. Subsidies will be complemented with cash transfer programmes to increase farm income and input use (in pillar 1), with a particular focus on vulnerable households, market liberalization (pillar 4) and infrastructure development to establish strong, private sector-led input supply markets. Reference is made to Priority Area 4 concerning regulatory framework and smart subsidies.

Through an Agribusiness Window, under the Agricultural Development Fund under Pillar 4, the PSTA 4 aims to facilitate private sector investment in the production, procurement and distribution within input markets with a focus on fertilisers, planting material, animal genetic resources, animal feed and agro-chemicals, and packaging material, as well as support services (e.g. transport and logistics). This fund aims to promote distribution channels for services and inputs provided through agro-dealers.

3.1.3 MARKET AND TRADE INFORMATION SYSTEMS (MTIS)

Accurate and timely market information systems drive sound marketing and investment decisions. Under the PSTA 4, the existing channel for market information, e-soko¹³⁶ is strengthened to expand its market information. It includes informal

¹³⁶www.esoko.gov.rw

cross-border trade information as well as advisory services as per the stage of the crop cycle, with data on weather information and climate services (linked to priority area 2.5.1). The e-Soko+ Market Place facilitates market linkages between smallholder farmers, cooperatives, traders, and the processing industries, and provides a mobile phone payment gateway to facilitate transactions.

e-Soko develops a business model to ensure financial sustainability through government support, SMS revenue-sharing with mobile phone companies and fees for apps and advertising. Furthermore, training and outreach for users will be provided on ICT and applying information. As an interim solution, the existing system will continue to serve government data collection needs in a limited fashion to display data collected more easily and to link to regional trade intelligence services such as RATIN¹³⁷. The e-Soko+ is based on a build, operate, transfer model whereby the government invests in the initial infrastructure and starts several services with the intention of sub-contracting various services related to e-Soko+.

Finally, e-auctions for coffee and tea are to be established in order to increase markets for quality coffee and tea. This will extend existing auctions such as the Cup of Excellence.

3.1.4 PROMOTION OF MARKET INFRASTRUCTURE

Agricultural market infrastructure development is key to broaden market access, reduce post-harvest losses and thereby increase farmer income. PSTA 4 focuses on increased private sector investments through the promotion of incentives and innovative PPP models (detailed in priority area 4).

Rwanda needs to enhance all-season road connectivity (including from very small farms) to agricultural market centres in the districts. The National Feeder Roads Policy and Feeder Roads Implementation Framework show clear institutional responsibilities of different stakeholders, promote labour-based technology in feeder road development and outline funding mechanisms for road development and maintenance in a gender-responsive and climate resilient manner. The Policy aims to bring a motorable road to within 2km of each farm by 2027¹³⁸.

Strengthening agro-logistics is crucial as the country moves to professionalize and transform the agriculture sector. Suitable post-harvest handling and storage facilities are needed to reduce losses. Public investment in development and maintenance of infrastructure and technologies would be for technology evaluation and validation, demonstration and training, and market development purposes. PPPs (models elaborated in Priority Area 4) will be promoted, to attract the private sector to develop infrastructure, such as drying grounds, warehouses, silos, cold chain facilities, community market structures and collection centres, whole-sale markets and export logistics facilities such as packing houses. One flagship project that is expected to be finalized in collaboration with private investors during the strategy period is the Kigali Wholesale Market, which will facilitate market access and price information for both producers, traders, and consumers.

Appropriate operation and maintenance activities ensure the efficiency, effectiveness, and sustainability of the market infrastructure, yielding the expected benefits and meeting the necessary standards. This includes soft components such as ICT systems and other operational systems.

IA 3.2 AGRICULTURAL MARKET RISKS AND FINANCIAL SERVICES

Objective: To strengthen demand-driven inclusive agricultural financial services and products, and mitigate market and production risks, thereby increasing access to finance and productive capital to improve productivity and surplus value.

¹³⁷ www.ratin.net

¹³⁸ National Feeder Roads Policy (April 2017)

Though Rwanda has made substantial headway, the success of the Land Tenure Regularisation Programme enabling farmers to use land as collateral¹³⁹, access to formal financial services and products remains suboptimal in the agriculture sector, and is primarily supplied by non-banks, namely SACCOs and mobile money providers.

Market (e.g. price volatility) and production (e.g. climate variability, pests, and diseases) risks impact sector productivity and growth¹⁴⁰. Though agricultural insurance has been available in the market since 2012, less than half a per cent report using agricultural insurance¹⁴¹. Scaling up of successful initiatives, such as national risk pooling (through sovereign disaster risk solutions) as well as specific sub-sector insurances (e.g. in the tea sector) offer potential. Furthermore, transparent, and market-oriented pricing mechanisms and instruments are needed to reduce exposure to international market risks and domestic price fluctuations. PSTA 4 also addresses the demand side for financial services in the agriculture sector, by promoting financial literacy of farmers and micro-enterprises with a particular focus on women.

3.2.1 INCLUSIVE AGRICULTURAL FINANCIAL SERVICES

This intervention provides technical and financial capacity to SACCOs other financial service providers and MFIs to develop appropriate agricultural financial products targeting smallholder farmers and MSME agribusinesses (see also Priority Area 4). PSTA 4 develops a National Insurance Scheme and scales up the existing Agricultural Guarantee Scheme, under the Agricultural Development Fund in pillar 4. Successful financing models and services are promoted, including warehouse receipt systems, structured trade finance, leasing schemes, agent banking (to facilitate outreach to rural area), cash flow-based financing and scaling up embedded value chain financing (both by input providers and buyers). Savings groups for vulnerable farmers are promoted to complement asset building initiatives.

Further efforts concentrate on capacity development and improved financial literacy and management, improved creditworthiness of producer cooperatives and SMEs, through digitalization of payments and publishing a directory of agribusiness enterprises. Women farmers and young entrepreneurs are targeted to facilitate more productive investments in farming and agribusinesses.

3.2.2 AGRICULTURAL RISK AND MECHANISMS

This intervention addresses agricultural risk and promotes transparent and market-oriented pricing mechanisms. It focuses its efforts on risk transfer through the development and promotion of micro insurance products and services. These relate to both production and market risks, recognizing the need for initial subsidies to promote insurance products. Other public interventions include: enhanced availability of weather and climate information (see priority area 2), capacity-building and awareness-raising of benefits and use of micro insurance products and services, strengthened risk management¹⁴² with improved coordination between and within institutions and actors and the promotion of innovative contracting such as forward contracts and price-to-be-fixed contracts.

In close collaboration with MINICOM and MINALOC, transparent and market-oriented pricing mechanisms are strengthened for selected products. Regular surveys on production, processing, and export costs will be undertaken to refine pricing mechanisms with a view to increasing price incentives for production, aligning prices to regional levels and computing minimum prices in each season. Quality premiums are to be included in the mechanism to promote investments into improved quality and formal market channels.

3.2.3 RWANDAN STRATEGIC GRAIN RESERVE

¹³⁹ Among households that accessed a loan from a formal source of credit, 41% used land as collateral to obtain the loan (World Bank - 2016)

¹⁴⁰ Though many countries in Sub-Saharan Africa have recurring negative agricultural growth because of various shocks, Rwanda has only had one year of negative growth in the last 20 years, in 2003 when drought hit the country. However, Rwanda does face slower growth and drought events predominantly affect the east of the country.

¹⁴¹ World Bank, Agri-Finance Diagnostic Report (2016)

To ensure food security for all Rwandese, tracking and managing the availability and accessibility of food in the country is crucial. This includes strengthening the Rwandan Strategic Grain Reserve (RSGR) and management systems to respond to food security emergencies. Models are to be explored on how best to manage the reserve. These include contracting private sector services to maintain physical warehouse space, tender mechanisms to purchase and sell (recycling or releasing) grain, and storage and stock maintenance services. There is also a need to decentralise the national strategic grain reserve down to the district and sector level to enhance food security readiness.

Decisions related to management of food stocks need to be informed in a timely manner by tracking certain indicators. Early warning for food security will be strengthened through data collection and analysis (including price tracking through MTIS) for food availability prediction to inform subsequent food management measures.

IA 3.3 QUALITY ASSURANCE AND REGULATION

Objective: To strengthen quality assurance and regulation throughout the value chain, to promote productivity and enhanced market access, increased competitiveness and improved food health and safety of domestic foodstuffs and export commodities.

A comprehensive quality regulatory framework, with improved coordination amongst relevant agencies and better enforcement improves value chain productivity and competitiveness. It furthermore increases access to international markets and ensures health and safety of foodstuffs and agricultural commodities. Though Rwanda has made much headway in terms of regulatory development, the outreach and capacity of service providers remains limited. To promote private sector investment in the sector and enhance cross-border trade, enhanced regulatory frameworks need to be in place, in line with COMESA, EAC and international standards.

3.3.1 SANITARY AND PHYTO SANITARY (SPS) REGULATION

To strengthen the regulatory framework, appropriate legislation is needed for plants and plant products; animal products; and agro-chemicals. Fully operational variety testing, release and registration will be required to facilitate the introduction of new high performing plant varieties as well as assurance and protection of the new varieties in line with international standards.

The Rwanda Inspectorate and Competition Authority (soon to be established) is the regulatory body concerning compliance of agriculture inputs, production and processing, amongst others, to relevant standards, laws, and technical regulations. The Rwanda Food and Drug Authority (also soon to be established) is responsible for issues dealing with food safety (*CODEX Alimentarius*). Coordination and working relations among these quality assurance and regulatory bodies will be necessary to minimise overlaps and ensure efficient service provision.

Efforts will also focus on certification and inspection services, including enforcement of laws governing seed and plant varieties, plant and animal health and accompanying regulations. PSTA 4 will also deliver plant and animal products certification services including enforcement of sanitary laws, monitoring and surveillance of animal diseases as well as animal inspection and certification.

For the purposes of facilitating trade within the region and internationally, standards under these services have been harmonised under COMESA and EAC and will therefore be implemented and enforced in this intervention.

IA3.3.2 CAPACITY BUILDING AND AWARENESS CREATION

Capacity building and awareness on the benefits and necessary requirements of relevant certification schemes and standards along the agricultural value chains will be provided. This includes technical assistance and capacity building on private standards certification for both production (Global GAP, ISO standards) as well as agro-processing including the Standardisation Mark or “S” mark of RSB. Agribusinesses can apply for financial support in certification, under the Agribusiness Window. The target audience also includes consumers along with agribusinesses and farmers regarding the rights and obligations under food safety and standards conformity.

3.3.3 SPS INFRASTRUCTURE

Relevant SPS and certification infrastructure and facilities will be strengthened. This includes upgrading testing equipment, software and capacities of post quarantine, organoleptic and chemical laboratories and quarantine stations at both Kigali airport and cross-border inspection points in Gatuna, Rusumo and Kagitumba, to ensure compliance with market requirements. The Memorandum of Understanding (MoU) with domestic (RSB), international and regionally accredited laboratories for use of services and technical assistance will be extended, pending the accreditation of Rwandan laboratories. Lastly, the registrars for plant varieties and agrochemicals will both require an office (including staff) to facilitate operations.

6.5 PRIORITY AREA 4: ENABLING ENVIRONMENT AND RESPONSIVE INSTITUTIONS

CONTEXT

Accelerating commercialisation and private sector investment in agriculture requires an enabling policy and regulatory environment and institutions that are responsive to farmers' and investors' needs. Agriculture is at the centre of Rwanda's economy, interfacing with sectors from trade to land management; environment to education. These interfaces need to be managed in terms of both policy development and implementation to enhance synergies, avoid conflicts and maximise the impact of investment.

The National Agricultural Policy sets out a comprehensive agenda for institutional change: (i) shifting the role of government from market actor to enabler, (ii) strengthening sector coordination, (iii) enhancing the effectiveness and efficiency of service delivery with decentralised administration, (iv) partnering with farmers and improving civil society engagement, (v) promoting evidence-based policy, programming and better information systems, and (vi) improving the regulatory environment for agriculture input and output markets.

PSTA 4 requires a strengthening of agriculture sector institutional framework in terms of organization development, policy and regulatory framework coherence, sector capacity building (district level included), cross sectoral synergies and coordination and private sector engagement, monitoring & evaluation, knowledge building, communication, and information sharing.

With the recent reorganisation and decentralisation of the Rwanda public administration, MINAGRI has 5 functions:

- Sector policy setting and strategic planning
- Legal and regulatory role for the sector
- Sectoral capacity building
- Monitoring and evaluation
- Resource mobilisation including the promotion of private sector partnerships

Direct service delivery to farmers lies with RAB and NAEB, and most importantly the local governments.

Market-driven productivity can be boosted through strengthened public-private dialogue along the value chain, improved PPP models, and investment promotion. Together with a conducive regulatory environment, liberalised markets and enhanced research plus sector capacity, these actions will provide the necessary incentives to attract domestic and foreign private sector investment. PSTA 4 also advocates a greater role for the private sector in service provision and delivery and management of agricultural infrastructure.

OUTCOME 4

The outcome of priority area 4 is effective and efficient public and private sector services in the agriculture sector delivered to all sector stakeholders.

Priority area 4 develops the service delivery capacity of agriculture institutions and provides conducive and business-oriented regulatory and legal frameworks. It provides continuing support to decentralized implementation and to

mainstreaming cross-cutting areas (e.g. nutrition, gender, youth, and resilience). PSTA 4 implementation is underpinned by strengthened monitoring, evaluation, and learning (MEL) capabilities as well as enhanced coordination with other sectors and stakeholders.

Priority area 4 underpins all the other priority areas by providing the enabling environment for agricultural transformation. Thus, its implementation must be appropriately synchronized and sequenced to match the planning and implementation of the other priority areas.

IA 4.1. AGRICULTURAL INSTITUTIONS DEVELOPMENT

Objective: To promote organisational strengthening and improved decentralized service delivery.

Central to achieving this objective is the restructuring of the institutional framework and adoption of new skills and processes in delivering services and providing a conducive enabling environment required to enable the strategic shift to a green and market-led agriculture sector.

4.1.1 ORGANISATIONAL DEVELOPMENT

Restructuring and **organisation development (OD) plans** for MINAGRI and for each of its agencies (NAEB and RAB) are to be prepared and implemented based on the requirements of the NAP and PSTA 4 and drawing on the range of analysis and recommendations made in recent years¹⁴³. These OD plans ensure that the functions, structures, and processes of the Ministry and its agencies support the delivery of their mandates (including joint mandates). The OD plans address the entities' relationships and information flows, the effectiveness of coordination and joint actions, and capacity and information gaps, and fine-tune working modalities, processes, and performance management enabling MINAGRI and associated agencies to be more responsive to stakeholder needs.

This process of organisational strengthening and change is frontloaded in the early period of PSTA 4 implementation, to support implementation of the whole PSTA 4. It builds on the restructuring of MINAGRI and its agencies undertaken thus far¹⁴⁴. The Agriculture Sector Capacity Building Plan (ASCBP) is updated to address the relevant skills required for the PSTA 4 implementation, particularly relating to private sector business development, strengthening its role as an “enabler”.

4.1.2 DECENTRALIZED CAPACITY DEVELOPMENT

In the framework of the recent decentralization policy, functions of the previous local branches of MINAGRI have been transferred to local governments. These deliver agriculture services to farmers and serve as the focal point representing the needs of local communities and coordinating multi-sector responses. Feedback loops between the central and local levels must work effectively, to ensure that implementation delivers expected benefits and that it can be adjusted if necessary.

This intervention conducts a **functional review** of public services to farmers at a decentralized level and by sector, to assess the current division of roles and performance with a focus on facilitating commercial agriculture. It assesses the comparative advantages and complementarities of private sector service delivery in terms of service diversity, upscaling

¹⁴³ 2005 and 2006 functional reviews of MINAGRI following the 2000 decentralisation process; the 2009 functional review to assess progress in reforms, the impact on service delivery, and institutional development needs; the 2013 Capacity Needs Assessment for MINAGRI and RAB; The PSTA 3 MTR (particularly its Annex 5 on institutional and organisational development); 2014 Functional analysis and capacity needs assessment of MINICOM, NAEB and RDB; and institutional assessment made for the PSTA 4 development process, plus ongoing mission from a World Bank supported institutions advisor.

¹⁴⁴ See Prime Minister's Order No. 40/03 of 27/02/2015 for MINAGRI; Law N°14/2017 of 14/4/2017 for RAB; and Law No. 13/2017 (of 14/4/2017) establishing NAEB as a commercial public entity.

potential, sustainability, and cost effectiveness. This review takes into consideration implementation responsibilities at the district level, in areas such as irrigation, terracing and extension services, and their alignment to the implementation agencies' mandates, to the decentralization policy, and to District Development Strategies (DDSs).

Out of the functional review, the local **services improvement plans** strengthen the complementarity of public and private sector service provision suited to farmers' needs. These local improvement plans include capacity building, monitoring and management responsibility and are incorporated into local joint-planning, in close coordination with district level authorities responsible for those services. The plans integrate the need for mainstreaming cross cutting-issues dealt with at the district level (such as nutrition, employment, gender, and resilience), the fine-tuning of outstanding staff incentives (Imihigo scheme awards bonuses and employee of the year award) and continuous professional development.

In addition, ASCBP includes a decentralized capacity building action plan to bridge the knowledge and skills gaps of Rwanda's farmers including women and youth as well as MINAGRI's capacity to coach and support decentralized services delivery.

IA 4.2. EVIDENCE-BASED POLICY DEVELOPMENT AND REGULATORY FRAMEWORKS

Objective: to enhance evidence-based policy making and build a conducive regulatory framework development.

The policy making, and regulatory function of the public sector is central for transforming the government's role and attracting more private sector involvement in both investment and service delivery. The expectations under PSTA 4 are firstly a more effective policy dialogue and coherence and secondly improved processes, data, and analytical tools for decision-making.

4.2.1. POLICY ANALYSIS FUNCTION

Given the increasingly strategic roles and responsibilities of MINAGRI, the complex interactions of agriculture with other sectors, and the new strategic directions of the NAP and PSTA 4, MINAGRI needs an enhanced policy analysis function. The concrete steps (e.g. staffing and strengthening of policy analysis and development capacities) will be set out in the MINAGRI organisational development (OD) plan, to be completed at the outset of PSTA 4 implementation. A central function that is to be fulfilled is policy analysis to inform the development and implementation of policy and programmes. This might involve policy tool kits, regulatory reviews, policy innovations and reviews of international best practices, evaluations, impact assessment and online documentation. Capacity on sectoral analysis and impact assessment is to be strengthened by tools development, training and expert coaching. Community of practices, platform and fora are to be set-up and operationalized to spread a culture of learning and knowledge-sharing as well as innovation adoption.

To this end, a dedicated policy function in MINAGRI is to be created, with responsibilities both to develop and implement broad policy frameworks and to support MINAGRI's specialised units and associated agencies in the preparation and revision of sub-sectoral policies.

4.2.2. POLICY AND REGULATORY FRAMEWORK

To facilitate the transition of the government as a market enabler, and to promote growth in the sector and bring about transformational change, PSTA 4 envisages several revisions and development of important strategies and regulatory reforms.

The government will continue to address the constraints on private sector engagement, in particular in the inputs market as revealed by the World Bank¹⁴⁵. In addition to the regulatory reforms¹⁴⁶ that have been laid out in the PSDEYS, a major focus will be on supporting the timely release and production of high-quality seeds by the formal seed supply system, legislation to handle GMOs, streamlining regulatory bottlenecks limiting access to fertilizer (including fertilizer registration, import and quality control), addressing regulatory barriers and practices limiting access and use of agricultural machinery (in particular, requirements for tractor import, registration and inspection, testing and standards) and lastly reviewing laws and regulations that impact smallholder producers and agribusinesses accessing domestic and foreign markets.

Related to this is the revision of the current subsidy scheme, which focuses on prioritized crops, into a more targeted sustainable smart subsidy programme. Smart subsidies for agriculture inputs include fertilisers, improved seeds and target farmers, who do not already apply agriculture inputs as well as the poorest and most vulnerable households. This reduces the risks of displacing commercial (non-subsidised) input sales and promotes pro-poor growth. Furthermore, it utilises and support the further development of existing private input supply networks and defines an exit strategy. PSTA 4 advocates further assessment into optimal models and schemes to ensure an effective and sustainable subsidy scheme for agriculture inputs, promoting productivity and profitability. Collaboration between MINAGRI legal advisors and those

¹⁴⁵ World Bank (2017) Enabling the Business of Agriculture 2017. Country Profile: Rwanda

¹⁴⁶ This covers access to finance, technology, contract enforcement, regional harmonisation, and the protection of intellectual property rights

from its affiliated agencies and data/information sharing between legal advisers and technical departments will contribute to better enforcement and coordination of the regulatory framework to achieve policy coherence.

4.2.3. LAND USE PLANNING AND ADMINISTRATION

Though much progress has been made on land reform in Rwanda, land availability and use remain contentious and a constraint on agricultural performance. Land use planning and improved land administration, including land consolidation, are critical factors to ensure land remains productive and that policies are inclusive.

This intervention, in close collaboration with MINILAF, builds on the success of past legislative reforms and programs. Though much headway has been made with the Land Tenure Regularisation (LTR) program, land transactions in rural areas remain informal, due to low awareness of relevant regulations and remoteness to public offices.

This intervention aims to strengthen the legal and enabling environment to improve formal land market transactions in rural areas and promote solutions such as land leasing - an effective tool that facilitates voluntary consolidation of farm assets. Relevant tools to counter land fragmentation are supported, to promote consolidation in both land use and land tenure. Land use planning of agricultural lands, including zoning and protection of certain areas, will be strengthened, which requires close coordination with MoE and the MINIALF and with natural resource committees at decentralized levels.

Agro-ecological and economic studies will inform government on areas of comparative advantage for the promotion of selected value chains. Improved coordination and training of staff in relation to land issues and the Land Policy is provided, with sensitisation to farmers and potential investors on land policy, registration, and on individual rights as well as land rights in the context of acquiring land for investment. This intervention will also support the registration of land holdings for vulnerable groups.

PSTA 4 continues to support the Agriculture Land Information System (ALIS), a platform for investors on available agricultural land under MINAGRI custodianship, which enables the ministry to better attract private investment in agriculture. The PSTA 4 aims at protecting the agriculture land. Using ALIS, plots are registered and entered on the ALIS platform, with, agricultural plots gazetted and hence protected by a Law.

IA 4.3. COMMERCIALISATION OF VALUE CHAINS IN THE AGRICULTURE SECTOR

Objective: To strengthen the commercialisation of the agriculture sector by increasing private sector engagement, promoting market-oriented agri-businesses, promoting high-value nutrient dense value chains to close dietary gaps, and capturing greater in-country surplus and value added.

In this area, sector coordination is key. It is recognized that the current Agriculture Sector Working Group needs to be strengthened through linkages with other fora, with increased participation from the private sector, including farmers. The latter will be organized in value chain platforms, from district to national level.

4.3.1 PUBLIC PRIVATE DIALOGUE (PPD) AND VALUE CHAIN PLATFORMS

PSTA 4 strengthens public-private dialogue through the promotion of existing and/or newly established value chain platforms, focusing on priority value chains, supporting PPD initiatives under the Private Sector Development and Youth Employment Strategy 2018-2024 (PSDYES). In line with PSDYES, PSTA 4 promotes the value chain approach with a focus on improving the regulatory environment. These value chain platforms aim to build cooperation, trust and to streamline operations in the targeted value chains. Platforms develop a joint sub-sector vision, address specific challenges, ensure a coherent enabling environment (between ministries) and promote stronger market orientation in the targeted value chain. These platforms support the PPD mechanisms promoted by RDB in collaboration with PSF to address key challenges in private sector development. It promotes a 'sector-building' approach, whereby business-enabling factors are identified, challenges in the value chain are addressed, and the lack of services and quality inputs are used as a prime business opportunity for further investment promotion.

District level value chain platforms are promoted to address local challenges and opportunities in the value chain. Central to this is the development and implementation of joint value chain action plans (across ministries and private sector value chain actors), with co-funding for relevant technical assistance and capacity building available through the agribusiness window of the Agricultural Development Fund under Pillar 4. There will be an emphasis on farmer welfare and addressing specific nutritional gaps as one of the drivers for value chain development or expansion. Furthermore, PSTA 4 advocates the expansion of Rwanda into regional platforms to facilitate trade and increase exports, complementing its existing membership of Grow Africa¹⁴⁷ and COMESA.

4.3.2 AGRICULTURE INVESTMENT PROMOTION AND AFTERCARE

PSTA 4 aims to optimise private investments, through the strategic provision of public goods and by promoting a conducive enabling environment for private investment.

To facilitate increased private sector engagement, MINAGRI and its agencies need to strengthen investment support for domestic and foreign investors in the before and after-care process. Investment constraints will be addressed as outlined in the National Agri-Business Investment Promotion Strategy (2017) and include: improved coordination between public institutions in investment process, improved information for agro-investors, provision of before- and after-care services and incentives, which include access to and provision of land, registration of agribusinesses, technical capacity building, and linkages to relevant suppliers, services, and buyers.

Central to investment promotion is the role that NAEB plays in export promotion of agricultural products, for non-traditional commodities. PSTA 4 strengthens the role that NAEB plays in facilitating the investment process, in supporting the business case for investing in non-traditional commodities, support to export promotion, and relevant mandatory and voluntary standard requirements. It promotes the 'Made in Rwanda' campaign, in support of export markets and in line with the Domestic Market Recapturing Strategy (DMRS) aimed at unleashing the potential of sectors, in particularly agro-

¹⁴⁷ The Grow Africa Partnership was founded in 2011 to increase private sector agricultural investment and accelerate the execution of investment commitments. It comprises of over 200 companies and governments in 12 countries.

processing. These efforts in investment promotion efforts are coordinated by RDB, responsible for private sector investment.

4.3.3 DEVELOPMENT OF PPP AND ALTERNATIVE MODELS

One strategy to attract investment into the agriculture sector is the promotion of public private partnerships (PPPs), with a focus on targeting infrastructure investments.

There are numerous models and arrangements for these partnerships. PSTA 4 undertakes an assessment for the agriculture sector to identify PPP projects and the most suitable PPP model based on the partnership at hand in line with the PPP law of 2016¹⁴⁸ and in close consultation with the PPP Committee. The two models advocated are Build Operate Transfer (BOT) for market infrastructure and concession contracts for irrigation schemes. The PPP law (2016) marks potential zones for investments and lists potential investors (both foreign and domestic) based on agreed criteria. This ensures inclusiveness and sustainability aligned to the principles of Responsible Investment in Agriculture and Food Systems¹⁴⁹.

Alternative cooperation models are explored, including commercial compensatory models, and concessionary management agreements with the private sector. Close cooperation with MINECOFIN, RDB and other relevant ministries and agencies is necessary to provide a package of fiscal and other incentives.

Central to this, the GoR will establish the Agricultural Development Fund, to leverage additional private capital and resources, and to engage private sector in reaching PSTA 4 targets. The Agricultural Development Fund will provide financial incentives through PPPs, competitive funds for matching grants and credit for agricultural stakeholders including small-holder farmers. The detailed implementation modalities are to be developed. There will be funding through the various windows to incentivize private sector engagement in the various facets of the sector:

Research Window:

- Demand-driven knowledge generation with the promotion of a competitive fund to strengthen university-industry linkages

Productivity Window:

- Private sector innovation, especially land productivity extending technologies (e.g. varieties, green houses, hydroponics)
- Mechanisation, especially to promote cooperatives or SMEs pre-process and add value
- Private sector investment in irrigation, including small scale irrigation
- Matching grant for the risk management scheme to cope with climate hazards

Agribusiness Window

- Inputs provision through private sector Seed-funding for agribusiness start-ups (focus on women and youth owned companies)
- Competitive funds to engage private sector in agri-services and improved input provision (seed production and distribution, veterinary services etc.)
- Extension services provision (e.g. FFS and private companies)
- Competitive fund to promote out-grower schemes
- Competitive fund for value addition and processing of commodities and certification

Guarantee Scheme: SACCO guarantee scheme

¹⁴⁸ Law N°14/2016

¹⁴⁹ www.fao.org/fileadmin/templates/cfs/Docs1314/.../CFS_Principles_Oct_2014_EN.pdf

IA 4.4. PLANNING, COORDINATION, AND BUDGETING

Objective: To improve the efficiency and effectiveness of inclusive planning, coordination, and budgeting processes.

4.4.1 COORDINATION

PSTA 4 recognizes the role of farmers in its implementation. Farmer's fora from village to national level will be strengthened through farmer organisations and cooperatives and using IT tools, feedback loops with information and data to be used in planning and implementation.

Beyond farmers, agribusinesses will be in Public-Private Dialogue to engage other private sector actors. These actors will be strengthened to improve planning, regulatory framework, and implementation through improved feedback mechanisms and bottom-up planning.

4.4.2. PLANNING AND BUDGETING

The Ministry's ability to mobilise required resources for the PSTA 4, suggests a high capacity to mobilise financial resources. Capacities on the agriculture sector planning cycle are to be further strengthened, specifically programme and project development by developing tools undertaking sector and thematic studies, developing capacity, and providing experts. The aim is to align strategic and operational plans, leverage private investment, and increase capacity to design projects and mobilise grants.

The agriculture sector planning function is vital for the implementation of PSTA 4 and is fed by interventions in other outcome areas (e.g. policy making, sectoral analysis, coordination, etc.). In that regard, specific capacities to develop feasibility studies as required by MINECOFIN (financial and economic modelling, macroeconomic analysis, forecasting of inflation, agriculture GDP, etc.) are to be strengthened. In addition, the SWAp is to be strengthened to permit the sector to maximize support from DPs.

4.4.2. SYNERGIES AND COORDINATION

Joint planning (inter-sectoral planning) is strongly promoted. Beyond the regular planning cycle at the level of the agriculture sector, current national priorities increasingly require collaboration across sectors in areas such as water management, the environment, trade, transport, and social protection. Sustainable food systems require a holistic approach. Therefore, under PSTA 4, joint planning takes a central role, with MINAGRI and other sector organisations consulting and working closely with stakeholders to develop joint programmes and projects including farmers and other private sector actors.

At **district level**, District Development Strategies (DDSs), overseen by the JADF, play an important role in implementing agriculture programmes. Previously, MINAGRI consulted the districts to agree on the targets of their DDPs, however, with PSTA 4, more emphasis is placed on delineating implementation modalities during the preparation process in support of the PSTA 4 implementation and giving ownership to the districts in implementation, as well as monitoring, management, and planning. As envisaged by the Intervention 4.1 (Agricultural Institutions Development) above, MINAGRI expects to review implementation roles and responsibilities in the PSTA 4 and other policies to allow an extended role to the districts. (for more details see section 10 on implementation arrangements).

Mainstreaming is the integration of **cross-cutting areas** into development planning and policy rather than implementation as stand-alone activities. Cross-cutting areas of importance under PSTA 4 include nutrition, gender, youth and resilience (climate and environment), and are also reflected across other sectors and in the NST. To ensure their inclusion in the planning and programming cycles, these cross-cutting issues have been mainstreamed into the activities in PSTA 4 during its formulation. Moving to implementation, it is envisaged to develop internal capabilities for each of these topics and assign focal points in MINAGRI. These focal points have a dual role: ensuring capacity building throughout the sector and across relevant implementation institutions on these key issues and verifying the integration on these issues in the sector programmes and projects. In parallel, a new set of climate and environment mainstreaming indicators will be agreed with REMA for MINAGRI and linked to NST (sustainable agriculture) and Vision 2050.

IA 4.5. KNOWLEDGE MANAGEMENT

Objective: To build capacities for improved knowledge management, through effective monitoring, evaluation & learning methodologies using streamlined information systems

Under PSTA 4, the sector's capabilities in knowledge management and institutional learning are strengthened. Continuous learning and knowledge building is crucial to the effective implementation of the programmes and especially in achieving their objectives. Monitoring, evaluation, and learning (MEL) capabilities are upgraded and the use of information systems streamlined. PSTA 4 facilitates results-based management through effective and efficient monitoring and evaluation systems and trend analysis, which will inform decisions for future planning and implementation with appropriate readjustment to measures and initiatives when necessary. The M&E function will be integrated into the units of Statistics, M&E, Communication and IT. Therefore, an M&E division with a division manager will be created at the ministry level.

4.5.1. MONITORING, EVALUATION, AND LEARNING (MEL)

Monitoring and Evaluation (M&E) will enhance accountability and learning through the provision and sharing of timely and accurate information on the sector's performance; in other words its effectiveness, efficiency, relevance, sustainability and impact.

A new M&E framework is to be developed, based on the PSTA 4 design and will provide the basis for the sector's M&E activities with regards to indicator metadata, responsibilities, timeframe, resources, methods of data collection, quality assurance and utilisation. The M&E framework and devised systems will have to be realistic and ensure high quality, consistency, and availability of data, especially at field level. The system will support gender and age disaggregated data collection and analysis. The MEL system will include:

- *Regular progress monitoring* related to the programmes' inputs, output indicators and operational plans. The monitoring system should also capture information on the processes that influence the project implementation and results and contribute to the learning objective. The system should be linked to assessments of financial performance. To get a better understanding of production-related issues and consumption (nutrition) patterns at farmer household level, intensive monitoring of sampled households by farmer type will be undertaken.
- *Evaluations* providing analytical, systematic, and objective assessments of the programme outcomes and impact taking the results framework and key indicators as the main reference but also analysing unintended effects. Evaluations include periodic internal assessments as well as external, independent evaluation exercises.
- *Learning and knowledge building.* The development and implementation of a learning system will integrate information from progress monitoring, outcome and impact assessments, annual reviews, external evaluations, learning and sharing events, and reporting.

4.5.2. STATISTICS MANAGEMENT

For long-term decision-making and review it is paramount that sectoral capabilities for collecting, analysing, validating, and agricultural data are improved. Current progress of ICT in Rwanda makes it possible to develop an operational agricultural information system for the digitalization of data collection, storage, processing and analysis. There is a need to upgrade access, storage and application of data at all data points in the agri-food system as well as food security and nutrition at the household level. MINAGRI has a 7-year project called the Smart Agricultural Information System (SAIS) which integrates agricultural data management and analysis in one unit. The system will have broad and relevant applications for all agriculture sector actors¹⁵⁰. An IT Unit will be created with specific tasks, such as overseeing the creation of a Common Data Warehouse. Apart from management of the MIS, which is the main instrument for data management

¹⁵⁰ SAIS has the potential to improve access to accurate data and information for planning and monitoring; to reinforce market and agriculture sector stakeholder linkages; to strengthen planning, verification, and monitoring of GoR subsidy programmes; to increase the ability to organize and analyse data; and to provide information related to the agriculture sector for decision-making at different levels and stages, including investment.

on the sector performance, the unit will be also responsible for developing a set of tools for information purposes on farm, land and livestock management and agricultural markets. Feeding the MIS with reliable and valid data will also require the creation of a statistics unit at the ministry level. Data collection tools will include farmer feedback, digital farmer registration and land profiling, input distribution and livestock registration systems. Drone and satellite imagery will complement the collected data and ensure accuracy for information related to land status, use and input distribution. Commercial information products will then be developed to serve clients' needs and generate revenue. In that regard, a communication unit will be created at the ministry level.

7. CROSS CUTTING AREAS

7.1 CAPACITY DEVELOPMENT

PSTA 4 seeks inclusively to build and strengthen the capacity of agriculture and rural actors to bring about the desired sustainable transformation of the sector. Capacity development focuses on enhancing the knowledge and skills of individuals (men and women), while at the same time improving the performance of the organizations or institutions in which they work. PSTA 4 targets both public and private individuals and organizations and proposes a range of methods to strengthen capacities. Capacity building efforts focus on technical capacities as well as functional capacities, which are particularly important to formulate and implement policies and lead policy reform; to generate, manage, and exchange information and knowledge, engage in networks, alliances, and partnerships and implement programmes and projects from planning to monitoring and evaluation. Therefore, a dedicated staff for capacity development looking at the creation, utilization and retention of capacities will be among the staff of the ministry.

7.2 GENDER AND FAMILY

The government of Rwanda has made a strong political commitment to gender equality and is determined to see this reflected in government policies at all levels. MINAGRI, guided by its agriculture gender strategy, will continue to make concerted efforts to mainstream gender and engage in gender-sensitive policy making and programming. Interventions under PSTA 4 make specific gender-responsive provisions to target and include women and design solutions that are tailored to their gendered needs and challenges. In addition to mainstreaming gender, specific activities are proposed to further women economic empowerment and engagement in decision-making processes. Special consideration is also given to youth to stimulate profitable engagement in agriculture and agribusinesses, through developing skills and promotion entrepreneurship. There will be dedicated staff in the M&E unit to ensure that gender and youth issues are addressed and mainstreamed.

7.3 NUTRITION-RESPONSIVE AGRICULTURE

The Government remains dedicated to achieving food and nutrition security for all. MINAGRI is committed to addressing the food security challenge by building its capacity to mainstream nutritional outcomes into its policy, plans and programmes. PSTA 4 reflects this commitment and deepens it with specific interventions that will use MINAGRI resources to address evidence-based dietary gaps either through specific value chains and/or through the expanded Kitchen Gardens Programme. To develop and monitor suitable nutrition strategies, a staff under the M&E unit will also be part of the MINAGRI structure.

7.4 ENVIRONMENT AND CLIMATE CHANGE

PSTA 4 advocates the sustainable use of resources and promotes environmentally-sensitive options for development in all stages of the value chain. This is reflected both in policy and regulatory frameworks to be developed as well as in the activities to be undertaken. Interventions range from promoting sustainable land and water management to stimulating efficient resource use in value addition and processing. Besides promotion of environmentally sustainable practices, PSTA 4 gives high priority to building productive resilience to climate change by promoting climate smart practices and technologies.

7.5 REGIONAL INTEGRATION

As a member of the EAC and COMESA, the GoR has made strong commitments to regional integration and is committed to deepening this further, yet at the same time forging a place for Rwanda on the international stage. Regional markets remain an untapped potential and the PSTA 4, in line with the NST, advocates stronger links. Increased exports targeting the region will be facilitated through measures such as harmonisation of SPS regulatory policies and through engagement in regional value chain platforms. PSTA 4 advocates harmonisation to the COMESA seed (and soon to be developed

fertiliser and agro-chemicals regulations) to facilitate increased availability of quality inputs. Furthermore, it advocates strengthened coherence with agricultural production and trade policies, to ensure stable prices of food crops.

7.6 DISASTER MANAGEMENT

Despite the emphasis of PSTA 4 on building resilience, disasters may hit that cannot be prevented. Agriculture is a sector that is particularly exposed and vulnerable to natural hazards and disasters. Risk mitigation and disaster management elements are considered in wide range of interventions proposed under PSTA 4. The emphasis on promoting good agriculture practices reduces risks at the farm level. Research efforts focus on risk reduction and adaptation and agriculture insurance products help farmers and agriculture stakeholders bounce back after a crisis. In addition, capacities and institutional systems are strengthened to improve preparedness to disasters by providing timely information and having response and recovery plans and systems in place.

7.7 OTHER RELEVANT CROSS-CUTTING AREAS

PSTA 4 recognizes the importance of addressing the needs to all actors in the agriculture sector and enabling farmers and agribusinesses to realize their full potential. The PSTA 4 promotes the inclusion of people with disabilities into the agriculture sector, through measures such as adaptive technology and labour-saving technologies. Furthermore, the PSTA 4 addresses HIV/AIDS through improved food and nutrition security, labour-saving technologies as affected persons may have reduced physical capabilities. Lastly, with a strong focus on nutrition and food security, the PSTA 4 helps to combat non-communicable diseases and nutrition-related non-communicable diseases, particularly focusing on infants and breast-feeding mothers.

8. ECONOMIC APPRAISAL

Rwanda is a signatory to the Malabo Declaration under the African Union’s Comprehensive Africa Agriculture Development Programme (CAADP), which commits to allocating 10 per cent of public spending toward agricultural development¹⁵¹. An important explanation for this commitment is that agriculture remains the backbone of Rwanda’s economy employing 68 per cent of the population and being the key to both food and nutrition security and poverty reduction. As such, agricultural development is the basis for transforming the economy to a modern knowledge-based economy in line with Vision 2050. This section provides an overview of general evidence for returns to investment in agriculture, and subsequently estimating the impact of PSTA 4 on the economy.

8.1 GENERAL FINDINGS ON RETURNS TO INVESTMENT IN AGRICULTURE

Agriculture sector growth is associated with public spending, to provide the required public goods that facilitate private sector investment to generate economic growth, job creation, poverty reduction and food security. While studies on economic returns to public investment in agriculture are limited by data availability, a few studies have been conducted over the past decade. A widely cited study is Fan et al. (2008)¹⁵². Using cross-country data for 44 developing countries from three regions the authors estimate the return on agricultural public spending. They found that increasing agricultural spending by 1 per cent is associated with growth in total GDP (not just agricultural GDP) by 0.21 per cent. Under the assumption that this finding applies to Rwanda and using the fact that the agriculture sector is about 30 per cent of the economy, we infer that a 1 per cent increase of public spending could generate 0.7 per cent higher agricultural GDP. Hence, each percentage point increase in overall GDP will require roughly 1.42 per cent higher public investment in agriculture.

Various country studies find that agriculture has the highest return to investment ratio in comparison to other public sectors investments (table 5). In neighbouring countries Uganda and Tanzania, the return to investment ratio in agriculture is 12.4 and 12.5 respectively.

Table 5: Returns to investment ratio of public spending in agriculture versus education, health, and roads in 6 countries

	Ghana ¹⁵³	Uganda ¹⁵⁴	Tanzania ¹⁵⁵	Ethiopia ¹⁵⁶	China ¹⁵⁷	India ¹⁵⁸
Agric. R&D	16.8	12.4	12.5	0.14	6.8	13.5
Education	-0.2	7.2	9.0	0.56	2.2	1.4
Health	1.3	0.9	N/A	-0.03	N/A	0.8
Roads	8.8	2.7	9.1	4.22	1.7	5.3

8.2 IMPACT ON AGRICULTURAL PRODUCTIVITY

Facing a constraint in further land expansion, agricultural growth will be led by increased productivity and technological upgrading. By “technology” we mean the efficiency with which the production factors (i.e. land, labour, and capital) are combined, and may refer to, for example, the quality of products, use of inputs, choice of crop, post-harvest handling,

¹⁵¹ See Technical Guidelines for achieving the Malabo Declaration Goals and Targets

¹⁵² Fan, S., B. Yu, and A. Saurkar. 2008. “Public Spending in Developing Countries: Trends, Determination, and Impact.” In *Public Expenditures, Growth, and Poverty: Lessons from Developing Countries*, edited by S. Fan. Washington, DC: IFPRI.

¹⁵³ Benin, S., T. Morgues, G. Cudjoe, and J. Randriamamonjy. (2012). In *Public Expenditures for Agricultural and Rural Development in Africa*, edited by T. Morgues and S. Benin. London and New York: Routledge, Taylor and Francis Group.

¹⁵⁴ Ibid.

¹⁵⁵ Ibid.

¹⁵⁶ Mogues, T. (2011) “The Bang for the Birr: Public Expenditures and Rural Welfare in Ethiopia.” *Journal of Development Studies* 47 (5): 735–52.

¹⁵⁷ Ibid.

¹⁵⁸ Ibid.

animal health and feed, marketing, etc. Technology improves if more can be produced (in monetary terms) for a given amount of land, labour, or capital. Therefore, transformation is contingent on attracting investments in capital while introducing labour and land saving technologies, which allow for higher production for a given input. Given that land and capital are the relatively scarce production factors, labour productivity and incomes will increase mainly through attracting capital investment to the sector and introducing land-saving technologies rather than labour saving technologies, for example by increasing crop yields and cultivating high value crops or increasing the quality and price of animal products.

For crop production, the PSTA 4 emphasizes improvements in yield and reduction of postharvest losses while for the livestock and fishery sectors it emphasizes the increases in livestock holding as well as improvement in livestock and fish net output. The reduction in the postharvest losses improves the net production from land, and hence, the actual yield of crop production increases. Given the envisaged investments, the estimated impact on production is displayed in Table 6.

Table 6: Estimated impact on production

Product		2016/17	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total growth
Yield of major crops									
Maize	MT/ha	1.57	1.94	2.11	2.34	2.76	2.85	2.94	87%
Sorghum		1.11	1.16	1.22	1.28	1.35	1.42	1.49	34%
Paddy rice		3.34	3.36	3.39	3.42	3.45	3.48	3.52	5%
Wheat		0.95	1.05	1.17	1.29	1.44	1.60	1.77	86%
Cassava		1.94	2.29	2.71	3.20	3.77	4.45	5.25	171%
Sweet Potatoes		7.18	7.76	8.38	9.05	9.77	10.56	11.40	59%
Irish Potatoes		8.18	9.90	10.60	11.60	13.50	13.76	14.00	71%
Yams & Taro		3.88	4.07	4.19	4.32	4.45	4.58	4.72	22%
Cooking Banana		3.36	3.53	3.70	3.89	4.08	4.29	4.50	34%
Dessert banana		2.62	2.76	2.89	3.04	3.19	3.35	3.52	34%
Banana for beer		2.82	2.97	3.11	3.27	3.43	3.60	3.78	34%
Beans		1.21	1.36	1.50	1.69	1.86	2.04	2.22	83%
Groundnuts		0.44	0.46	0.48	0.51	0.53	0.56	0.59	34%
Soya beans		0.55	0.64	0.73	0.84	0.97	1.11	1.28	133%
Vegetables		9.92	10.52	11.15	11.82	12.53	13.28	14.08	42%
Fruits	3.2	3.8	4.5	5.3	6.2	7.4	8.7	172%	
Coffee¹⁵⁹	kg/tree	2.8	3.0	3.2	3.4	3.6	3.8	4.0	43%
Tea¹⁶⁰	MT/ha	7.0	7.2	7.3	7.5	7.7	7.8	8.0	14%
Animal products									
Milk	1000 MT	776	855	934	1,013	1,092	1,171	1,250	61%
Beef		43	45	47	49	51	54	57	33%
Goat		12	13	14	16	17	18	19	58%
Sheep		3	3	3	3	3	4	4	33%
Poultry		23	25	27	29	31	35	41	173%
Pork		18	22	24	28	37	68	77	328%
Eggs		7	9	10	11	13	15	17	143%
Fish		27	35	45	65	90	100	112	315%

¹⁵⁹ PSTA 4 will make sure farmers are benefiting from the sale of their coffee beans

¹⁶⁰ PSTA 4 will make sure farmers are benefiting from the sale of their leave tea

8.3 ESTIMATED MACROECONOMIC EFFECTS

Running the CGE model to project macroeconomic effects of expected yields and animal resources products, we obtained expected impacts of PSTA 4 in terms of agriculture GDP growth and poverty.

To better assess the potential economy-wide impact of the PSTA 4's targets, we used a computerised general equilibrium (CGE) model¹⁶¹. We have considered the agriculture spill-over to the wider economy yielding a modest 1 per cent productivity growth in non-farm sectors because of increased agricultural productivity. Such spill-overs would be a result of lower food prices and increased demand in the economy from higher agricultural incomes. We find that agricultural growth will be about 10 percent per year whereas if we continue with business as usual, the model projects agricultural growth of 4.4 per cent.

8.4 EFFECT ON HOUSEHOLD INCOMES AND POVERTY

The implementation of PSTA 4 will lead to the increase of rural household income of 5.8 per cent per year.

The increased growth in household incomes leads to poverty reduction. Agricultural growth helps the poor households improve their food security and reduce hunger, which leads to the fall in poverty rates for both rural and urban households and hence the national poverty rate.

In total, the model predicts that full PSTA 4 implementation will lead to national poverty rates of 15 percent by 2024 compared to 21.8 percent if we continue with business as usual.

8.5 EFFECT ON FOOD AVAILABILITY

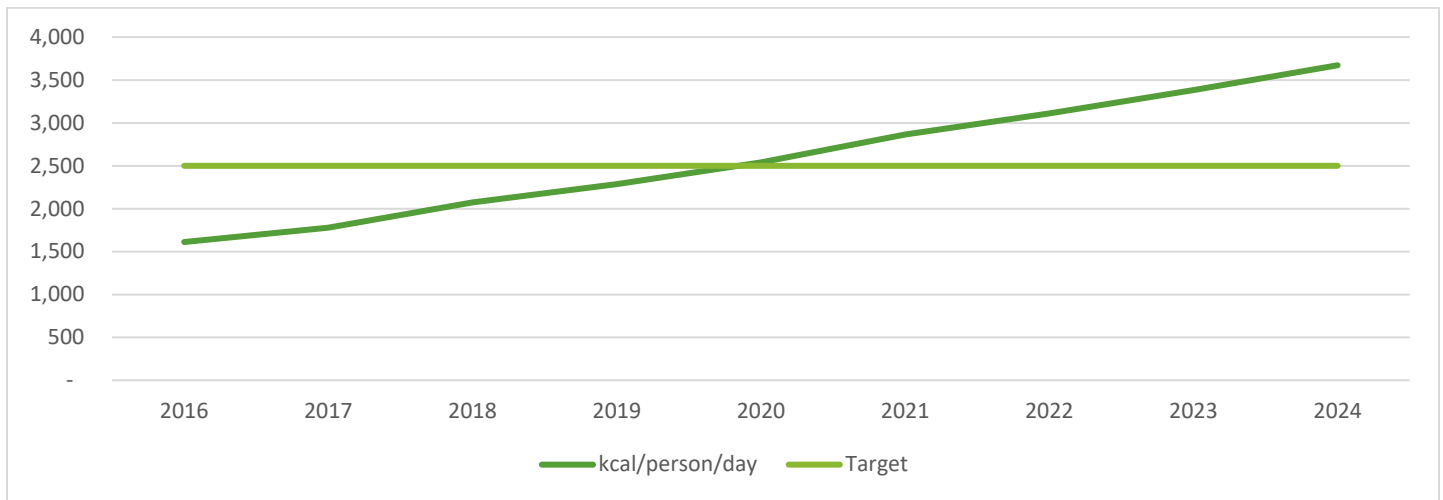
Agriculture production is also key to securing domestic food supply and increasing food availability is MINAGRI's core mandate to address food security issues by availing food to the population. The FAO has defined the calorie threshold at 2100 kcal adult equivalent per capita and day for food-secure livelihoods. However, the adult equivalent threshold is defined domestically by each country depending on the food requirements of the population. In the EICV4, Rwanda has defined its calorie threshold per adult equivalent at 2500 kcal per day¹⁶².

Taking population projections into account, the targeted yield improvements in PSTA 4 is expected to bring domestic food production above the 2500 kcal per day consumption threshold by 2020.

¹⁶¹ Xinshen D., J. Randriamamonjy and J. Thurlow: "Economywide Impact of Agricultural Growth with PSTA 4 Targets - Preliminary Results from the Rwanda CGE Model", IFPRI, Nov 2017

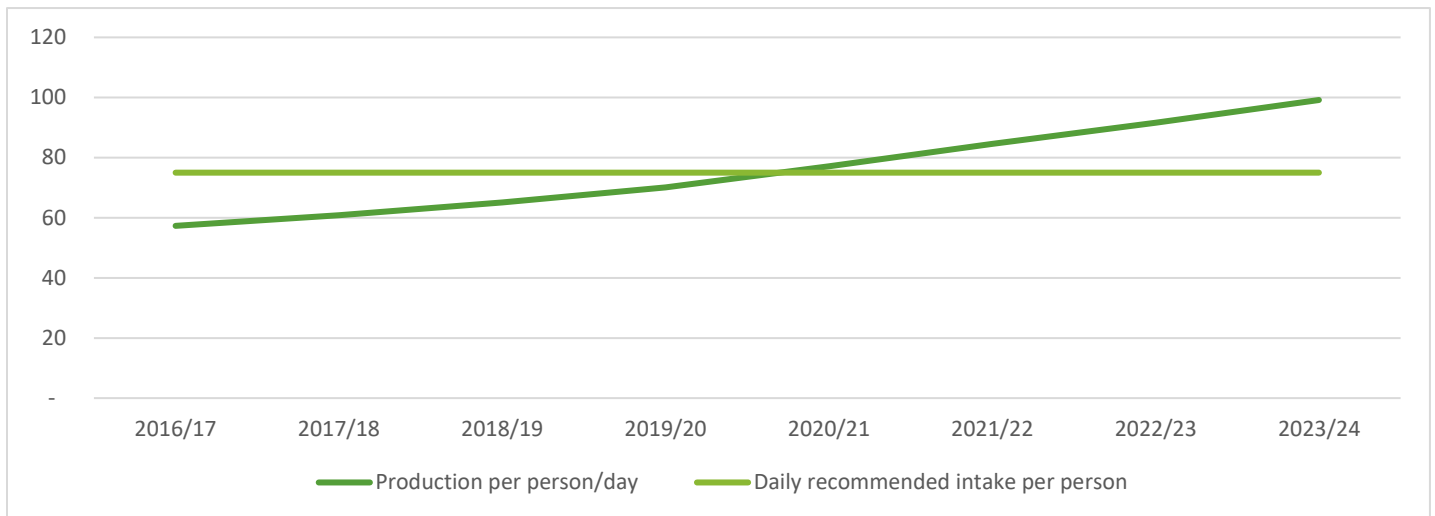
¹⁶² NISR, Population Census (2012) Population projections

Table 7: Projected kcal/person/day



FAO guidelines recommend that proteins take up 10-12% of daily energy intake, which amounts to recommended 76 gr proteins per adult equivalent per day. The estimated productivity growth is projected to generate excess protein production by 2021 (Figure 5).

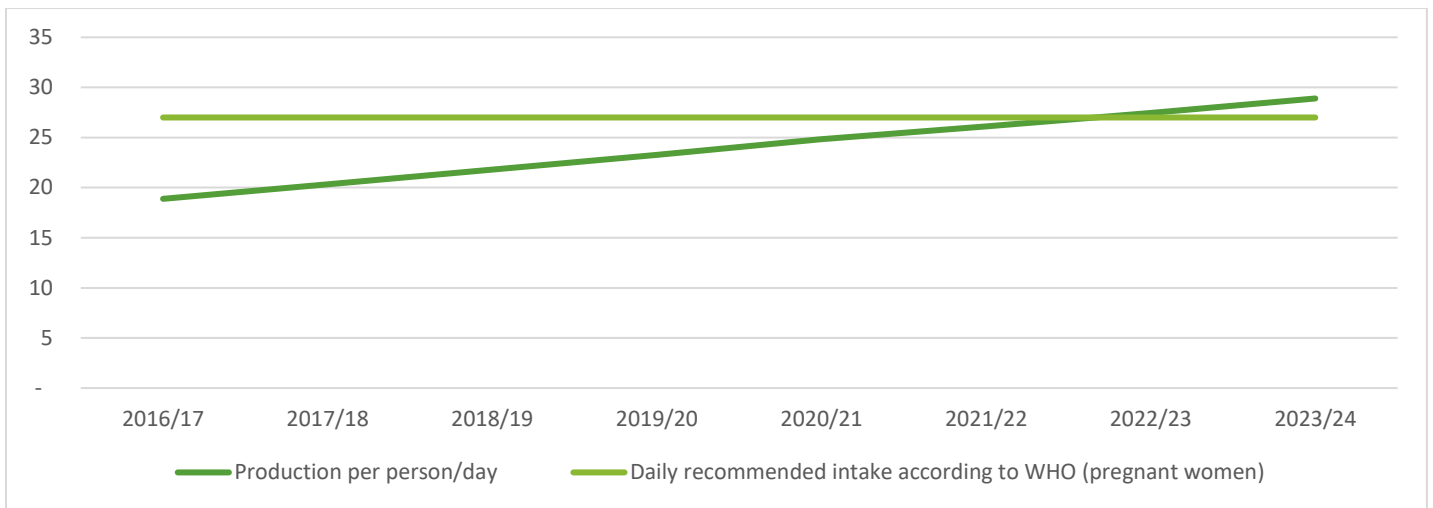
Figure 5: Proteins per adult equivalent per day



Iron is an important micronutrient especially for pregnant women and childhood development. Domestic production is projected to provide for consumption at the recommended threshold for pregnant women by 2022 (

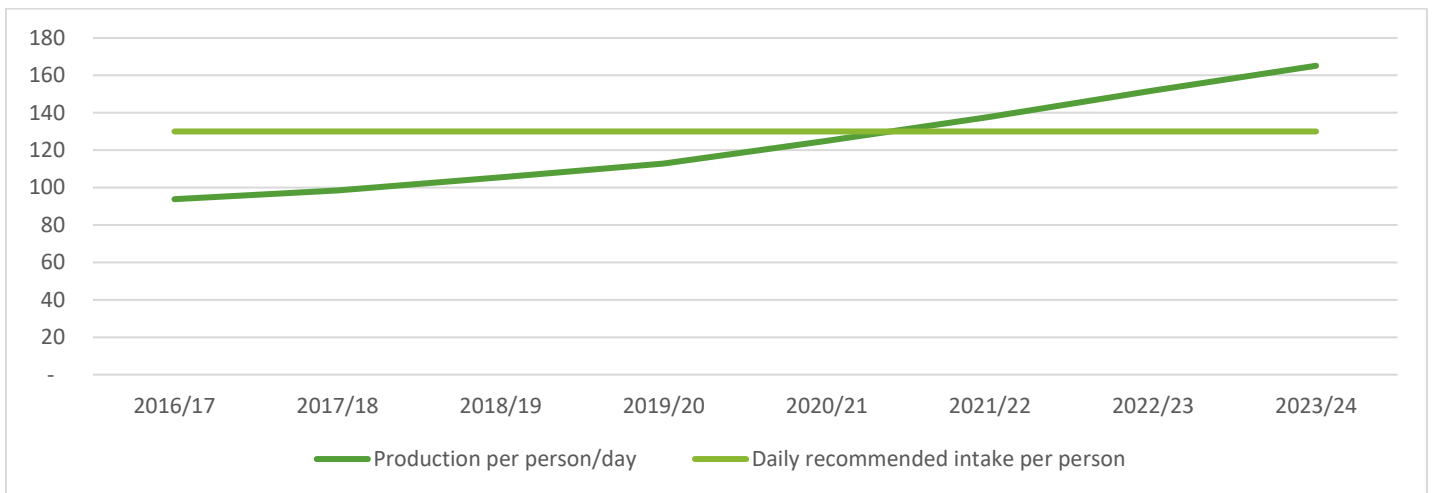
Figure 6).

Figure 6: Iron production per adult equivalent per day (mg)



Domestic production of calcium is expected to exceed the recommended consumption threshold by 2021 (Figure 7).

Figure 7: Calcium per adult equivalent per day (mg)



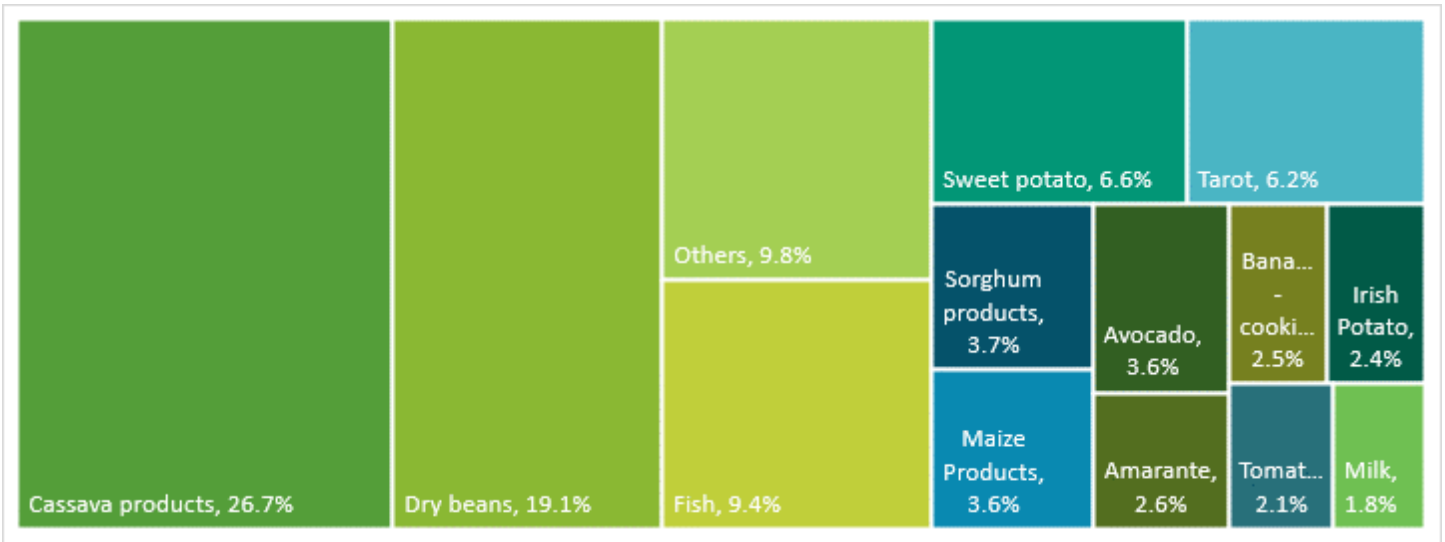
8.6 FOOD TRADE BALANCE SHEET

The role of the agriculture sector is to ensure sufficient national food production to meet the dietary needs of the population. If this is not the case, food would need to be imported. On the other hand, excess food production would allow for food exports.

The agriculture sector cannot control actual trade flows, but they can set production targets to meet the dietary needs of of the population, such that food exports are possible without adding to food insecurity in the country. While Rwanda has has not defined national guidelines on food consumption, the EICV 4 defines a food basket composed by commodities and and percentages displayed below at which an adult equivalent consumes 2500 kcal per person per day (

Figure 8).

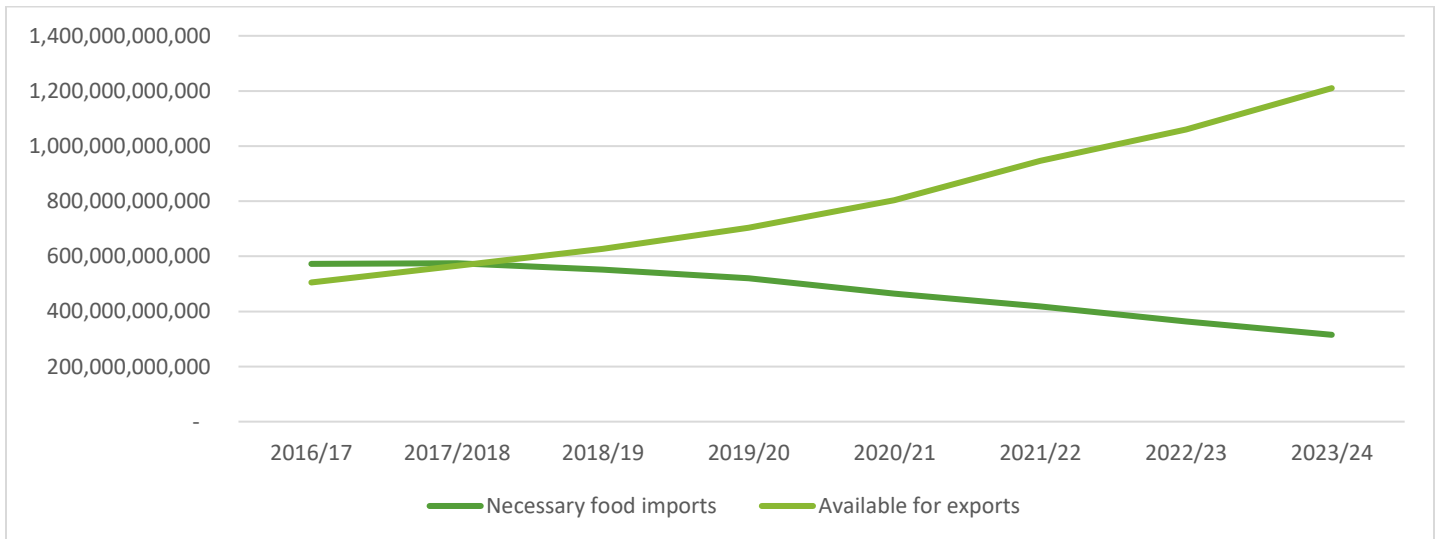
Figure 8: Consumption basket to consume 2500 kcal per adult equivalent per day (EICV 4)



Using the Rwandan food basket and the population projections, we can define the domestic consumption for each food item in the basket that is required for adequate national consumption. Comparing to projected production figures, it can be estimated whether or not Rwanda would be a net importer or net exporter of each product. The trade value for each food item is obtained using fixed 2014 prices from NISR. Hence, we can estimate the value of net trade for each item, given the domestic production if all Rwandans were to consume according to the defined food basket. For example, the current domestic production of milk would allow Rwanda to be a net exporter, as the national production exceeds the necessary consumption defined by the food basket. On the other hand, Rwanda would need to import cassava to meet the dietary needs of the population.

In total, Rwanda would currently need to import food worth RWF 67 bn in 2014 prices to avail the food basket to all Rwandans (Figure 9). However, with the projected increased productivity especially in higher value food products, the value of food available for exports exceeds the value of required imports by 2019. By 2024, national production allows for net exportation of food worth RWF 895 bn, while allowing each resident to secure 2,500 kcal per day.

Figure 9: Food balance sheet projections (RWF 2014 prices)



9. FINANCING REQUIREMENTS

9.1 COSTING METHODOLOGY

Given the complexity and scale of PSTA 4, its implementation can only be effective and done in a timely manner with an appropriate financial package. The PSTA 4 investment plan lays out its investment requirements and is structured around the four priority areas. While the private sector is the real driver of growth in agriculture, the PSTA 4 investments have been estimated from a public-sector perspective. This will inform the Government of Rwanda of the targeted investments necessary to transform the agriculture sector and stimulate the crowding-in of the private sector. It is vital for resource mobilisation, planning and budgeting for the full implementation of the proposed plan over the 6 years.

The main methodological choices that guided the costing process were threefold:

First, as already stated, the costing of the PSTA investment requirements is from a public-sector perspective, estimating the necessary resources that the public sector needs to mobilize and allocate. These targeted public investments provide the necessary public goods and create a conducive environment necessary for the transformation of the sector, and support to the private sector in driving this change. The Government of Rwanda, with support from Development Partners, seek to crowd-in rather than compete with private sector investments. For example, the government support will encourage private sector investments in fertiliser distribution, together with a network of agro-dealers. Subsidies will be in the form of voucher schemes to support those farmers unable to purchase fertiliser at market prices. Measures promoted in the PSTA 4 to stimulate increased private sector investment include further liberalisation of input markets, subsidised technical assistance, PPPs to mitigate risk, challenge and start-up funds, and voucher schemes.

Second, the costing presented below includes investments associated with outputs led by MINAGRI and its associated agencies. For budgeting purposes, this avoids duplication with other sectors in outputs that are cross-sectoral, such as feed roads and climate information.

The investment plan took a bottom-up approach, ensuring linkages with existing (sub) sector plans and budgets, as well as other Ministerial (sub) sector plans. Under each priority area, the outputs and sub-outputs included in the results framework have been further disaggregated into clustered activities. As far as possible, each activity was characterised by a single measure of expenditure (person days for technical assistance, training session for capacity building, units and numbers for infrastructure development and so forth) with a unit cost and gradually phased quantities over the implementation period. These annual quantities are linked to the annual targets over the 6-year period in the results framework. In some cases, detailed activities were defined. In other cases, cost estimates were consolidated into aggregated activities or low-level outputs. Both activities and low-level outputs are further grouped by sub-outputs, outputs, and outcomes under each Priority Area.

The PSTA 4 investment plan was developed by (sub) sectoral MINAGRI teams, who led the data collection and validation, and ensured that the PSTA 4 costing was built on existing sub-sectoral plans and budgets. Contributions from other relevant stakeholders were made including other Ministries and Agencies (this includes MININFRA, MoE and MINILAF). Inflation has been considered at a constant level of 6 per cent per annum for each of the six years.

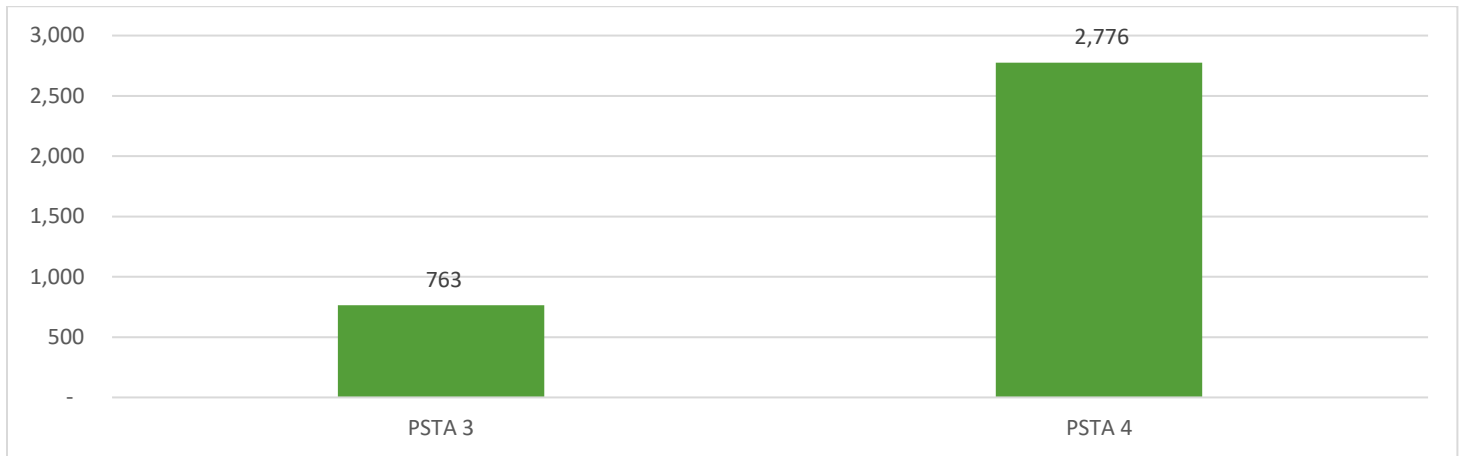
The PSTA 4 contains the analysis and details of the consolidated output and sub-output level of investments. The operational framework with related investments (as a separate annex) contains the disaggregated investments and the corresponding costed activities within the sub-outputs. It highlights expenditure measures (training, technical assistance, units etc.), unit costs per measure, annual costs (corresponding to targets) over the six-year period, expenditure type (investment vs. recurrent), and lead implementer (MINAGRI and other Ministries and Agencies).

The Investment needs of the PSTA 4 provide an indicative perspective on the resources needed for an effective implementation. The annual planning and budgeting processes will require further detailed analysis based on the programmes and sub-programmes to better specify the costs associated with the priority activities. These exercises will be conducted under the umbrella of the investment plant of PSTA 4.

9.2 PSTA 4 FINANCING REQUIREMENTS

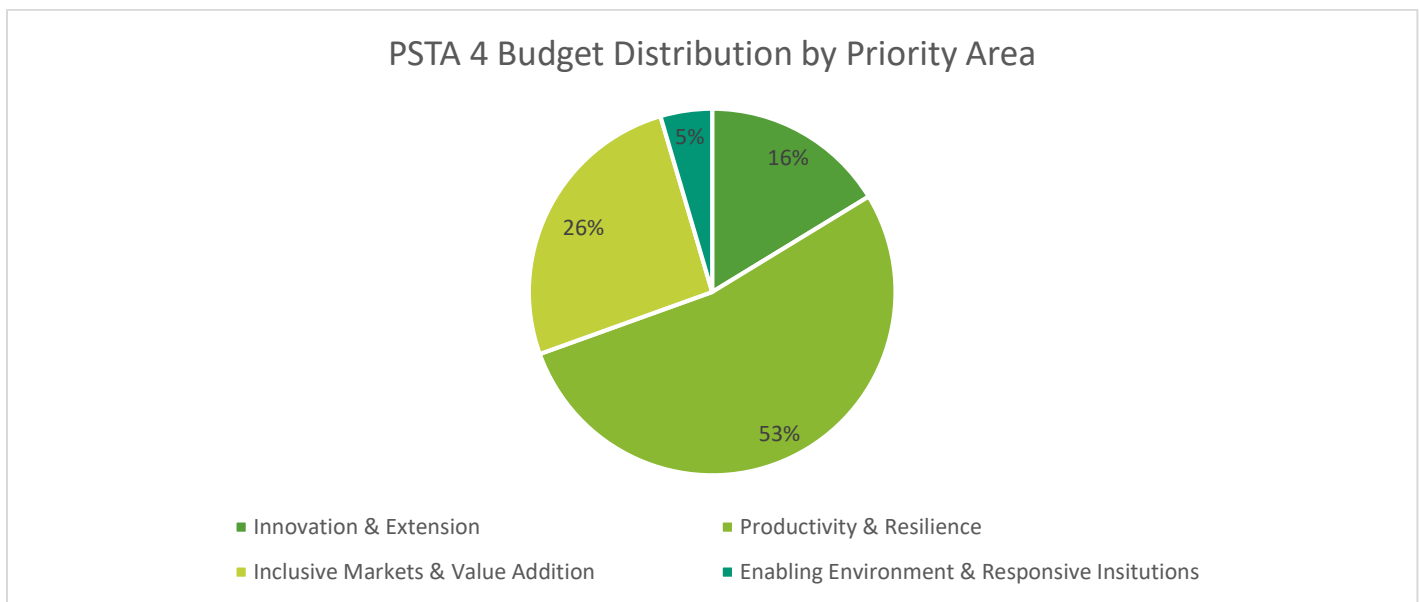
Using this methodology and process, the overall financing requirements for PSTA 4 have been estimated at bn 2,776 RwF over the 6-year period of implementation. Averaging different sources, the agricultural expenditure during PSTA 3 was about 763 billion RwF over a 5-year period.

Figure 10: PSTA 4 financing requirements compared to PSTA 3 (RwF Millions)



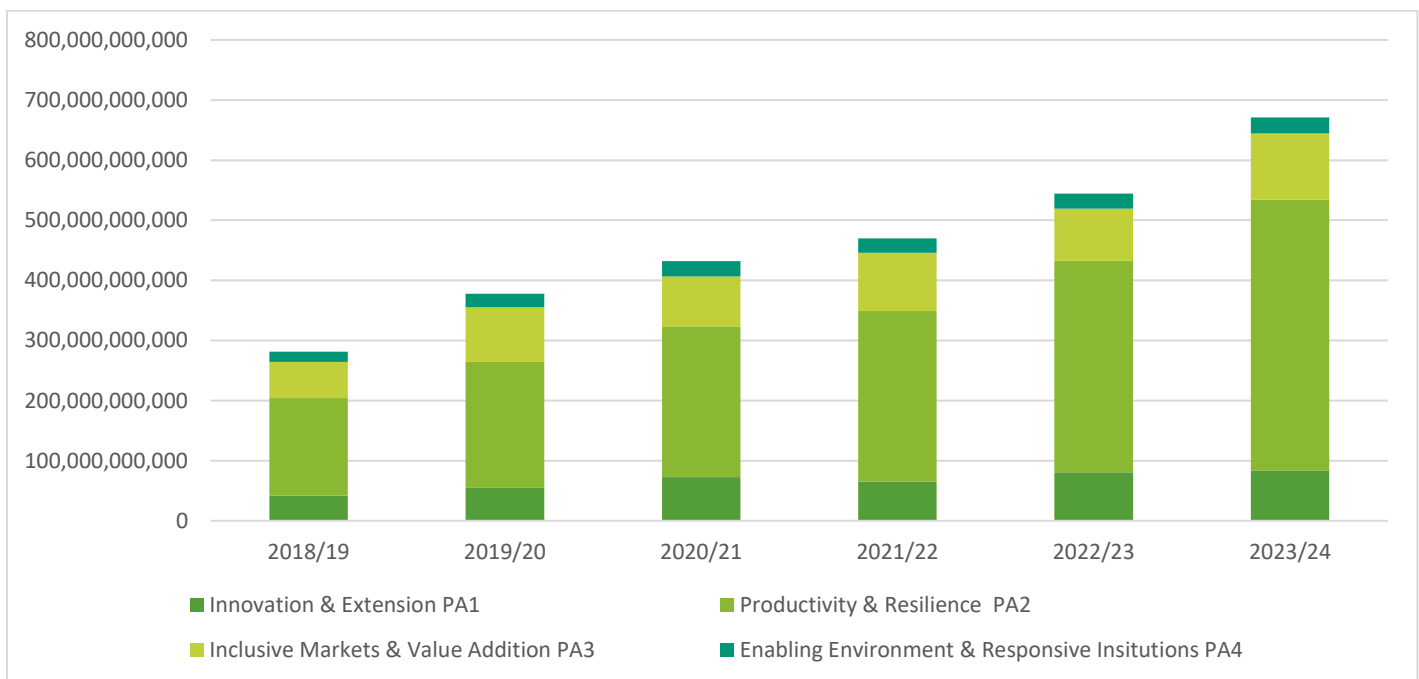
The theory of change and the proposed mix of activities in PSTA 4 are reflected in the distribution of financing requirements by priority area. Priority area 2 – (*Productivity and Resilience*) – requires 53% given the infrastructure investments needs coupled with the production support measures. Inclusive Markets & Value Addition take up 26%, Innovation & Extension take up 16%. Enabling Environment & Responsive Institutions requires 5% of the budget given that this area has little expenditures on infrastructure and implementation of large programmes.

Figure 11: PSTA 4 Budget Distribution by Priority Area (RwF)



Following the balanced targets of the results framework, PSTA 4’s costing process has resulted in well-adjusted yearly estimates, ranging from 281 billion RwF in the first year of implementation to 671 billion RwF in 2023/2024 (both nominal). The average growth per year is about 8 per cent, correlated with the growth rates considered in PSTA 4. The overall balance between priority areas is also reflected in the yearly estimates with production-related activities on a continuously growing trend and requiring slightly over half of the financing.

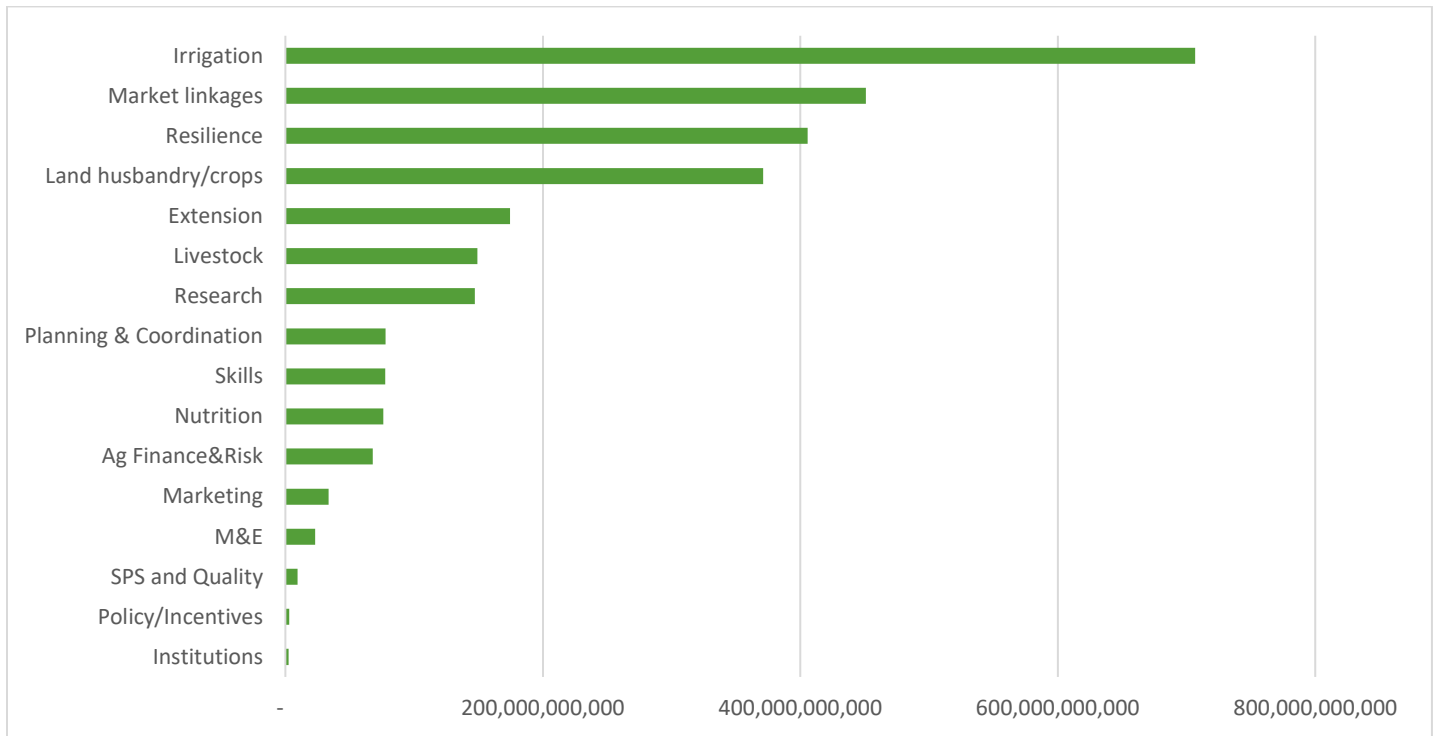
Figure 12: PSTA 4 financing requirements per year (RwF million)



At a more disaggregated level, it becomes clear that the output on irrigation - especially marshland and small-scale irrigation - is the main cost driver, taking up 25 per cent of the total budget. Secondly, Efficient and Inclusive markets take up 16 per cent. This area includes market infrastructure as well as subsidies to inputs markets. Third, the mechanisms for increased resilience output include significant provisions for asset-building for vulnerable groups taking up another 15 per

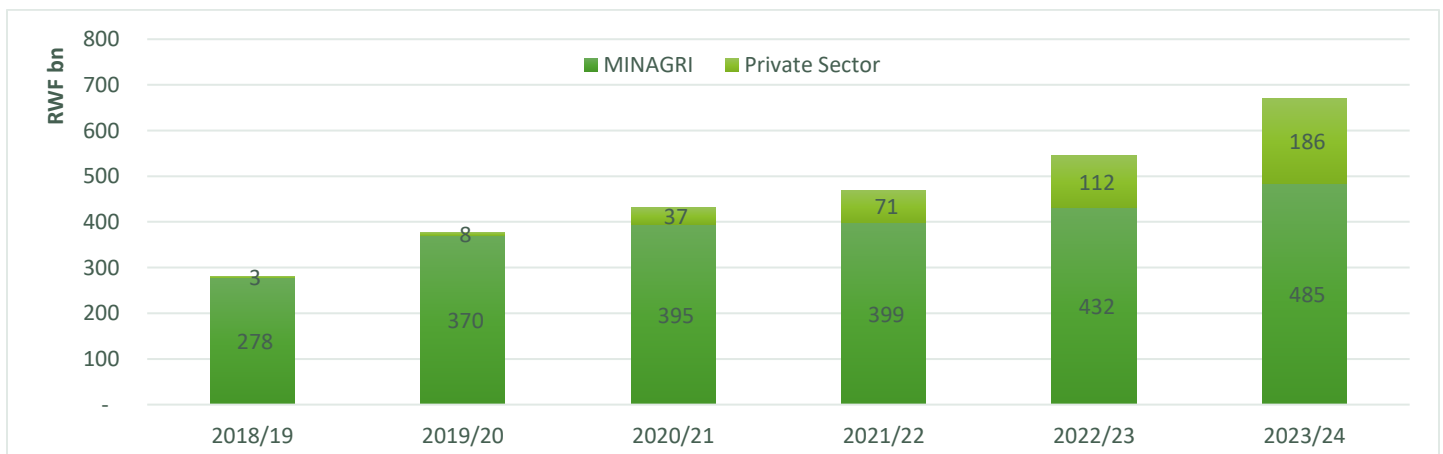
cent. Fourth, land husbandry/crops take up 13 per cent mainly for radical terraces followed by progressive terracing and biological soil conservation practices. Fifth, extension provisions take up 6 per cent of the total budget.

Figure 13: PSTA 4 Main cost driver at output level



As part of the strategy for the policy for the GoR to move from being a market actor to becoming a market enabler, the private sector is expected to participate in the financing of the strategy. The private sector may do so when there is a positive financial return on the investment. Depending on the specific project, the private funds may be leveraged through co-investment or by paying for goods and services that result in a financial gain. The private sector contribution is expected to increase from about RWF 3 bn in the 2018/19 to about RWF 186 bn in 2023/24 (Figure 14). In percentage terms, the private sector contribution is planned to increase from 1% in 2018/19 to 28% by 2023/24. In total, the planned private sector funds to be leveraged over the 6 years is RWF 417 bn or 15% of total costs.

Figure 14: Public and Private Contributions



The intervention areas with higher expected private contributions are 1) Effective and efficient irrigation under IWRM frameworks Irrigation in which the government matches private investment. Currently, the GoR matches small-scale

irrigation investment with 50% of the investment. For hill-side and marsh-land irrigation, the private sector is expected to take up an increasing role by exploiting matching public investments. 2) Mechanisms for increased resilience in which transfer of productive assets (i.e. mostly livestock and small-stock) will follow the Girinka model in which beneficiaries transfer new-bred animals to other beneficiaries. 3) Market linkages where the private sector can benefit from investing in market infrastructure and productive alliances.

Table 3: Private contributions in RWF and share of total investment by intervention area

Intervention Area	Total	Private share of total
Research	5.53	3.8%
Extension	5.95	3.4%
Skills	18.02	23.3%
Land husbandry/crops	28.36	7.6%
Irrigation	173.52	24.6%
Livestock	13.02	8.7%
Nutrition	0.99	1.3%
Resilience	100.24	24.7%
Market linkages	59.95	13.3%
Ag Finance & Risk	3.14	4.6%
SPS and Quality	0.52	5.5%
Institutions	0.00	0.0%
Policy/Incentives	-	0.0%
Marketing	3.00	9.0%
Planning & Coordination	4.05	5.2%
M&E	0.36	1.6%
Total	416.66	15%

10. IMPLEMENTATION ARRANGEMENTS

The implementation arrangements guide the roles and responsibilities of agricultural institutions and partners involved in the implementation of the PSTA 4. They define the structures and approaches through which activities will be coordinated and implemented. Having clearly defined implementation arrangements in place is important to ensure effective and efficient public and private expenditures in support of agriculture development. The implementation arrangements proposed for PSTA 4 take into consideration the Malabo-based CAADP implementation orientation which advocates an increased focus on results, especially market-led agriculture growth and private sector investment, and inter-sectoral cooperation and coordination.

10.1 INSTITUTIONAL STRUCTURES

10.1.1 OVERSIGHT AND GUIDANCE

MINAGRI is responsible for engaging all relevant stakeholders of the agriculture sector in the PSTA 4 coordination. The steering process is at the impact and outcome level.

Previous phases of PSTA have put in place several relevant steering mechanisms which will be held during PSTA 4 implementation. Essentially, these are the same mechanisms in place for the implementation of the NAP and comprise the following mechanisms:

- ▶ The Agricultural Sector Working Group (ASWG) is an essential forum for dialogue and coordination around key agricultural development issues. Members include development partners, NGOs, the private sector, civil society, farmer organizations, financial institutions and Government agencies.

- ▶ In addition, the Sector Wide Approach (SWAp) group brings together MINAGRI and key budget support development partners with its instrumental role of discussing issues related to budget support in the agriculture sector and coordinating financial support to the PSTA.
- ▶ Sub Sector Working Groups (SSWGs) of four permanent specialized clusters: crop development, livestock development, agribusiness, markets and export development, and planning & budgeting. SSWGs will seek to enhance stakeholders' roles in the processes of planning, monitoring, advisory, coordination and financing for the sector.
- ▶ At the district level, the Joint Action Development Forum (JADF) made up of district government representations, (international) Non-governmental Organizations (NGOs), farmer and community organizations, and traditional and religious leaders, meets regularly to discuss sectoral issues. The implementation of the District Development Plan is overseen by the JADF. PSTA 4 will continue efforts under the previous phase to improve district feedback mechanisms.

While working through existing implementation structures, several improvements are proposed: (i) increased representation of private sector and farmer organizations in sector steering groups, (ii) increased use of ICT, M&E and knowledge management products for evidence decision-making, (iii) adjustment of the meeting planning schedules according to the PSTA 4 implementation cycle, (iv) creation of agricultural for a, and (vi) agriculture PPD.

10.1.2 REVIEW AND JOINT SECTOR REVIEWS

The MINAGRI-led Joint Sector Review (JSR) forum of the agriculture sector brings together the Sector Working Group (SWG) stakeholders, including public and private sector actors to monitor annual progress in the implementation of the PSTA (backward looking JSR) and to discuss prioritized areas in the implementation for the next fiscal year (forward looking JSR). The JSR is a process that emphasizes mutual accountability of governance to improve service delivery and encourage proper collaboration with stakeholders of the sector. The JSR also supports the preparation of Rwanda's CAADP biennial review agreed by Heads of State at the African continental level (Malabo Declaration).

10.2 IMPLEMENTATION FRAMEWORK

MINAGRI is the leading institution to deliver on the implementation of the four priority areas of PSTA 4 in partnership with its agencies, concerned line ministries, districts, and the private sector (including farmers and their organization).

10.2.1 OUTCOMES LEADERS

To strengthen internal coordination of PSTA 4 within MINAGRI, outcome leaders are identified for each Priority Area. The responsibilities of these outcome leaders are to operationalize results chains at different levels, build synergy among priority areas, support output implementation by the various actors, streamline synergies between RAB, NAEB, SPIU and MINAGRI through increased functional guidance, and inform annual planning by thorough feedback on implementation lessons learnt and best practices.

The entities proposed as outcome leaders of PSTA 4 outcomes and impact is as follows: Priority area 1 and 2: RAB, Priority area 3: NAEB and Priority area 4: Ministry.

10.2.2 ROLES AND RESPONSIBILITIES

Intervention Area	Lead	Others	Roles and responsibilities
Priority Area 1: Innovation and Extension			
1.1 Research and innovation development	RAB	MINAGRI MoE/RWFA Districts Universities Research institutions (national and international) Private sector	<ul style="list-style-type: none"> - MINAGRI provides strategic guidance and oversight, advises on research policy and priorities and capacity development, and oversees implementation and impact - RAB leads research and coordination of research actors and coordinates infrastructure upgrading and human resource strengthening - MoE/RWFA works with RAB to identify and undertake research on agroforestry and to mitigate and adapt to environmental and climate risks - Districts identify research needs and conduct targeted research, they coordinate with RAB to upgrade research infrastructure and deliver institutional and human capacity development at decentralized levels - Universities collaborate with RAB to upgrade research capacities and curricula - Research institutions, universities and private sector play an increasingly important role in innovative research through a challenge fund
1.2 Proximity extension and advisory services	RAB	MINAGRI NAEB MINALOC Districts	<ul style="list-style-type: none"> - MINAGRI provides guidance and oversight on extension content and delivery in line with sector priorities and the decentralization process - RAB coordinates public extension provision for food crops and animal resources in close collaboration with MINALOC district staff

Intervention Area	Lead	Others	Roles and responsibilities
		MYICT Private sector	<ul style="list-style-type: none"> - NAEB provides and coordinates extension to cash export crops - MYICT supports the use of ICT for outreach and farmer feedback in extension and advisory services - Districts under the ongoing decentralization play more of a leading role in managing and coordinating district level extension delivery and FFSS - Private sector is increasingly involved in providing a range of (specialized) and demand-driven extension and advisory services
1.3 Skills development for agriculture value chain actors	RAB	RCA MINEDUC MIFOTRA MYICT RYAF RDB PSF Private sector	<ul style="list-style-type: none"> - MINAGRI advises on and oversees capacity development efforts - RAB coordinates capacity development and skills development of rural value chain actors - RCA is responsible for farmer cooperatives and works closely with MINAGRI in strengthening organizational and business skills of cooperatives and farmer organizations - MINAGRI works with MINEDUC to provide input and support to articulate VET curricula - MIFOTRA supports the provision of trainings at local level - MYICT supports the use of ICT and e-learning in training delivery -RYAF supports the delivery of trainings and work experience by using its network to advance entrepreneurship in the agri-food sector - RDB and PSF collaborate with MINAGRI in setting up seed funds and start-up funds to spur entrepreneurship and women economic empowerment - RBD supports the skills need identification in consultation with the private sector - Private sector provides work experience, internships and mentoring to young entrepreneurs
Priority Area 2: Productivity and Resilience			
2.1 Sustainable, diversified and climate smart practices	MINAGRI	RAB NAEB RWFA Districts Private sector including	<ul style="list-style-type: none"> - MINAGRI provides guidance on priorities for sustainable production RAB provides technical assistance to land management practices including terracing - Districts lead implementation of land management works - RWFA works with RAB on agroforestry - RAB and NAEB support CSA practices uptake for their respective commodities

Intervention Area	Lead	Others	Roles and responsibilities
		cooperatives and input suppliers	- Cooperatives and other private sector increasingly play a role in production and dissemination of inputs
2.2 Effective and efficient irrigation under IWRM frameworks	MINAGRI	MINIRENA RAB NAEB Districts Private sector	- MINAGRI oversees and leads planning of irrigation investments - RAB provides technical support - Districts lead implementation of irrigation infrastructure - Private sector is increasingly engaging to invest in (innovative) irrigation and irrigation management
2.3 Animal resources and production systems	MINAGRI	RAB VHS Districts	- MINAGRI is responsible for the development of animal resources - RAB, working closely with the districts, supports capacity development and delivery of livestock specific and crop/livestock integration extension and feed development - VHS is responsible for the delivery of animal health services
2.4 Nutrition-sensitive agriculture	MINAGRI	RAB NFNCS/MINALOC MINEDUC MINISANTE MIDGEPROF Districts	- MINAGRI is responsible to coordinate agricultures contribution to the eradication of malnutrition - MINAGRI coordinates closely with NFNCS on planning and implementation of nutrition related interventions - MINEDUC, MINISANTE and MIDGEPROF are closely engaged in activities related to nutrition education, either through kitchen gardens, school feeding or other programmers - Districts, working with RAB, play a leading role in implementing field-level nutrition interventions
2.5 Mechanisms for increased resilience	MINAGRI	RAB MINALOC/ LODA Meteo Rwanda, MoE REMA MIDIMAR Districts	- MINAGRI coordinates activities and builds institutional capacities to build resilience - MINAGRI collaborates with MoE, REMA and Meteo Rwanda on weather and climate services - RAB together with the districts plays a role in farmer use and uptake of climate information and tools - MINALOC/LODA are responsible for social protection programmes in Rwanda (VUP), and MINAGRI will coordinate closely all agriculture-related social protection interventions - MINAGRI will work with MIDIMAR and districts on disaster prevention, preparedness, and response
Priority Area 3: INCLUSIVE MARKETS AND VALUE ADDITION			
3.1	MINAGRI	MINAGRI	- MINAGRI develops and updates policy framework and regulations for increased market linkages, development of market

Intervention Area	Lead	Others	Roles and responsibilities
Market Linkages		MINICOM PSF RAB NAEB RCA RDB MINALOC MYICT MININFRA Districts	<p>infrastructure, coordinates with other relevant ministries and private sector, and oversees overall implementation, data generation and monitors impact</p> <ul style="list-style-type: none"> - MINICOM facilitates the linkages, training, and coordination of agro-processing enterprises with MINAGRI and relevant agencies - PSF represents the interests of the agribusinesses and coordinates with MINAGRI and other relevant agencies in strengthening the market linkages - RAB coordinates and delivers capacity-building and training to cooperatives and farmers in cooperation with RCA - NAEB coordinates and delivers capacity-building and training in selective value chains (traditional and non-traditional export commodities) - RCA in cooperation with NAEB and RAB delivers the capacity building and training to cooperatives and farmers - RDB is responsible for overall private sector investments in market linkages - MININFRA coordinates with MINAGRI, the private sector and cooperatives in support of the development of the marketing infrastructure - MYICT facilitates the development of the Market and Trade Information Systems - MINALOC supports with management and implementation of the activities in the districts - Districts support with the management and implementation of the activities in the districts
3.2 Agricultural Risks and Financial Services	MINAGRI	MINICOM NAEB RAB BRB RCA RDB PSF	<ul style="list-style-type: none"> - MINAGRI develops and updates policy framework and regulations for agricultural risk and financial services for the agriculture sector, coordinates with other relevant ministries, BRD and private sector, and oversees overall implementation, data generation and monitors impact - MINICOM, in close cooperation with MINAGRI, facilitates the development of agricultural risk and financial services for agribusinesses - NAEB facilitates the development of agriculture risk and financial services in selected value chains (traditional and non-traditional export commodities) - RAB facilitates the development of agriculture risk and financial services in selected value chains (food crops and animal resources)

Intervention Area	Lead	Others	Roles and responsibilities
			<ul style="list-style-type: none"> - BRD will manage and implement the guarantee fund and insurance scheme - RCA in cooperation with other agencies delivers the capacity-building and training to cooperatives and farmers - RDB is responsible for overall private sector investments - PSF represents the interests of the agribusinesses and coordinates with MINAGRI and other relevant agencies in strengthening the agricultural risk and financial services
3.3 Quality Assurance and Regulation	MINAGRI	NAEB RICA RSB MoH PSF	<ul style="list-style-type: none"> - MINAGRI develops and updates framework and regulations for quality assurance and standards for the agriculture sector, coordinates with other relevant ministries, and the private sector, and oversees overall implementation, data generation and monitors impact - NAEB provides capacity building, testing, and inspection of quality assurance in selective value chains (traditional and non-traditional export commodities) - RICA in close cooperation with MINAGRI and PSF, facilitates and inspect standards adherence in the private sector, and covers agricultural products as well as consumer protection in Rwanda. - RSB is responsible for the overall quality assurance and regulation and, in cooperation with MINAGRI, the development of standards, conformity assessment and metrology services - MOH is responsible for the strengthening of food safety and health standards in close coordination with other partners - PSF represents the interests of the agribusinesses and coordinates with MINAGRI and other relevant agencies in strengthening quality compliance of agribusinesses
Priority Area 4: Enabling environment and responsive institutions			
4.1 Agricultural institutions development	MINAGRI	NAEB RAB MINALOC Districts	<ul style="list-style-type: none"> -MINAGRI leads and coordinates institutional assessments and their implementation -MINAGRI, RAB and NAEB's organization development plans are implemented to support functions and capacities to support PSTA 4 implementation -District capacities are strengthened through implementation of the local services improvement plans to enhance implementation and service delivery capacities at district level
4.2 Evidence-based policy	MINAGRI	NAEB	<ul style="list-style-type: none"> - MINAGRI develops policies and regulatory frameworks for the agriculture sector based on evidence-based processes

Intervention Area	Lead	Others	Roles and responsibilities
development and regulatory frameworks		RAB MINECOFIN, MINICOM MINILAF Sector ministries	<ul style="list-style-type: none"> - RAB and NAEB (for export crops) collaborate with MINAGRI and provide inputs on policy and regulatory framework development for agriculture issues touching upon their respective domains - MINAGRI works closely with MINICOM on regulatory issues to attract private sector investment in agriculture -MINAGRI will work closely with MINILAF on all issues pertaining to land use planning and administration - MINAGRI works with MINECOFIN for regulatory issues to have fiscal implications - Sector ministries are engaged where policies or regulatory instruments require harmonization between sectors
4.3 Commercialization of value chains	MINAGRI	NAEB MINICOM Districts PSF RDB	<ul style="list-style-type: none"> - MINAGRI is responsible for providing an enabling environment to attract private sector investment - MINAGRI works closely with MINICOM to attract private sector investment in agriculture - RDB supports PPD mechanisms and VC platforms in collaboration with PSF to address key challenges in private sector development - Districts are engaged in local level PPD and value chain platforms - NAEB supports MINAGRI on PPDs and platforms for cash export value chains
4.4 Planning, Coordination and budgeting	MINAGRI	MINECOFIN, MINALOC Sector ministries and agencies Districts Development Partners Private sector	<ul style="list-style-type: none"> - MINAGRI is responsible for coordinating all actors in the agriculture sector in Rwanda and leads planning and budgeting processes for the Ministry - MINECOFIN supports budget planning and harmonization between MINAGRI and other sectors - MINAGRI brings together all actors in various coordination mechanisms - Districts play an increasingly prominent and leading role in PSTA 4 implementation, as reflected by aligned district planning -MINAGRI engages in joint planning/joint Imihigo with a range of sector ministries and agencies to implement PSTA 4

Intervention Area	Lead	Others	Roles and responsibilities
4.5 Knowledge management , Monitoring, Evaluation, and Learning (MEL), Information Systems and Statistics	MINAGRI	RAB NAEB NISR Districts	<ul style="list-style-type: none"> -MINAGRI is responsible for monitoring and evaluation and management of information systems - RAB and NAEB (for cash export crops) monitor performance and impact and coordinate data management with MINAGRI - NISR undertakes household and farm surveys and MINAGRI increasingly collaborates with NISR and harmonizes data collection and methodologies - Districts play a more active role in M&E and learning as well as information dissemination to the field

10.2.3 INTER-MINISTERIAL COORDINATION AND HARMONIZATION

Joint inter-ministerial planning and budgeting is becoming ever more important as the recognition grows that sectoral responsibilities are not clearly demarcated, and collaboration and complementarity is key. Since 2013, synchronization of planning has been improving due to the much-strengthened planning and budget processes MINECOFIN initiated. In addition, the increasing importance of Joint Imihigo tends to support coordination, collaboration, and synchronization between ministries.

In fact, ministerial coordination is crucial to achieve defined outcomes and maximize impact. This is particularly relevant for PSTA 4 as the scope of the Malabo-based CAADP goes beyond the narrow definition of agricultural production and services. Malabo promotes a multi-sector approach to agriculture development, recognizing achieving broad-based and sustainable agriculture growth (and achieving Malabo targets) is not (completely) under the control of the Ministry of Agriculture. In this context, inter-ministerial cooperation has become even more crucial.

Given the complexity of the agricultural development in Rwanda, involving several line ministries and the fact that the actual development activities take place at a decentralized level, MINAGRI will closely collaborate in the PSTA 4 implementation with a range of public institutions through the creation of collaborative platforms. The basis of each coordination mechanism or arrangement must be a clear definition and division of roles and responsibilities while building synergies and jointly addressing challenges. Areas requiring focus on cross sectoral coordination include:

Nutrition. The Ministry of Health (MINISANTE) is a key partner in implementing policies on nutrition. MINAGRI, MINISANTE, MINALOC and development partners jointly monitor the implementation of the National Food and Nutrition Strategic Plan. MINAGRI will closely work with MINALOC as the responsible ministry for coordinating the implementation of all country-wide nutrition and food security related interventions through the newly created National Food and Nutrition Coordination Secretariat (NFNCS). MINAGRI will actively participate in the Social Cluster and Food and Nutrition Technical Working Group.

Trade. At the highest level of policy design - policy principles - agriculture and trade policies are generally aligned. Collaboration mostly takes place through the high-level ministerial economic cluster working group and the annual joint export performance contract (Imihigo). Coordination is currently heavily focused on promoting agriculture sector export growth. However, trade has a high degree of relevancy beyond just exporting (for example related to tariff setting for fruit and vegetables relevant to ensure year-round availability and affordability) and this requires greater attention in the future. The value chain prioritisation process can also benefit from improved harmonisation between MINICOM and MINAGRI.

Environment and Agroforestry. The Ministry of Environment and Natural Resources (MoE) and the Ministry of Land and Forestry (MINILAF) have strong linkages to agriculture in: (i) agroforestry (ii) rural land administration, (iii) natural resource management including water resources and integrated water resource management, (iv) weather information and climate services (including through Rwanda Meteo) and (iv) climate change adaptation for sustainable agriculture. Close collaboration with MoE, MINILAF and their agencies on these areas is crucial. The agro-forestry policy under development falls under the responsibility of MINAGRI and MINILAF and its implementing agency the Rwanda Water and Forestry Authority. Successful implementation of the policy requires close collaboration between these institutions

Marketing, Agribusiness, and processing. To promote private sector driven value chain development joint planning of activities are foreseen with several ministries: The Ministry of Trade and Industry (MINICOM) promotes business and trade growth and development, including expanded agribusiness. Its role in agriculture includes marketing of primary produce, agro-processing research, capacity development of farmers, and facilitating farmers' access to credit. MINICOM leads in policy and strategy to achieve an expanding, competitive and healthy private sector. The Ministry of Infrastructure (MININFRA) has a role relating to rural electrification, construction and maintenance of feeder roads, and technical support in agriculture related work.

Social Protection. MINALOC through its Local Administrative Entities Development Agency (LODA) is responsible for social protection schemes to increase the resilience of vulnerable households (including subsistence farmer households), notably with the Vision 2020 Umurenge Programme (Rwanda's flagship social protection programme) which includes direct transfers and public works. Agriculture will collaborate closely with the VUP to improve targeting and design of social protection programmes for farmers.

10.2.4 PROGRAMMING AND IMPLEMENTATION AT DISTRICT LEVEL

Rwanda has been decentralizing since the early 2000s with the objective of “promoting good governance, service delivery, and national development”¹⁶³. The principal instrument for mainstreaming the government's decentralization policy into agriculture sector is the PSTA. The ongoing decentralization of the Rwandan public administration empowers local governments to deliver agricultural policies to farmers and, more broadly, serve as the focal point in representing the needs of the local communities and coordinating multi-sector responses. They absorb the functions of the previous local branches of MINAGRI and rely on an evolving partnership with the central government.

Districts prepare their District Development Plans (DDSs) which run congruently with the national planning framework cycles (i.e. PSTA for agriculture). In doing so, they play an important role in implementing agriculture programmes. Currently, MINAGRI confers with the districts to agree on the targets of their DDSs, but more emphasis should be placed on clearly delineating implementation modalities as part of the DDSs preparation process in support of the PSTA implementation. This requires that MINAGRI reviews the share of implementation roles and responsibilities in the PSTA and other policies to leave an extended role to the districts. Implementation responsibilities in for example irrigation, terracing and extension revolve around the ministry, or its agencies, providing scope for improved decentralization during the implementation of PSTA 4.

To operationalize vertical synergies as suggested by the NAP and the decentralization policy, MINAGRI and its agencies will devolve more substantive implementation roles to districts and concentrate on coordination and M&E, wherever districts show sufficient and sustained expertise. In order for districts to take on these increased responsibilities, **local services improvement plans** (see also 4.1.2) are being developed which include capacity building, monitoring and management responsibility. Districts will be more actively involved in contract tendering and management wherever possible. The content of the local services plans will be incorporated in local joint-planning contracts, in close coordination with district level authorities responsible for those services. The plans will also outline capacity development for the district, including the fine-tuning of outstanding staff incentives (Imihigo scheme awards bonuses and employee of the year award) and continuous professional development.

¹⁶³ GoR (2012): National Decentralization Policy (Revised), Ministry of Local Government, Kigali June 2012

10.2.5 PRIVATE SECTOR ENGAGEMENT AND IMPLEMENTATION

In addition to public agencies and districts, the private sector, including farmer organisations, is involved in the implementation of PSTA 4. The private sector is facilitated and incentivised to provide inputs, service extension, financial and commercial services¹⁶⁴. Besides attracting direct private sector investment, the government may opt to engage private sector in PPP arrangements. PPPs are particularly relevant where:

- 1) The private sector is not currently investing due to high risk or high transaction costs. The public sector may co-invest or provide subsidies to encourage private investors. Before embarking on investing in financially and economically viable projects, the GoR will seek first ways of attracting private investors or co-investing with them.
- 2) The project is desirable for society, not profitable for private investment, but the private sector may provide finance and/or technical capabilities to operate the projects. Such projects could attract Build, Operate, Transfer (BOT) models or concessions. Such models could be pursued to 'crowd-in' private investment in infrastructure projects, land husbandry, and irrigation schemes.

Any PPP type will be selected after a complete financial and economic analysis of the project.

In any individual instance, the decision whether a project should receive public funding will depend on a cost-benefit assessment of the expected financial and economic return¹⁶⁵, in line with the decision matrix in 13. Public investment will be focused toward quadrant 4, i.e. projects with positive economic return (desirable for society) but negative financial return (unprofitable) and thus undersupplied by the private sector. Projects in quadrant 2, i.e. both profitable and desirable for society will be left for private sector investment once available and the Government will go in if the private sector is not yet ready. Taxes from these projects can be used to finance public investment in quadrant 4. Projects with negative economic return (undesirable for society) will either not be undertaken (quadrant 3) or they will be subject to regulation (quadrant 1).

Table 43: Decision Matrix on Public versus Private investment

	Negative Economic Return	Positive Economic Return
Positive Financial Return	1. The private sector could invest with a return, but it is undesirable from a social viewpoint due to negative spill-overs. It is recommended to limit this type of project with regulations.	2. Private and public sector could invest and the proceeds may be used to invest in type 4 projects
Negative Financial Return	3. Neither public nor private will invest.	4. The project is desirable for society but will not be undertaken by private sector due to unprofitability. The public sector can invest through direct provision, subsidies, or PPPs.

10.3 START-UP ACTIVITIES

A number of start-up activities have been identified to be undertaken in the period leading up to the implementation of PSTA 4 or during the initial PSTA 4 implementation phase. Three types of activities relate to budgeting, M&E, and studies.

¹⁶⁴ Following the Law N°14/2016 of 02/05/2016 Governing Public Private Partnerships, GoR may seek partnerships for justified investments through a competitive tendering process, or it may evaluate justifications from unsolicited partnership proposals.

¹⁶⁵ If the financial return is positive, this means the project implementer would profit from undertake the project. If the economic return is positive, society would benefit from the project.

10.3.1 BUDGET

A smooth implementation of the PSTA 4 investment plan requires the following budget preparatory activities to translate PSTA 4 into concrete actions:

- Repackage the investment plan into 3 year and annual programmes according to MINECOFIN’s screening criteria
- Define allocations to the districts for each programme following the subsidiarity principle based on a sound review of their capacities and comparative advantages
- Ensure that PSTA 4 annual activities and indicators are translated into Imihigo indicators
- Set up results-oriented budgeting monitoring accompanied by results-oriented capturing of expenditures
- As the agriculture sector has relied much on external donor budget and project support so far, devise a medium to long-term plan for gradually increasing domestic funding in the sector
- Harmonize the financial management standards across Government and development partners sponsored projects to master the level of budget execution deviation

10.3.2 STUDIES

PSTA 4 is aimed at implementing SDGs, Malabo declaration targets and NST objectives. For some of those goals, there is a lack of baseline and then there is no way to set targets. In that regard, important studies will be undertaken at the beginning of this strategy to establish baselines and to prepare implementation. In the PSTA 3 era, the sector did not have the massive private sector investments. Consequently, a study on identifying what should be done to have the private sector on board is among the top priorities.

Below, a list which is not exhaustive shows examples of urgent studies to be carried out:

- Action plan of new prioritized value chains and most important cash crops for market orientation, food system building, private sector mobilization & incentives development
- Geographical and/or social targeting for specific action, zone targeting for appropriate and flexible support package to overcome specific challenges (nutrition, farm profitability, etc.)
- Feasibility study and design of a framework for the adoption/implementation of smart cards (with chip) in the inputs delivery to registered farmers
- Farmer registration
- Livestock registration
- ALIS 1
- ALIS 2
- Irrigation master plan
- Land use planning
- Gazetting the agriculture land

10.4 M&E PLAN

Monitoring is the ongoing process by which PSTA 4 stakeholders obtain regular feedback on *progress* towards achieving the set results. Evaluation aims at assessing the *impact* of the PSTA 4. Both, monitoring and evaluation processes enhance the effectiveness of PSTA 4 implementation and contribute to its revision and update.

PSTA 4 advocates a comprehensive and coordinated approach to sector development that is evidence-based and implemented by a range of government and non-government actors with progress jointly measured under agreed indicators and against an agreed baseline. This will require both improved coordination between actors in the sector as well as harmonisation of data collection and analysis.

The PSTA 4 will strengthen the capacity to conduct M&E under Priority Area 4, specifically by promoting evidence-based policy making (see 4.2.1), promoting Monitoring, Evaluation and Learning (see 4.5.1) and upgrading of agricultural information systems (see 4.5.2). At the onset of PSTA 4 implementation, a new comprehensive M&E framework will be developed based on the PSTA 4 design and structure. Where baselines are absent, studies will be undertaken to fill gaps.

10.4.1 TRACKING INDICATORS

Many of the output indicators will be tracked through MINAGRI's MIS which serves as an important source of verification. Other important agriculture statistics are provided by NSIR, including Seasonal Agriculture Surveys and Integrated Household Living Conditions Surveys (EIVC). MINECOFIN provides important growth and macro-level statistics.

A detailed results framework and accompanying monitoring framework has been developed during the PSTA 4 formulation phases but needs to be operationalized by:

- Its appropriation by developing new indicators, drafting their narrative and rule of calculation:
 - Growth rate of agriculture value added at constant US dollars per hectare of agricultural arable land
 - Diversity of food produced on farms (Shannon Index)
 - Proportion of fish stocks within biologically sustainable levels
 - Percentage of food used in national school feeding programmes that is locally purchased and/or grown in the school garden
- Process baseline survey accordingly
- Develop automated data processing and trends analysis needed for reporting and communication
- Develop a detailed M&E plan and strengthen M&E capacities

10.4.2 STRUCTURE OF THE M&E SYSTEM

The M&E system for PSTA 4 has the dual objective of capturing the transformational strategic value and reflecting all lower-level outputs and interventions. To do so, the PSTA 4 M&E framework proposes a two-tiered monitoring structure:

- A Strategic Results Framework, focusing on the key outputs and indicators related to transformation
- A linked Operational Framework, which includes the lower level (sub) outputs and indicators with targets and related activities and costs.

The Strategic Results Framework with key transformational indicators is complemented by an Operational Framework to trace back to activities and inputs. The Strategic Framework furthermore reflects a strategic plan of the entire agriculture sector (not a project or programme). The (sub) outputs of the Operational Framework are clearly linked to the higher-level outputs ('results') and serve as a basis for programme/project monitoring.

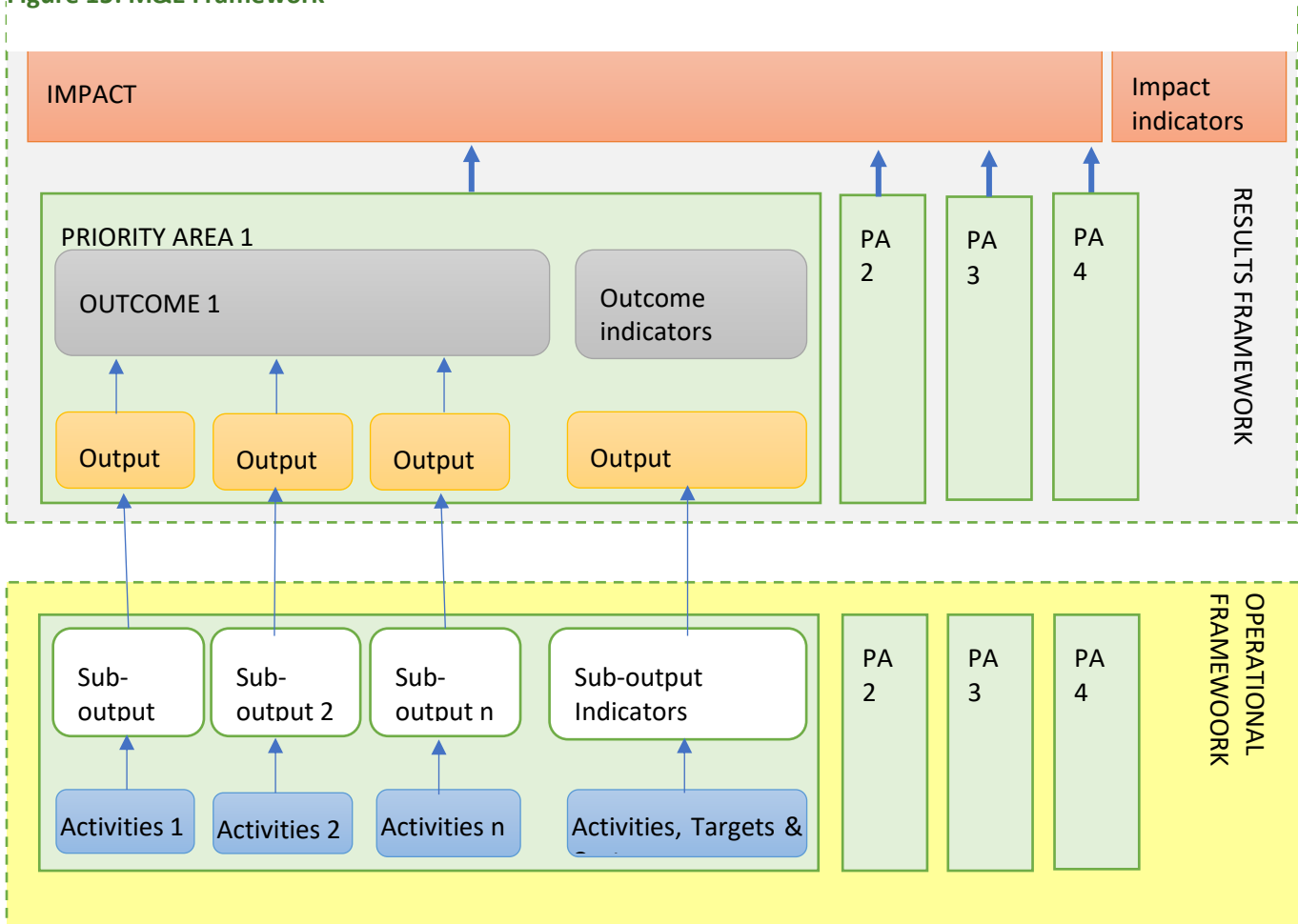
The PSTA 4 Strategic Results Framework has been built to incorporate key indicators reflecting commitments and ambitions of the agriculture sector towards various global, continental, and national processes, notably the SDGs, Malabo and the NST. Efforts have been made to optimize alignment and avoid proliferation of indicators to be reported on in the agriculture sector. In the Strategic Framework, the selected impact areas are aligned to 4 CAADP impact areas: i) increased contribution to wealth creation, ii) economic opportunities and prosperity - jobs and poverty alleviation, iii) improved food security and nutrition, and iv) increased resilience and sustainability. The corresponding impact indicators used are to the greatest extent aligned to the various commitments.

Outcome indicators have been selected to measure the transformational outcomes as envisaged.

To avoid the impression of simple and linear attribution of (sub) outputs to outcomes (in reality a combination of a range of outputs will contribute to moving the outcome indicators) the operational (sub) outputs and indicators are presented in the operational framework. The indicators and targets are thereby directly linked to the activities costed in the PSTA 4 investment plan. For both, the Strategic and Operational Frameworks, indicator targets are cumulative unless indicated otherwise. Some targets indicate "0" as a baseline, referring to results of activities previously not undertaken that are to

be initiated under PSTA 4 or results that are dependent on implementation of certain activities under PSTA 4 (e.g. number of farmers trained). For some indicators baseline values and targets need to be established or fine-tuned and this will be

Figure 15: M&E Framework



10.4.3 ROLES AND RESPONSIBILITIES REGARDING M&E

The overall responsibility for M&E of the PSTA 4 will rest with MINAGRI which is also in charge of coordinating its implementation. Within the ministry, MINAGRI’s Directorate of Planning has primary responsibility for M&E and will collaborate with other MINAGRI directorates, NISR, and line ministries among others. Districts are increasingly involved in M&E and provide valuable inputs to progress monitoring and evaluations.

In view of the magnitude of the task and the need to consolidate data from different sources and implementing partners, it is proposed to align the responsibility for data collection and reporting closely to the implementation structure. At the level of each outcome, the Outcome Leaders (see 8.2.1) are responsible for data collection and reporting on the respective output indicators. The operational programming structure of the PSTA 4 mirrors this division of responsibility. MINAGRI will consolidate the data for the outputs and report on outcome and impact indicators. The ASWG will monitor the proper set up and operation of the system through the JSR. The Sector Working Groups can help the respective lead agencies in facilitating data collection as required.

10.4.4 REPORTING

Reporting is a key component of the M&E plan that ensures appropriate feedback mechanisms and stakeholder engagement in the implementation of the strategy. MINAGRI will be responsible for reporting on the Strategic and

Operational Frameworks supported by Outcome Leaders and Implementers. The timing of the reporting on the Strategic and Operational outputs will be timed in such a way as to serve as inputs to the forward and backward looking JSR meetings.

Reporting commitment	Responsible	Frequency
Impact	MINAGRI Directorate of Planning with support from MINECOFIN	Year 3 and Year 6
Outcomes and strategic outputs	Outcome leaders (MINAGRI Directorates, RAB, NAEB)	Annual
Operational (sub) outputs	Outcome leaders with inputs from all implementing parties	Biannual

In addition, MINAGRI will prepare a final report on the performance against the Strategic Framework. External evaluations will be conducted at mid-term and conclusion of the PSTA 4 cycle for which an external evaluator will be engaged.

Besides reporting on the PSTA 4, MINAGRI also bears the responsibility to report on the Sustainable Development Goals relevant to agriculture and the Biennial Review under the Malabo. At the national level, MINAGRI also reports to MINECOFIN on the achievement against the NST targets.

10.5 RISKS ASSESSMENT

The identified risks associated with implementing PSTA 4 and mitigating measures are presented in the table below.

Potential risk	Risk level	Mitigation actions
Insufficient involvement and investment of private sector	Moderate	Priority areas 3 and 4 focus on attracting private sector investment and service delivery. A package of activities and measures are proposed and include: conducive enabling environment, incentive schemes, improved coordination and access to information, public institutions, and processes. M&E system specifically and periodically monitors the involvement of private investment and service delivery.
Land use competition among the agriculture, urban and protected areas development	Moderate	A land use management system is to be set up to define agricultural zoning. Inter-sector coordination makes it possible to coordinate the use and conservation of agricultural land, especially in sub-urban areas.
Climatic hazards affect production	Moderate	Priority area 2 foresees the up-scaling of climate change adaption practices adoption as well as the development of an effective response to disasters for farm communities.
Donor funding shortfalls	Low	Donor resource allocation mechanism provides a prediction of potential financial resources available but also its limitation. Private investment expects to increase and domestic resource mobilization to be boosted.

Potential risk	Risk level	Mitigation actions
District implementation capacity level	Low	PSTA 4 develops a decentralized capacity development plan to prepare the districts to ensure extended functions for the implementation of agricultural development activities given the fact that the PSTA III implementation was positively affected by increasing competence of the District Administrations.
Different implementation timeframe of certain key actions	Low	The interdependence of key actions such institutional and way of doing business changes, capacity building and value chain integration could be mitigated by anticipating their execution and adopting an appropriate sequencing and synchronization.
Staff turnover	Moderate	Staff can be motivated by a conducive work environment and work-related incentives, commendation by senior management for well-executed assignments, independent thinking, personal initiative rewards and professional development scheme. Adequate funding of recurrent expenditure (personnel costs) is set up to provide appropriate human resources

ANNEX 1: RESULTS FRAMEWORK

IMPACT LEVEL

The Impact level constitutes high-level national targets. They are grouped according to the Malabo Declaration targets considering the NST and EAC Vision 2050. The results at this level cannot be solely attributed to activities, outputs, and outcomes in the agriculture sector, yet the sector plays an important contributing role.

Impact level targets

No	INDICATOR	Unit	BASELINE	TARGET 2018/19	TARGET 2019/20	TARGET 2020/21	TARGET 2021/22	TARGET 2022/23	TARGET 2023/24	MEANS OF VERIFICATION	Assumption	
Impact level												
Increased Wealth Contribution												
NST: 39	A1	Percentage of agricultural production growth measured by production volumes and fixed 2014 prices	Per cent growth	TBD from SAS 2017	10%	10%	10%	10%	10%	10%	Seasonal Agricultural Survey	Farmers adopt the production of food crops and conditions in the wider economy will be favourable
	A2	Export value: 356 (Million USD)	USD Million	378 (2017)	403	432	461	501	537	RRA/BNR	BNR Export statistics	Global commodity prices will not decline significantly
Increased Economic Opportunities												
CAAD P: 4.1ii	B1	Rural Households living below poverty line (gender disaggregated)	Per cent	43.3% (2014)	39.0% (from CGE model)	34.7%	30.3%	25.9%	21.6%	17.0% (from CGE model)	EICV. Baseline from IFPRI SAM based on EICV.	Result from higher agricultural production
	B2	Number of jobs related to agriculture compared to baseline	Number	TBD from next Labour Force Survey	60,000 (from CGE model)	120,000	180,000	240,000	300,000	360,000 (from CGE model)	Labour force survey to capture jobs from agriculture suppliers,	Results from increased agricultural production and value chain development

	No	INDICATOR	Unit	BASELINE	TARGET	TARGET	TARGET	TARGET	TARGET	TARGET	MEANS OF VERIFICATION	Assumption
					2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
		(gender disaggregated)									service providers, traders, and agro-processors	
SDG 2.3.2 CAAD P: 3.2.i; SDG: 2.3.1	B3	Average income per smallholder farming household (gender disaggregated)	Annual income growth for small holder farmers (real RWF)	3.7% (from CGE model) (2017)	3.7% (from CGE model)	3.7%	3.7%	3.7%	3.7%	3.7% (from CGE model)	EICV to publish household income levels	Results from increased agricultural skill leading to higher production and value chain development
Improved Food Security and Nutrition												
SDG 2.2.2	C1	Percentage of food insecure households	Per cent	20% (2015)	19%	18%	16%	14%	12%	10%	CARI Score in CFSVA	Household incomes increase, food prices decrease, mitigating measures are taken against shocks to the agri-food system
	C2	kcal production per capita	kcal production per capita	1,934 (2017)	2,180	2,340	2,525	2,764	2,919	3,094	SAS, Population projections	Agricultural yields improve through higher production
Increased Resilience												
NST: cc1; CAAD P 6.1; SDG 2.4.1	D1	Share of agriculture land under Sustainable Land Management practices	Per cent	56% (2016)	60%	64%	68%	73%	78%	83%	Land Husbandry+ Irrigated land / irrigated land	Effects from climate change are mitigated

STRATEGIC OUTCOME AND OUTPUT LEVEL

At this level, the results can be attributed to activities and outputs in the agriculture sector. Outcomes are arranged according to the four Priority areas: (1) Innovation and Extension, (2) Productivity and Resilience, (3) Inclusive Markets and Value Addition, (4) Enabling Environment and Responsive Institutions. The following table provides an overview.

PSTA IV RESULTS FRAMEWORK OVERVIEW – Strategic Outcomes and Outputs

Priority Area	1. INNOVATION AND EXTENSION	2. PRODUCTIVITY AND RESILIENCE	3. INCLUSIVE MARKETS AND VALUE ADDITION	4. ENABLING ENVIRONMENT AND RESPONSIVE INSTITUTIONS
Outcomes	Technological upgrading in agricultural production and farmers and rural value chain actors making informed decisions to profitably engage in economic activities	Increased productivity, nutritional value and resilience through sustainable, diversified, and integrated crop, livestock, and fish production systems	Increased competitiveness and value addition of diversified agricultural commodities for more inclusive domestic and international markets	Effective and efficient public services delivery and enabling environment in the agriculture sector
Outputs	Improved research capacity developed, and innovative research undertaken	Sustainable, diversified and climate smart practices	Strengthened agricultural market linkages and market infrastructure	Sector institutions developed to become responsive to stakeholder needs
	Effective extension services established and implemented	Effective and efficient irrigation under IWRM frameworks	Agricultural market risks and financial services	Evidence-based policy development and regulatory framework
	Skills developed for agriculture value chain actors	Animal resources and production systems	Quality assurance and regulation	Commercialization of value chains in the agriculture sector
		Nutrition sensitive agriculture		Effective planning, coordination, and budgeting
		Mechanisms for increased resilience		Monitoring, evaluation, and evidence-based knowledge management and learning undertaken, supported by effective information systems

Figure 16: Strategic Outcomes and Outputs

	No	INDICATOR	UNIT	BASELINE	TARGET						MEANS OF VERIFICATION	ASSUMPTIONS
					2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
Priority Area 1: Innovation and Extension												
Outcome 1: Farmers and rural value chain actors are engaged in innovative agricultural practices and improved business management												
	A.	Percentage of farmers adopting appropriate technology and improved practices (gender and age disaggregated)	Per cent of farmers using improved practices as defined in P4R	19.38% (2016)	23	26	29	32	36	40	To be monitored in Seasonal Agricultural Survey	The private sector (farmers) consider improved techniques promoted with extension services beneficial
	B.	Number of innovative start-ups / businesses created through research partnerships, trainings, extensions, and financial grants (cum.) (gender and age disaggregated)	Number	0 (2017)	50	100	150	200	300	400	Programme reports	
	C.	Women empowerment in Agriculture index	Per cent	91% (2014)	93	94	95	96	98	100	WEAI Resource Centre	
1.1	OUTPUT 1.1.:		Improved research capacity developed, and innovative research findings produces									
	A.	Number of new technologies, crops varieties and breeds released	Number	34 (2016)	40	50	60	80	100	120	RAB	
SDG:2 5.1	B.	Number of plant and animal genetic resources for food and agriculture secured in either medium or long-term conservation facilities	Number	900 plant genetic resources conserved 20 forest genetic resources conserved	TBD	TBD	TBD	TBD	TBD	TBD	To be monitored by RAB	Gene bank established

No	INDICATOR	UNIT	BASELINE	TARGET						MEANS OF VERIFICATION	ASSUMPTIONS	
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24			
			88 animal genetic resources conserved									
1.2	OUTPUT 1.2.:	Effective extension services established and implemented										
NST Cross-cutting 5	A.	Percentage of farmers who received extension and/or advisory services in the previous year (disaggregated by gender) including climate-smart and nutrition-sensitive agriculture	Per cent	69 (2016)	72	74	76	78	80	82	EICV	Timely availability of financial resources and increased FTE
	B.	Number of farmers accessing extension services through private sector incentive scheme	Number	0 (2017)	3,000	6,000	8,000	2,000	25,000	25,000		200,000 per service
1.3	OUTPUT 1.3.:	Skills developed for agriculture value chain actors including farmer organisations, women, and youth										
	A.	Number of value chain actors (including farmers) trained and supported in business/cooperative management (disaggregated by age and gender) (cum.)	Number	0 (2017)	5,000	10,000	15,000	20,000	25,000	30,000	From project document	
	B.	Number of women and youth supported in setting up an agri-business (cum.)	Number	0 (2017)	3,000	5,000	7,000	9,000	11,000	13,000	From project document	There is a sufficient number of relevant farmer organisations to be trained
Priority Area 2: Productivity and Resilience												

No	INDICATOR	UNIT	BASELINE	TARGET						MEANS OF VERIFICATION	ASSUMPTIONS	
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24			
OUTCOME 2: Increased productivity, nutritional value and resilience through sustainable, diversified, and integrated crop, livestock, and fish production systems												
A.	Yield of major crops:	MT / Ha									SAS	Inputs timely provided to farmers; package of supports adapted to farmers' needs and options
	Maize		1.57 (2016)	1.94	2.11	2.34	2.76	2.85	2.94			
	Sorghum		1.11 (2016)	1.16	1.22	1.28	1.35	1.42	1.49			
	Paddy rice		3.34 (2016)	3.36	3.39	3.42	3.45	3.48	3.52			
	Wheat		0.95 (2016)	1.05	1.17	1.29	1.44	1.6	1.77			
	Cassava		1.94 (2016)	2.29	2.71	3.2	3.77	4.45	5.25			
	Sweet Potatoes		7.18 (2016)	7.76	8.38	9.05	9.77	10.56	11.4			
	Irish Potatoes		8.18 (2016)	9.9	10.6	11.6	13.5	13.76	14.23			
	Yams & Taro		3.88 (2016)	4.07	4.19	4.32	4.45	4.58	4.72			
	Cooking Banana		3.36 (2016)	3.53	3.7	3.89	4.08	4.29	4.5			
	Dessert banana		2.62 (2016)	2.76	2.89	3.04	3.19	3.35	3.52			
	Banana for beer		2.82 (2016)	2.97	3.11	3.27	3.43	3.6	3.78			
	Beans		1.21 (2016)	1.36	1.5	1.69	1.86	2.04	2.22			
	Groundnuts		0.44 (2016)	0.46	0.48	0.51	0.53	0.56	0.59			
	Soya beans		0.55 (2016)	0.64	0.73	0.84	0.97	1.11	1.28			
	Vegetables		9.92 (2016)	10.52	11.15	11.82	12.53	13.28	14.08			
Fruits (to be disaggregated by type)	3.2 (2016)	3.8	4.5	5.3	6.2	7.4	8.7					
Coffee	18,439 (2016)	22,999	27,000	28,500	30,000	31,000	32,500	NAEB				

No	INDICATOR	UNIT	BASELINE	TARGET						MEANS OF VERIFICATION	ASSUMPTIONS	
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24			
	Tea		25,565 (2016)	30,000	35,109	37,000	40,000	42,000	45,000			
	Flower	Number of stems	5,992,033	TBD	TBD	TBD	TBD	TBD	TBD			
B.	Percentage increase in water use efficiency	MT of produce/cubic meter of water	51 (2016)	52.7	54.4	56.1	57.8	59.5	61	RAB/Programme report	Regulatory water use tariffs are enacted and enforced	
C.	Animal products produced:											
	Milk	1000 MT	776 (2016)	800	825	850	875	900	925		Private investment will complement public investment	
	Beef		45 (2016)	47	49	51	54	57	60			
	Goat		13 (2016)	14	16	17	18	19	20			
	Sheep		3 (2016)	3	3	3	4	4	4			
	Poultry		18 (2016)	22	25	30	35	41	42			
	Pork		22 (2016)	24	28	37	68	77	79			
	Rabbit		6 (2016)	6	7	8	8	9	10			
	Honey		6 (2016)	6	6	7	7	8	8			
	Eggs		7.4 (2016)	8	8.5	9	9.5	10.2	11.2			
Fish			27 (2016)	35	45	65	90	100	112			
D.	Percentage of households that consume adequate micro-nutrient food	Number	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Survey	Farmers produce micro-nutrient crops	
2.1	OUTPUT 2.1.:	Sustainable, diversified, and climate smart crop practices implemented										
	Area of land under erosion control measures (cum.):	Ha	1,034,509 (2017)	1,098,104	1,167,104	1,241,104	1,320,104	1,404,104	1,495,624	RAB, Survey	MIS,	One area may benefit from a combination of erosion control measures
NST 34	a. Radical terraces	Ha	110,905 (2017)	115,000	120,500	125,000	130,000	135,000	142,500			
NST 34	b. Progressive terraces	Ha	923,604 (2017)	937,604	947,500	965,604	979,604	993,604	1,007,624			

	No	INDICATOR	UNIT	BASELINE	TARGET						MEANS OF VERIFICATION	ASSUMPTIONS
					2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
		c. Biological soil conservation practices development	Ha dev	TBD	25,000	50,000	75,000	100,000	125,000	150,000		
		d. Agro-forestry	Ha	20,000	500	5,500	15,500	30,500	50,500	75,500		
	B.	a. Percentage of farmers use quality seeds: on consolidated sites/large-scale farmers) (disaggregated by gender)	Per cent	52 (2017)	55	60	63	67	71	75	RAB	
		b. Percentage of farmers use quality seeds: agricultural operator/non-consolidated sites	Per cent	18 (2017)	20	25	30	36	43	50		
NST Cross-cutting 2	C.	Percentage of farmers who practice integrated pest management	Per cent	TBD	1	3	5	7	9	11	RAB	
NST	D.	Percentage of mechanized farm operations	Per cent	25 (2017)	29	33	37	41	45	50	RAB	
	2.2	OUTPUT 2.2.:	Effective and efficient irrigation developed under an IWRM framework									
NST 32; CAAD P 3.1. ii	A.	Ha of irrigation developed within an Integrated Water Resources Management Framework (cum.)	Ha	51,884 (2017)	60,284	68,684	77,084	85,484	93,884	102,284	RAB, Districts	

	No	INDICATOR	UNIT	BASELINE	TARGET						MEANS OF VERIFICATION	ASSUMPTIONS
					2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
		a. Hillside (medium-large scale)		8,789 (2017)	11,189	13,589	15,989	18,389	20,789	23,189		
		b. Marshland medium-large scale)		36,521 (2017)	39,521	42,521	45,521	48,521	51,521	54,521		
		c. Small-scale hillside		6,574 (2017)	9,574	12,574	15,574	18,574	21,574	24,574		
	2.3	OUTPUT 2.3.:	Animal resources (including fisheries) production systems improved									
	A.	Percentage of farmers using improved feed / fodder and technologies (hay, silage, improved pasture) (disaggregated by gender)	Per cent	9 (2014)	10.5	12	13.5	15	16.5	18	RAB	
	B.	Percentage of livestock owners accessing animal health services (disaggregated by gender)	Per cent	93	94	95	96	97	98	100	RAB, MIS	Districts,
	C.	Improved local breed as a percentage of local breeds (by livestock type)	Per cent	38	39	40	41	42	43	44	RAB, Districts	
NST 40	D.	Number of fingerlings production	x 1000	3,137	8,000	12,000	30,000	60,000	100,000	180,000	RAB	
	2.4	OUTPUT 2.4.:	Nutrition-sensitive agriculture enhanced									
	A.	Percentage of farm households that produce micro-	Per cent	TBD	TBD	TBD	TBD	TBD	TBD	TBD		

No	INDICATOR	UNIT	BASELINE	TARGET						MEANS OF VERIFICATION	ASSUMPTIONS	
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24			
	nutrient-rich food year around											
2.5	OUTPUT 2.5.:	Mechanisms for increased resilience developed and implemented										
A.	Percentage of farmers receiving weather and climate information products/services	Per cent	TBD	5	10	15	20	30	50	Surveys		
NST 46	B.	Number of vulnerable farmers who have benefitted from asset building programmes (disaggregated by male/female headed HH)	Number	297,230	60,000	64,000	68,000	93,000	103,000	110,000	RAB, Districts, MIS, surveys	Funds for distribution are made available
	a.	Small livestock (under new Girinka)	Number	26,696	30,000	31,000	32,000	33,000	34,000	35,000		
	b.	Other programmes (if implemented)	Number	TBD	30,000	33,000	36,000	60,000	69,000	75,000		
C.	Percentage of affected farmers receiving post-disaster packages	Per cent	TBD	25	50	75	100	100	100	MIDIMAR		
Priority Area 3: Inclusive Markets and Value Addition												
OUTCOME 3: Increased competitiveness and value addition of diversified agricultural commodities for more inclusive domestic and international markets												
NST 38; CAAD P 33; SDG 12.3.1	A.	Food loss index (Proxy measure: post-harvest losses)	Index to be developed based on studies.								Post-Harvest Loss (survey) to be monitored by RAB or M&E MINAGRI	Funds are available for infrastructure and private sector engages in improved logistics and food systems
		Maize		26.5 (2015)	23.9	21.5	19.3	17.4	13.25	11.51		
		Rice		17.7 (2015)	15.9	14.3	12.9	11.6	8.85	7.68		
		Wheat		25 (2015)	22.5	20.3	18.2	16.4	12.5	10.86		

	No	INDICATOR	UNIT	BASELINE	TARGET						MEANS OF VERIFICATION	ASSUMPTIONS
					2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
		Cassava		43 (2014)	38.7	34.8	31.3	28.2	21.5	18.67		
		Beans		15 (2014)	13.5	12.2	10.9	9.8	7.5	6.49		
		Tomato		39.5 (2016)	35.6	32	28.8	25.9	19.75	17.15		
		Milk		33 (2014)	29.7	26.7	24.1	21.7	16.5	14.37		
		Potato		45.5 (2015)	41	36.9	33.2	29.9	22.75	19.8		
CAAD P 2.4	B.	Percentage of men and women engaged in agriculture that have access to financial services to be able to transact agriculture business - CAADP Indicator	Per cent	TBD	TBD	TBD	TBD	TBD	TBD	TBD	FinScope	Financial systems improve
CAAD P 4.1.iii	C.	Reduction rate of the gap between wholesale price and farm gate price	Per cent	TBD	TBD	TBD	TBD	TBD	TBD	TBD	E-soko+/ value chain-based surveys	
CAAD P 5.1	D.	Intra-African trade in agriculture commodities and services	Growth rate in trade with Africa, constant USD	1 (2017)	1.2	1.4	1.6	1.8	2	2.2	BNR trade stats	Regional integration continues
CAAD P 4.4, NST: Cross-cutting 5	E.	Percentage of famers involved in agribusiness by gender and age	%, food trade, agri-inputs, processing, agri-services	TBD	TBD	TBD	TBD	TBD	TBD	TBD	To be captured in EICV	
	3.1	OUTPUT 3.1.:	Strengthened agricultural market linkages and market infrastructure									
	A.	Number of other market infrastructure developed - constructed, rehabilitated, maintained (Cum):	# (cum.)								MINAGRI	Public and private funds are made available for the investment
		Drying grounds		40 (2017)	80	120	160	200	240	280	Project document	

No	INDICATOR	UNIT	BASELINE	TARGET						MEANS OF VERIFICATION	ASSUMPTIONS
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
	Metallic silos (capacity of 5,000 MT)		2 (2017)	4	6	8	10	10	12		
	Cold trucks		1	1	1	1	3	3	5		
	Collection centres		100 (2017)	200	300	400	500	600	700		
	Warehouses (capacity of 10,000 MT)		3 (2017)	6	9	11	13	15	17		
	Export logistics warehouses		1 (2017)	2	3	3	3	3	3		
	Cold chain facilities		1 (2017)	2	3	3	3	3	3		
	Wholesale market with sorting and grading equipment		0 (2017)	Funded	Implementation	Implementation	Implementation	Implementation	Operationalized		
	Cross-border markets and facilities (not cum.)		4 (4 cross borders in total) (2017)	1	1	1	1	0	0		
	Rural community markets and facilities		TBD	10	15	20	25	30	35		
NST: 25	Tea factories operational		15 (2017)	15	16	16	17	17	18		
B.	Number of farmers (male/female) accessing the Market Information Tool (E-soko+) (cum.)	Number	3,500 (2014)	10,000	50,000	100,000	200,000	300,000	500,000	MINAGRI	
C.	Number of formalised out-grower schemes and similar modalities implemented with GoR support (cum.)	Number	48 (5 in fruits and vegetables, 16 in milk, 1 macadamia, 16 in tea) (2016)	60	72	84	96	108	120	RAB/NAEB	

Economic supports development appraisal further

No	INDICATOR	UNIT	BASELINE	TARGET						MEANS OF VERIFICATION	ASSUMPTIONS	
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24			
3.2	OUTPUT 3.2.:	Agricultural market risk management systems and financial services developed										
A.	Number of agricultural financial services and insurance products provided through SACCOS and coops	Number	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	MINAGRI	
NST: 38	Kcal stored in Rwandan Strategic Grain Reserve (cum.)	MT	199,000 (2017)	249,032	254,761	260,490	266,521	272,756	278,998			Budget is availed to cover 10% of population for 3 months, 2500 kcal per person. 2.3% population growth
		National reserve	MT Maize	10,000 (2017)	44,200	45,200	46,200	47,300	48,400	49,500	MINAGRI	
	MT Beans		5,000 (2017)	16,600	17,000	17,300	17,700	18,200	18,600			
	District storage	MT Maize	123,000 (2016)	125,829	128,723	131,684	134,712	137,811	140,980			
		MT Beans	61,000 (2016)	62,403	63,838	65,307	66,809	68,345	69,917			
NST: 38	C. Grain storage facilities (cum.)	MT	295,495.00 (2016)	304,651.00	313,807.00	322,963.00	332,119.00	341,275.00	350,431.00	RAB		
3.3	OUTPUT 3.3.:	Quality assurance and regulation mechanisms established										
A.	Quality assurance and regulation mechanisms established	Number of companies trained	0 (2017)	50	150	300	500	750	1050	MINAGRI		
Priority Area 4: Enabling Environment and Responsive Institutions												
Outcome 4: Effective and efficient public services delivery and enabling environment in the agriculture sector												
A.	Level of satisfaction in services delivery (public & private) in agriculture (effectiveness & efficiency)	Per cent	55% (2015)	59%	64%	69%	74%	79%	84%	MINAGRI score card survey: net satisfaction		

	No	INDICATOR	UNIT	BASELINE	TARGET						MEANS OF VERIFICATION	ASSUMPTIONS
					2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
SDG: 2.2; CAAD P 2.2	B.	Percentage of private Investment to public Investment in agriculture	Per cent	23%	TBC	TBC	TBC	TBC	TBC	TBC	RDB/MINECOFIN Financial reports	
SDG: 2.2; CAAD P 2.3	C.	Percentage of FDI to Public Investment in agriculture	Per cent	9.4% (2016)	11.40%	11.40%	11.40%	11.40%	11.40%	11.40%	Foreign Capital Census, MINECOFIN Financial reports	
	D.	Credit to Agriculture sector as percentage of total loans	Per cent	5.2 (2017)	6	7	8	9	10	10.4	BNR, MONETARY POLICY AND FINANCIAL STABILITY STATEMENT	
	E.	Scores in Enabling the Business of Agriculture (EBA) report (to be customised to the Rwandan context) - average score ¹⁶⁶	Per cent	50.06 (2017)	56	60.2	61	62.67	65.17	68.83	WB report	Political support for change processes.
Seeds regulations score according to EBA report		20.21 (2017)		24.21	28.4	36.7	45.2	51.3	60			
Fertilizer regulations score according to EBA report		52.58 (2017)		53	53.6	54	54	55	58.2			
Machinery regulations score according to EBA report		43.37 (2017)		46	48.2	50.5	52.8	55	57.8			

¹⁶⁶ The World Bank publishes a biannual international ranking on regulatory performance against international best-practices in areas affecting agricultural performance. For example, regulations on seeds, fertilizers, transport, finance etc. The numbers are to be interpreted as a score on the regulatory environment and is not directly linked to outcomes. For example, the score on seeds (21.21%) reflects how the World Bank perceives Rwanda's regulations on seeds against other countries rather than an outcome such as for example the percentage of farmers using seeds.

No	INDICATOR	UNIT	BASELINE	TARGET						MEANS OF VERIFICATION	ASSUMPTIONS
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
	Finance regulations score according to EBA report		80.63 (2017)	81	81	82	83	84	84		
	Markets regulations score according to EBA report		49.3 (2017)	50	50	51	52	49.3	54		
	Transport regulations score according to EBA report		62.7 (2017)	63	63	64	64	65	65		
	Water regulations score according to EBA report		50 (2017)	53	56	59	62	65	78		
	ICT regulations score according to EBA report		41.67 (2017)	46	51	56	61	67	72		
CAAD P 7.1	F. Capacity for evidence-based planning, implementation and M&E	Index of capacity to generate and use agriculture statistical data and information, (ASCI)	TBD	TBD	TBD	TBD	TBD	TBD	63		
4.1	OUTPUT 4.1.:	Sector institutions strengthened to become responsive to stakeholder needs									
A.	Achievement of MINAGRI & its agencies organization development plan	Per cent	Plan preparation	10	30	50	80	100			
B.	Achievement of decentralized capacity development plan	Per cent	Plan preparation	10	25	50	75	100			
4.2	OUTPUT 4.2:	Evidence-based policies and regulatory framework developed and implemented									

	No	INDICATOR	UNIT	BASELINE	TARGET						MEANS OF VERIFICATION	ASSUMPTIONS
					2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
	A.	Number of policies, regulatory frameworks and strategies developed or revised according to produced policy analysis toolkit and taking cross-cutting priorities into account	Number	12 (2017)	3	2	2	2	2	2	MINAGRI performance reports	
NST 32	B.	Land consolidation	Ha	635,603 (2017)	716,303	797,003	877,703	980,000	980,000	980,000		Farmers are willing to consolidate their land
NST 26	C.	Land for coffee and tea	Ha	64,379 (2017)	65,759	67,139	68,519	69,899	71,279	72,800	NAEB	
4.3		OUTPUT 4.3:	Commercialisation of value chains in the agriculture sector									
	A.	Number of registered private investment and PPPs in agriculture sector	Number	5 (2017)	10	15	20	25	30	35	National Committee and MINAGRI	
	B.	Number of domestic private seed and fertiliser production and extension services companies (cum.)	Number	TBD	10	20	25	30	35	40		
	C.	Percentage of operationalized agricultural investment eligible for investment certificate	Per cent	NA	20	30	40	50	60	70	Agricultural investment plans and agreements	
4.4		OUTPUT 4.4.:	Effective planning, coordination, and budgeting									
	A.	Percentage of budget executed at districts level	Per cent	11 (2017)	13	15	17	19	21	23	National Budget	Districts have adequate capacity to implement

No	INDICATOR	UNIT	BASELINE	TARGET						MEANS OF VERIFICATION	ASSUMPTIONS
				2018/19	2019/20	2020/21	2021/22	2022/23	2023/24		
B	Percentage of decentralised project integrating cross-cutting components	Per cent	30%	20	30	40	50	65	75	Project and district performance reports	
4.5	OUTPUT 4.5.:	Monitoring, evaluation, and evidence-based knowledge management and learning undertaken, supported by effective information systems									
A.	Number of Information System applications developed and integrated into agricultural information platform	Number	2 (ALIS and MIS) (2017)	3	4	5	6	7	7	SMART progress reports, M&E reports, statistics/data coordination meetings	

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
1.1.3	Collaboration and research networks								
	Establish financing mechanisms for: mechanization, PPPs, youth, women, entrepreneurship, landless farmers								
	Establish and maintain international research network								
	Acquisition of patents and licensing through networks								
	Establish and maintain domestic research network								
1.1.4	Action-oriented research to improve soil health and fertility								
	Mobile soil testing equipment/GIS technologies	Tools	30	30	30	30	30	30	180
	Update the Soil Map								
	Study on the relationship between inputs and outputs for crop and livestock								
1.1.5	Innovative research on crop improvement and husbandry								
	Acquire various equipment and inputs for crop improvement, husbandry, post-harvest and conservation of crop genetic resources								
	Produce Seeds of bio-fortified beans	MT	1,000	1,000	1,000	1,000	1,000	1,000	6,000
1.1.6	Innovative research on animal resources improvement								

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Acquire various equipment and inputs for research on animal resources production systems, nutrition, and health and animal genetic resources conservation								
1.1.7	Innovative research on aquaculture and fisheries								
	Limnology studies	Number	2	2	2	2	2	2	12
	Acquire various equipment and inputs for research on fish production technologies, breeding, fish feed and post-harvest								
1.1.8	Innovative research on agro-forestry								
	Develop agro-forestry models and technologies								
	Conservation of agro-forestry genetic resources								
	Acquire various equipment and inputs for developing and up-scaling agro-forestry models and technologies and conservation of agro-forestry genetic resources								
1.1.9	Research on markets and food systems								
	Creation of competitiveness hub/Marketing Department for undertaking market research and product development (domestic, regional, global)								
1.2	Proximity extension and advisory services								
1.2.1	Institutional capacity development								
	Set-up a national extension coordination team in RAB								

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Research & innovation 'into use' platforms	Session	1	2	2	2	2	2	11
	Build in fisheries and aquaculture	Training day	10	10	10	10	10	10	60
1.2.2	Quality proximity extension services to farmers								
	Training of Master trainers (Training of trainers) for crop	Master Trainers	40	-	50	-	40	-	130
	Capacity building of crop frontline extension agents (FFS Facilitators) and their cooperatives	FFS facilitators	800	1,000	1,000	1,000	1,000	700	5,500
	Facilitate FFS Facilitators in communication and transport	FFS facilitators	3,300	4,300	5,300	6,300	7,300	8,000	34,500
	Build capacities of Farmer Promoters	Farmer Promoters	1,000	1,000	1,000	1,000	1,500	1,300	6,800
	Capacity building for gender responsiveness and targeting in extension (FPs and FFSFs, district/RAB extension staff)	Extension agents	500	1,000	2,000	3,000	4,000	5,000	15,500
	Developing a performance-based incentives mechanism								
	Evaluate the performance of Farmer Promoters and FFS Facilitators								
	Training of Master trainers (Training of trainers) for livestock	Master Trainers	40	-	50	-	40	-	130
	Build capacities of Livestock Farmer Promoters	Farmer Promoters	500	1,000	1,000	1,000	1,000	700	5,200

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Capacity building for improving veterinary extension services (Promoters)	Livestock farmer Promoters	400	1,500	2,000	3,000	3,000	3,000	12,900
	Capacity building for improving fisheries and aquaculture extension services (Master Trainers/RAB extension staff & Private extension workers)	Number of people	-	15	-	-	-	-	15
	Capacity building for improving fisheries and aquaculture extension services (Facilitators)	Number of people	-	50	50	50	-	-	150
	Capacity building for improving fisheries and aquaculture extension services (Promoters)	Number of people	-	150	150	150	-	-	450
	ICT/Upgrading MINAGRI websites/Extension website (Noz'Ubuhinzi)								
	Call Centre: Collection of feedback from farmers and other stakeholders								
	Scaling up ICT-driven communication systems to distribute agriculture extension and advisory services								
	Capacity building for agriculture extension partners and stakeholders in using ICT solutions								
	Digitizing and automating agriculture extension materials for Twigire Muhinzi								
1.2.3	Tailored and demand driven services by private sector								
	Promote private sector extension and advisory services								
	Training for private extension workers exports	Sessions	-	4	3	3	3	3	16

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
1.3	Skills developed for agriculture value chain actors								
1.3.1	Support to farmer organizations and cooperatives								
	Capacity building on management, organizational and entrepreneurial capacities of farmer organization and cooperatives to provide services to their members								
	Exchange visits of farmer organizations and cooperatives								
1.3.2	Skills development in agriculture value chains								
	Capacity building for skills in farming as a business (marketing skills, post-harvest handling, book keeping, auditing, leadership skills - especially for women -, gender equality and GBV prevention)								
	Capacity building for developing skills for domestic production of equipment and technologies								
1.3.3	Women empowerment and skills development								
	Capacity building for developing skills and promoting increased involvement of women in agribusiness	Training sessions	300	300	300	300	300	300	1,800
	Capacity building for developing leadership and management skills for women	Training sessions	300	300	300	300	300	300	1,800
1.3.4	Youth agribusiness development								
	Training/mentoring for business incubation (Youth who did agriculture and livestock related programs at University or secondary school)	Training sessions	15	25	25	25	25	25	140

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Training/business development support to assist youth in accessing suitable financial products	Training sessions	50	150	150	150	150	150	800
	Training of youth (women and men) trainers of kids who did not attend agriculture or livestock programs but who did 12 or 9 years at secondary school. Study tours are also planned	People	30	100	200	300	416	500	
2	Sustainable, diversified, and resilient production and productivity								
2.1	Sustainable land husbandry and crop production intensification								
2.1.1	Sustainable land husbandry and climate smart practices								
	New progressive terraces constructed	Ha	14,000	14,000	14,000	14,000	14,000	14,000	84,020
	New radical terracing constructed	Ha	5,000	5,000	5,000	5,000	5,000	7,000	32,000
	Biological soil conservation practices	Ha	25,000	25,000	25,000	25,000	25,000	25,000	150,000
2.1.2	Efficient and sustainable use of inputs								
	Professionalize 700 cooperatives multiplying seeds	Cooperatives	90	95	120	125	130	140	700
	Update of seed needs assessment and quantity forecast, adapted supply planning								
	Update of fertilizers needs assessment and quantity forecast, adapted planning supply								
	Support to the production of organic fertilizer								

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
2.1.3	Promotion of integrated plant protection and pest management								
	Pest and disease surveillance								
	IPM promotion	People	1,500	1,500	1,500	1,500	1,500	1,500	9,000
	Training for farmers on safe handling and disposal	People	1,500	1,500	1,500	1,500	1,500	1,500	9,000
	Equipment & tools (Numberly package)	Number	30,000	60,000	90,000	90,000	90,000	90,000	450,000
2.1.4	Mechanization and technology								
	Mechanization service centre set-up (PPP included)	Number	-	2	2	2	2	2	10
	Demonstration centre for dissemination of adapted technologies	Number	20	30	30	10	10	-	100
2.1.5	Increase production of Coffee, Tea, and Horticulture								
	Replacement of coffee tree stock	% of stock replaced as of baseline	0%	5%	11%	17%	23%	30%	
	Coffee fertilizer application	MT/year	4700	6000	9,000	12,000	15,000	18,750	
	Tea fertilizer application	MT/year	7000	7,500	8,000	8,500	9,000	10,000	
	Area of flower production	ha	20	40	80	200	350	500	
	Are of vegetable production	ha	20,000	30,000	40,000	60,000	80,000	100,000	80,000
	Area of fruit production	ha	6,500	7,000	7,500	8,000	8,500	9,000	2,500

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
2.2	Effective and efficient irrigation under IWRM frameworks								
2.2.1	Water resource development								
	Development of hillside lands irrigation within an Integrated Water Resources Management Framework	Ha	2,400	2,400	2,400	2,400	2,400	2,400	14,400
	Development of marshland irrigation	Ha	3,000	3,000	3,000	3,000	3,000	3,000	18,000
	Development of small scale irrigation and water infrastructures (water harvesting)	Ha	3,000	3,000	3,000	3,000	3,000	3,000	18,000
	Rehabilitation and improvement of irrigation systems	Ha	3,000	3,000	3,000	3,000	3,000	3,000	18,000
	Water management training	Training sessions	100	100	100	100	100	100	600
2.2.2	Promotion of innovative irrigation								
	Greenhouses (vegetables and flowers) PPP arrangement	Ha	55.5	119	149	149	299	499	1274.5
	Hydroponics (vegetative crops: Irish potatoes, cassava, etc.) PPP arrangement	Ha	-	5	6	9	10	8.1	38.1
2.2.3	Innovative mechanisms for the management of irrigation infrastructure								
	Number of Water User Associations supported to set up	No.	100	100	100	100	100	100	600
	Number of cooperative members and farmers trained	No.	10,000	20,000	20,000	20,000	20,000	20,000	110,000
2.3	Animal resources and production systems								

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
2.3.1	Sustainable animal nutrition, feeding and husbandry practices								
	Support to cooperatives to establish small scale animal feed processing	Number	60	60	60	60	60	60	360
	Support to improved forage/fodder seed multipliers	Ha	3,000	3,000	3,000	3,000	3,000	3,000	18,000
	Support to cooperatives for improved forage/fodder production, storage, and use	Number	60	60	60	60	60	60	360
	Support to cooperatives to increase the use and conservation of crop residues and by products	Number	60	60	60	60	60	60	360
	Support to establish a digitalized (SMS & web based) tracking system for key livestock service delivery								
	Forage/fodder banks set up in districts								
2.3.2	Animal disease control and health management								
	Support to upgrade Rubirizi national veterinary laboratory and satellite laboratories								
	Support to satellite laboratories								
	Support to animal quarantine	Number	2	2	1	-	-	-	5
	Animal vaccination	Number	500,000	500,000	500,000	500,000	500,000	500,000	
	Support to farmers organisations in primary health of livestock								

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Enhance, establish, and enforce procedures and systems for animal disease control and animal products								
2.3.3	Improved and high-quality animal genetic resources								
	Establish and enforce procedures for a national animal identification and performance recording systems	Number	140,000	150,000	160,000	170,000	180,000	190,000	990,000
	Quality semen production	Number	200,000	180,000	160,000	140,000	120,000	100,000	900,000
	Improve & increase bovine artificial insemination	Number	150,000	140,000	130,000	120,000	110,000	1,000,000	1,650,000
	Training & Capacity building for AI technicians	Training session	30	30	30	30	30	30	180
	Support to acquisition of AI inputs								
	Support to development of cooperative breeding programs with an appropriate on-farm herd/flock & performance recording system								
	Support to national distribution of liquid nitrogen (litre)	Number	126,000	151,200	181,440	217,728	261,274	313,528	1,251,170
	Maintenance of existing liquid nitrogen plants								
	Establish standard operating procedures of hatcheries and animal breeder farms								
	Build capacities of cooperatives on standard operating procedures of hatcheries and animal breeder farms	Training session	60	60	60	60	60	60	360

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Support for the introduction of processing equipment for cooperatives								
2.3.4	Knowledge-based fisheries and aquaculture development								
	Training of cooperatives on production technologies	Training session	20	20	20	20	20	20	120
	Support increased fingerlings production	Number	20,000,000	60,000,000	100,000,000	60,000,000	40,000,000	20,000,000	300,000,000
	Restocking of lakes and ponds (transporting, oxygen, etc.)	Fingerings	500,000	800,000	1,000,000	1,500,000	2,000,000	2,300,000	8,100,000
	Support cooperatives for the creation of storage and processing through PPPs								
2.3.5	Bees production systems (apiculture) and insect farming								
	Training for cooperatives on commercial insect production (e.g. queen rearing and colonies multiplication)	Training session	24	24	24	24	24	24	144
	Distribution of improved hives	Number	5,000	5,000	3,000	2,000	2,000	2,000	19,000
	Support for the introduction of honey and bee products processing equipment								
2.4	Nutrition-sensitive agriculture								

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
2.4.1	Mainstreaming nutrition								
	Training of MINAGRI, RAB and NAEB staff on NSA mainstreaming	Staff	20	30	40	50	60	100	300
	Promote nutrition dense food e.g. iron fortified beans								
	Promote PPP models for food fortification								
	Nutrition education for farming households								
2.4.2	Up-scaling of kitchen gardens programme and home-grown school feeding programme								
	Promote fruit trees	Number	200,000	200,000	200,000	200,000	200,000	200,000	1,200,000
	Promote school kitchen gardens								
	Contribute in the development of school curricula with nutrition chapters								
2.5	Mechanisms for increased resilience								
2.5.1	Enhanced weather and climate services								
2.5.2	Asset building for vulnerable groups								
	Support vulnerable groups with:	Number	3,000	4,000	5,000	6,000	7,000	8,000	27,000
	Chicken transfer	No. of chicken	400,000	600,000	800,000	1,000,000	1,200,000	1,400,000	5,400,000
	Pigs transfer	No. of pigs	50,000	150,000	200,000	250,000	300,000	300,000	1,250,000

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Girinka	No. of cows	30,000	30,500	31,000	32,000	32,500	33,000	189,000
	Asset transfer of other small-stock (goats and rabbits)	No	10,000	20,000	30,000	40,000	50,000	60,000	210,000
2.5.3	Effective response to disasters for farm communities								
	Preparedness plans developed/updated								
	Development of rapid needs assessment mechanism								
3	Productive, Inclusive Markets and Value Addition								
3.1	Market linkages fostered (incl. market and aggregation infrastructure)								
3.1.1	Strengthened post-harvest handling, aggregation, and pre-processing								
	Data collection and dissemination on post-harvest losses	Number	12	-	12	-	-	12	36
	Training on reducing post-harvest losses	Beneficiaries	360	360	360	360	360	360	2,160
	Capacity building on post-harvest handling	Beneficiaries	300	300	300	300	300	300	1,800
	Production and dissemination of post-harvest handling technology	Number	50	50	50	50	50	50	300
	Awareness raising campaigns to facilitate private sector investment in post-harvest operations	Number	2	1	1	1	1	1	7
	Training on pre-processing	Person day	360	360	360	360	360	360	2,160
	Capacity building to cooperatives on improved standards, grading and technology	Cooperatives	500	500	500	500	500	500	3,000

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Beneficiaries of a Competitive Fund (cooperatives, farmers, and SMEs to establish post hard technology units and promote pre-processing and value addition	beneficiaries	50	50	50	50	50	50	300
3.1.2	Promotion of productive alliances								
	Capacity building to cooperatives in support of diversification/graduation into value addition and/or engagement in high end value chains	Cooperatives	300	300	300	300	300	300	1,800
	Capacity building to cooperatives on marketing and aggregation services	Cooperatives	500	500	500	500	500	500	3,000
	Beneficiaries of a Competitive Fund to facility private sector in input and service markets (fertiliser blending, seed production, animal feed, etc.)	Number	10	10	5	5	5	5	40
	Registration of collection centres	Number	100	416	500	600	800	1000	600
	Supported registered collection centres	Number	100	200	300	400	500	600	600
	Profiling agricultural export commodities	Number	2	3	4	6	8	10	33
	Technical assistance on improved quality, grading systems and embedded service provision	Person day	200	200	200	200	200	200	1,200
	Beneficiaries of the Competitive Fund to facilitate contract farming and out grower schemes	Number	12	12	12	12	12	12	72
	Beneficiaries of the Competitive Fund to facilitate private sector in input and service markets (fertiliser blending, seed production, animal feed, etc.)	Number	10	10	5	5	5	5	40

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Agro dealer networks and commodity platforms established	Number	40	40	40	40	40	40	240
	Quantity of fertilizers per ha	Kg	39	46	51	60	65	75	
	Quantity of subsidized seeds	MT	5,200	5,200	5,200	5,200	5,200	5,200	31,200
3.1.3	Market Information Systems								
	Awareness raising on e-Soko and e-Soko+ within government structures								
	Establish e-Soko+								
	e-Soko+operational								
3.1.4	Promotion of market infrastructure							-	
	Construction, rehabilitation, provision of equipment's and maintenance of drying grounds	Number	40	40	40	40	40	40	240
	Construction, rehabilitation, provision of equipment's and maintenance of metallic silos (capacity of 5,000 MT)	Number	2	2	2	2	2	-	10
	Cold trucks	Number	1	-	-	2	-	2	5
	Construction, rehabilitation, provision of equipment's and maintenance of collection centres	Number	100	100	100	100	100	100	600
	Construction, rehabilitation, equipment's, and maintenance of warehouses (capacity of 10,000 MT)	Number	5	5	5	4	3	2	24

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Upgrade, rehabilitation and maintenance of export logistics warehouses	Number	1	1	1	-	-	-	3
	Construction, rehabilitation, and maintenance of (mobile) cold chain facilities	Number	1	2	1	-	-	-	4
	Construction of wholesale market with sorting and grading equipment	Number	-	1	1	2	-	1	5
	Construction, rehabilitation and maintenance of cross border markets and facilities	Number	1	1	1	1	-	1	5
	Construction, rehabilitation and maintenance of rural markets and facilities	Number	10	10	10	5	5	5	45
3.2	Agricultural market risks and financial services								
3.2.1	Inclusive agricultural financial services								
	Pilot National Agricultural Insurance Scheme								
	Pilot Agricultural Guarantee Schemes								
3.2.2	Management of agricultural risk and mechanisms								
	Capacity building and awareness raising on benefits of risk management and transfer mechanisms	Training days	25	25	25	25	25	25	150
	Surveys on production, processing, and export costs	Surveys	2	2	2	2	2	2	12
3.2.3	Decentralised Rwandan Strategic Grain Reserve								
3.3	Quality assurance and regulation								
3.3.1	Sanitary and Phyto Sanitary (SPS) regulation								

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Required regulations and Standard Operating Procedures (SOPs)	Documents	2	2	2	2	2	2	12
	Surveillance of quarantined pests and diseases								
	Certification for biosafety control (HACCP) and establishment of standard for animal feed quality and a biosafety law								
	Development and preparation of the dossier for livestock to submit for status free from FMD, PPR, CBPP, ASF	Documents	4	4	4	3	3	-	18
3.3.2	Capacity building and awareness creation								
	Upgrade the Capacities of Personnel on private standards (Global GAP, Organic certification, Rain forest alliance, UTZ, ISO Standards, Fair Trade etc...)	Numbers	10	10	10	10	10	10	60
	Capacity building on Sanitary and Phytosanitary Measures (SPS measures)	Trainings	10	10	10	10	10	10	60
	Capacity building and awareness creation on SPS issues and private certification	Trainings	50	50	50	50	50	50	300
3.3.3	SPS Infrastructure								
	Incinerators	Number	1	-	-	-	-	1	2
	Quarantine stations (at airport and cross border stations (Gatuna, Rusumo & Kagitumba))	Number	1	1	1	1	1	-	5
	Pest scan detectors	Number	1	-	1	-	-	-	2

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Upgrading post-quarantine laboratory: Upgrading of testing equipment and material, including aflation, antibiotics and pesticides residues and heavy metals.	Number	1	1	-	-	-	-	2
	Organoleptic laboratories for tea and coffee: Upgrading of organoleptic lab equipment and material for testing coffee and tea prior to export	Number	1	1	-	-	-	-	2
	Chemical laboratories for pesticide residue, essential oil components and fertiliser quality	Number	1	-	-	-	-	-	1
	Memorandum of Understanding for laboratory usage	Number	3	3	-	-	-	-	6
4	Enabling Environment and Responsive Institutions								
4.1	Agricultural Institutions Development								
4.1.1	Organisational reform								
	Develop and implement a new organization structure								
	Establish financing mechanisms for: mechanization, PPPs, youth, women, entrepreneurship, landless farmers								
4.1.2	Decentralised Capacity Development								
	Function review and implementation of the recommendations								
4.2	Evidence-based policies development and regulatory framework								
4.2.1	Policy analysis function								

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Policy analysis and implementation of the outcomes								
4.2.2	Policy and regulatory framework								
	Policy frameworks and strategies developed or revised	Number	6	6	6	6	6	6	36
	Regulatory frameworks developed or revised	Number	5	3	3	3	3	3	20
	Policy consultations	Session	3	3	3	3	3	3	18
	Investment appraisal Training								
	Training on macroeconomic analysis and development								
	Review and development of selected government schemes and mechanisms								
4.2.3	Land-use planning and administration								
	Gazette agriculture land								
	Develop land leasing modalities								
	Develop/revise Agriculture Land Regulatory frameworks								
	Develop ALIS support (agriculture land information system) annual support								
4.3	Strengthened partnership in the commercialisation of agriculture sector value chains products								
4.3.1	Public Private Dialogue (PPD) and value chain platforms								

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Setting up of value chain platforms for priority value chains at national level	Session	16	28	48	68	68	68	296
4.3.2	Agriculture investment promotion and aftercare								
4.3.3	Development of PPP and alternative models								
	Establish the Agricultural Development Fund to incentivise private sector and stakeholders to invest in: Knowledge generation, Innovation, Mechanization, provision of extension services, inputs, post-harvest handling, and agro-trade, start-ups that facilitate value chain involvement of women and youth.								
	Profile and map potential zones of investment								
	Identify potential investors in agriculture								
	Trainings on PPP models								
4.4	Planning, coordination, and budgeting								
4.4.1	Planning and budgeting								
	Sectoral planning meetings	Meeting	2	2	2	2	2	2	12
	Programme and project development meetings	Meeting	5	5	5	5	5	5	30
	Budgeting meetings	Meeting	5	5	5	5	5	5	30
	Capacity building on project formulation and appraisal								
4.4.2	Synergies and Coordination								
	Intra-sectoral coordination meetings	Meeting	15	15	15	15	15	15	90

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Inter-sectoral coordination meetings	Meeting	12	12	12	12	12	12	72
	Policy dialogue events	Session	5	5	5	5	5	5	30
	Joint planning	Session	6	6	6	6	6	6	36
	Trainings on mainstreaming crosscutting areas	Sessions	20	20	20	20	20	20	120
4.5	M&E&L, Information Systems, and Statistics								
4.5.1	M&E&L								
	Establish all baselines of PSTA 4 through additional studies/surveys or modification of existing surveys								
	Stocktaking report of PSTA 4 Results framework, targets, and priorities								
	Training on M&E	Sessions	3	3	4	3	3	4	20
	Sectoral analysis and impact assessment	Documents	2	2	3	4	5	6	
	External communication on improved approaches, best practices, tools, etc.	Session	3	3	4	3	3	4	20
	ICT equipment for data collection	Number	10	8	10	10	5	5	48
	Upgrading of M&E system								
	Training on M&E								
	Women Empowerment in Agriculture Index survey								
4.5.2	Smart Agricultural Information Systems (SAIS) and Statistical Capacity								

	Item	Unit	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	ICT equipment for data collection	Number	5	5	5	5	5	5	30
	Develop and maintain a common data warehouse								
	To get and analyse Satellite and drone imagery	Number	4	4	4	4	4	4	24
	Computerize Input distribution system								
	Farmer feedback system								
	Establish Fora of farmers from the Village to the Country level								
	Livestock registration system								
4.5.3	Agriculture sector visibility and Public Relations								
	Organising exhibitions, agriculture open days, study tours & field visits	Number	4	4	4	4	4	4	24
	Production of branded visibility and promotional materials	Number	20	20	20	20	20	20	120
	Generation and dissemination of information through mass media (on-line, print, radio, and TV programs)	Number	492	492	492	492	492	492	2,952
	Generation and dissemination of information through social media (Twitter, Facebook, YouTube, Instagram, Flickr)	Number	50	50	50	50	50	50	300
	Strengthening the capacity of Rwandan journalists working on agriculture related assignments	Beneficiaries	30	30	30	30	30	30	180

ANNEX 3: DETAILED COSTING (RWF, NOMINALS)

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
Total	PSTA 4 Costing	281,184,078,599	377,734,771,733	431,963,925,628	469,772,592,526	544,453,475,939	670,982,835,160	2,776,091,679,586
1	Innovation and Extension	41,928,261,853	55,614,449,998	72,646,097,159	65,330,612,292	80,803,484,264	84,254,451,994	400,577,357,560
1.1	Research and innovation development	23,957,647,253	27,402,979,288	31,201,705,989	20,487,544,296	22,074,103,183	23,455,999,398	148,579,979,406
1.1.1	Research infrastructure	0	0	0	0	0	0	0
	Upgrading of and building of new laboratories for research: bio-fertilizers, biotechnology for invitro fertilisation, animal nutrition	10,600,000,000	11,236,000,000	11,910,160,000	0	0	0	33,746,160,000
	Upgrading and construction of greenhouses and hydroponic facilities	1,187,200,000	1,258,432,000	1,333,937,920	1,413,974,195	1,498,812,647	1,588,741,406	8,281,098,168
	Upgrading and construction of post-harvest research facilities and conduct research on post-harvest	1,060,000,000	1,123,600,000	1,191,016,000	1,262,476,960	1,338,225,578	1,418,519,112	7,393,837,650
	Research facilities for seed drying, sorting, treatment, and storage	318,000,000	337,080,000	357,304,800	378,743,088	401,467,673	425,555,734	2,218,151,295
	Maintenance of laboratories: spare parts and technicians	742,000,000	786,520,000	833,711,200	883,733,872	936,757,904	992,963,379	5,175,686,355
	Upgrading of research stations: renovation of offices, laboratories, and staff housing	530,000,000	561,800,000	595,508,000	631,238,480	669,112,789	709,259,556	3,696,918,825
	Gene bank for conservation of plant genetic resources	1,060,000,000	1,123,600,000	1,191,016,000	1,262,476,960	1,338,225,578	1,418,519,112	7,393,837,650
	Gene bank for conservation of animal genetic resources	2,120,000,000	2,247,200,000	2,382,032,000	2,524,953,920	2,676,451,155	2,837,038,225	14,787,675,300
	Lab equipment	1,060,000,000	1,123,600,000	1,191,016,000	1,262,476,960	1,338,225,578	1,418,519,112	7,393,837,650
	ICT equipment	458,189,253	485,680,608	514,821,444	545,710,731	578,453,375	613,160,577	3,196,015,988

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Upgrading information and documentation systems	159,000,000	168,540,000	178,652,400	189,371,544	200,733,837	212,777,867	1,109,075,647
1.1.2	Human resource capacity development	0	0	0	0	0	0	0
	Training of current staff in various topics (Climate change, impact studies, GMOs)	76,320,000	80,899,200	85,753,152	90,898,341	96,352,242	102,133,376	532,356,311
	Climate change modelling and impact research	238,500,000	252,810,000	267,978,600	284,057,316	301,100,755	319,166,800	1,663,613,471
	Rewarding system for outstanding scientists' achievements	6,360,000	6,741,600	14,292,192	15,149,724	16,058,707	21,277,787	79,880,009
	Support ICT4 Agriculture innovations and initiatives	159,000,000	168,540,000	178,652,400	189,371,544	200,733,837	212,777,867	1,109,075,647
1.1.3	Collaboration and research networks	0	0	0	0	0	0	0
	Promote development and testing of innovations and mechanisation through partnerships/PPPs (through Agricultural Development Fund)	530,000,000	2,247,200,000	4,764,064,000	5,049,907,840	5,352,902,310	5,674,076,449	23,618,150,599
	Scientists' access to high world class research facilities	530,000,000	561,800,000	595,508,000	631,238,480	669,112,789	709,259,556	3,696,918,825
	Exchange visits of world leading scientists or staff/technical assistance	119,250,000	126,405,000	133,989,300	189,371,544	200,733,837	265,972,334	1,035,722,014
	Acquisition of patents and licensing through networks	0	224,720,000	0	0	267,645,116	283,703,822	776,068,938
	Technical assistance for curriculum development with university	238,500,000	252,810,000	267,978,600	284,057,316	301,100,755	319,166,800	1,663,613,471
	Joint supervision of postgraduates' students/research	212,000,000	224,720,000	238,203,200	252,495,392	267,645,116	283,703,822	1,478,767,530
	Students' attachment to RAB research facilities	106,000,000	112,360,000	119,101,600	126,247,696	133,822,558	141,851,911	739,383,765
	Professional internships under RAB research and extension departments	275,600,000	292,136,000	309,664,160	328,244,010	347,938,650	368,814,969	1,922,397,789
1.1.4	Action oriented research to improve soil health and fertility	0	0	0	0	0	0	0

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Staff/Technical assistance for developing Integrated Soil Fertility Management (ISFM) technologies	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Staff/Technical assistance for developing Integrated Pest Management (IPM) technologies	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Staff/Technical assistance for research on bio-fertilizer technologies (Vermi- composting, termite, enriched compost)	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Staff/Technical assistance for research on upgrading lime quality through granulation	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Staff/Technical assistance for soil diagnosis, including mobile soil testing	15,264,000	16,179,840	17,150,630	18,179,668	19,270,448	20,426,675	106,471,262
	Staff/Technical assistance for developing site specific fertilizer recommendations	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Mobile soil testing equipment/GIS technologies	270,300,000	286,518,000	303,709,080	321,931,625	341,247,522	361,722,374	1,885,428,601
	Updating of soil maps	0	7,865,200	8,337,112	0	0	0	16,202,312
	Purchase and testing of fertilizer dosing equipment and dissemination strategy development	0	0	9,528,128	10,099,816	0	0	19,627,944
	Inputs and equipment for research on soil erosion	89,040,000	94,382,400	100,045,344	106,048,065	112,410,949	119,155,605	621,082,363
	Development of Integrated Soil Fertility Management (ISFM) and Integrated Pest Management (IPM) technologies	95,400,000	101,124,000	107,191,440	113,622,926	120,440,302	127,666,720	665,445,388
1.1.5	Innovative research on crop improvement and husbandry	0	0	0	0	0	0	0
	Staff/Technical assistance for variety development	15,264,000	16,179,840	17,150,630	18,179,668	19,270,448	20,426,675	106,471,262
	Staff/Technical assistance for research on bio-fortification/nutrient rich crops	15,264,000	16,179,840	17,150,630	18,179,668	19,270,448	20,426,675	106,471,262
	Staff/Technical assistance for accelerated breeding using molecular markers	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Staff/Technical assistance for research on conservation agriculture	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Staff/Technical assistance time for conservation of plant genetic resources and micro-bio genetic resources	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Staff/Technical assistance time for research on water use efficiency	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Staff/Technical assistance time for research on post-harvest and nutrition technologies	15,264,000	16,179,840	17,150,630	18,179,668	19,270,448	20,426,675	106,471,262
	Various equipment and inputs for crop improvement, husbandry and post-harvest and conservation of crop genetic resources	19,080,000	20,224,800	21,438,288	22,724,585	24,088,060	25,533,344	133,089,078
	Development of biofortified seeds	583,000,000	617,980,000	655,058,800	694,362,328	736,024,068	780,185,512	4,066,610,707
1.1.6	Innovative research on animal resources improvement	0	0	0	0	0	0	0
	Staff/Technical assistance for research on animal genetic improvement	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Staff/Technical assistance for research on animal nutrition (forage, food/feed crops integration, utilization of crop residues)	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Staff/Technical assistance for research on animal health	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Staff/Technical assistance for research on commercial insects	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Staff/Technical assistance for conservation of animal genetic resources	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Development of a nationally adapted animal breeding program, including animal genetic resources conservation	190,800,000	202,248,000	214,382,880	227,245,853	240,880,604	255,333,440	1,330,890,777
	Research on commercialization and expansion of animal feed value chains	10,176,000	10,786,560	11,433,754	12,119,779	12,846,966	13,617,783	70,980,841
	Strengthened disease diagnostic capacity in national veterinary and satellite laboratories	190,800,000	202,248,000	214,382,880	227,245,853	240,880,604	255,333,440	1,330,890,777
1.1.7	Innovative research on aquaculture and fisheries	0	0	0	0	0	0	0
	Staff/Technical assistance for research on fish breeding	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Staff/Technical assistance for fish feed production technologies development	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Staff/Technical assistance for diversification of fish species	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Staff/Technical assistance for research on post-harvest losses reduction and increasing quality and value of fish	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Limnology studies	381,600,000	404,496,000	428,765,760	454,491,706	481,761,208	510,666,880	2,661,781,554
	Various equipment and inputs for research on fish breeding and production technologies, and post-harvest and value addition	19,080,000	20,224,800	21,438,288	22,724,585	24,088,060	25,533,344	133,089,078
1.1.8	Innovative research on agro-forestry	0	0	0	0	0	0	0
	Various equipment and inputs for developing and upscaling agro-forestry models and technologies and conservation of agro-forestry genetic resources	44,520,000	47,191,200	50,022,672	53,024,032	56,205,474	59,577,803	310,541,181
	Pilot on urban forestry through promoting fruit trees	0	89,888,000	0	0	0	0	89,888,000
1.1.9	Research on markets and food systems	0	0	0	0	0	0	0
	Creation of a competitiveness hub for undertaking market research and product development (domestic, regional, global)	79,500,000	84,270,000	178,652,400	189,371,544	301,100,755	319,166,800	1,152,061,499
1.2	Proximity extension and advisory services	14,878,340,200	21,604,771,812	28,332,686,589	31,300,174,652	38,753,366,710	39,623,877,363	174,493,217,325
1.2.1	Institutional capacity development	0	0	0	0	0	0	0
	Operational planning and review meetings at sector level: 400 SECTORS	3,816,000,000	4,044,960,000	4,287,657,600	4,544,917,056	4,817,612,079	5,106,668,804	26,617,815,539
	Operational planning and review meetings at district level	286,200,000	303,372,000	321,574,320	340,868,779	361,320,906	383,000,160	1,996,336,165
	Operational planning and review meetings at national level	12,720,000	13,483,200	14,292,192	15,149,724	16,058,707	17,022,229	88,726,052
	Research & innovation 'into use' platforms	10,600,000	22,472,000	23,820,320	25,249,539	26,764,512	28,370,382	137,276,753

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Capacity building to provide support services to livestock, fisheries, and aquaculture	26,500,000	28,090,000	29,775,400	31,561,924	33,455,639	35,462,978	184,845,941
1.2.2	Quality proximity extension services to farmers	0	0	0	0	0	0	0
	Training of Master trainers (Training of trainers)	296,800,000	0	416,855,600	0	374,703,162	0	1,088,358,762
	Technical Backstopping and FFS activities supervision	506,860,200	537,271,812	1,021,498,693	1,082,788,614	1,554,041,216	1,647,283,689	6,349,744,225
	Capacity building of frontline extension agents (FFS Facilitators)	1,696,000,000	2,247,200,000	2,382,032,000	2,524,953,920	2,676,451,155	1,985,926,757	13,512,563,832
	Transport and Communication Facilitation for FFS Facilitators	839,520,000	1,159,555,200	1,514,972,352	1,908,865,164	2,344,571,212	2,723,556,696	10,491,040,623
	Capacity building of frontline extension agents (Farmer Promoters)	1,060,000,000	1,123,600,000	1,191,016,000	1,262,476,960	2,007,338,366	1,844,074,846	8,488,506,172
	Capacity building for gender responsiveness and targeting in extension (FPs and FFSFs, district/RAB extension staff)	530,000,000	1,123,600,000	2,382,032,000	3,787,430,880	5,352,902,310	7,092,595,561	20,268,560,752
	Technical assistance for developing a performance-based incentives mechanism	0	84,270,000	0	0	50,183,459	0	134,453,459
	Technical assistance/staff time for performance evaluation of Farmer Promoters and FFS Facilitators	71,550,000	0	53,595,720	0	60,220,151	0	185,365,871
	Funds for financial incentives for FPs and FFSFs and agricultural competition (Through Agricultural Development Fund)	106,000,000	1,123,600,000	2,382,032,000	2,524,953,920	4,014,676,733	4,255,557,337	14,406,819,990
	Training for strengthening FFSFs coops	212,000,000	224,720,000	238,203,200	252,495,392	267,645,116	283,703,822	1,478,767,530
	Capacity building for improving veterinary extension services (Master Trainers/RAB extension staff)	169,600,000	0	238,203,200	0	214,116,092	0	621,919,292
	Capacity building for improving veterinary extension services (Facilitators)	1,060,000,000	2,247,200,000	2,382,032,000	2,524,953,920	2,676,451,155	1,985,926,757	12,876,563,832
	Capacity building for improving veterinary extension services (Promoters)	424,000,000	1,685,400,000	2,382,032,000	3,787,430,880	4,014,676,733	4,255,557,337	16,549,096,950
	Capacity building for improving fisheries and aquaculture extension services (Master Trainers/RAB extension staff & Private extension workers)	0	67,416,000	0	0	0	0	67,416,000

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Capacity building for improving fisheries and aquaculture extension services (Facilitators)	106,000,000	224,720,000	357,304,800	378,743,088	401,467,673	425,555,734	1,893,791,295
	Capacity building for improving fisheries and aquaculture extension services (Promoters)	0	168,540,000	178,652,400	189,371,544	0	0	536,563,944
	Technical assistance for the integration of ISFM into FFS and extension (ToT)	2,226,000,000	2,359,560,000	2,501,133,600	2,651,201,616	2,810,273,713	2,978,890,136	15,527,059,065
	Needs assessment of extension materials	63,600,000	67,416,000	0	0	0	0	131,016,000
	Technical assistance for updating training curriculum and materials to integrate crosscutting themes	63,600,000	67,416,000	0	0	0	0	131,016,000
	Development of extension materials	679,460,000	720,227,600	763,441,256	0	0	0	2,163,128,856
	Production and dissemination of training curriculum and materials	0	0	25,011,336	26,512,016	28,102,737	0	79,626,089
	ICT/Upgrading MINAGRI websites/Extension website(Noz'Ubuhinzi)	106,000,000	112,360,000	119,101,600	126,247,696	133,822,558	141,851,911	739,383,765
	Call Centre: Collection of feedback from farmers and other stakeholders	108,120,000	114,607,200	121,483,632	128,772,650	136,499,009	144,688,949	754,171,440
	Capacity building for agriculture extension partners and stakeholders in using ICT solutions	8,480,000	8,988,800	9,528,128	10,099,816	10,705,805	11,348,153	59,150,701
	Digitizing and automating agriculture extension materials for Twigire Muhinzi	12,720,000	13,483,200	0	0	0	0	26,203,200
	Harmonization of agriculture extension messages and advisory services	2,650,000	5,618,000	0	0	0	0	8,268,000
1.2.3	Tailored and demand driven services by private sector	0	0	0	0	0	0	0
	Coordination and relation building meetings between producers and private extension workers	6,360,000	6,741,600	7,146,096	7,574,862	8,029,353	8,511,115	44,363,026
	Start-up fund to promote the private sector extension and advisory services (Through Agricultural Development Fund)	106,000,000	1,123,600,000	2,382,032,000	2,524,953,920	4,014,676,733	4,255,557,337	14,406,819,990
	Incentive scheme for farmers to access private sector-delivered support services	265,000,000	561,800,000	595,508,000	631,238,480	334,556,394	0	2,388,102,874

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Training for private extension workers (export crops)	0	13,483,200	10,719,144	11,362,293	12,044,030	12,766,672	60,375,339
1.3	Skills developed for agriculture value chain actors	3,092,274,400	6,606,698,899	13,111,704,581	13,542,893,344	19,976,014,371	21,174,575,233	77,504,160,829
1.3.1	Support to farmer organizations and cooperatives	0	0	0	0	0	0	0
	Capacity building on management, organizational and entrepreneurial capacities of farmer organization and cooperatives to provide services to their members	1,192,500,000	1,264,050,000	1,339,893,000	1,420,286,580	1,505,503,775	1,595,834,001	8,318,067,356
	Exchange visits of farmer organizations and cooperatives	21,200,000	22,472,000	23,820,320	25,249,539	26,764,512	28,370,382	147,876,753
	Provision of contractual management staff to Foes/Coops (for a determined period)	508,800,000	539,328,000	571,687,680	0	0	0	1,619,815,680
	Asset building/small start-up funds (Through Agricultural Development Fund)	53,000,000	224,720,000	476,406,400	1,009,981,568	1,338,225,578	1,418,519,112	4,520,852,658
1.3.2	Skills development in agriculture value chains	0	0	0	0	0	0	0
	Technical assistance/staff time for curriculum development for skills in farming as a business	0	48,472,104	0	0	0	0	48,472,104
	Capacity building for skills in farming as a business (Marketing skills, Post-harvest handling, book keeping, Auditing leadership skills (especially for women), gender equality and GBV prevention	34,174,400	36,224,864	38,398,356	40,702,257	43,144,393	45,733,056	238,377,326
	Technical assistance/staff time for curriculum development for developing skills for domestic production of equipment and technologies	0	31,414,171	0	0	0	0	31,414,171
	Capacity building for developing skills for domestic production of equipment and technologies	0	226,517,760	240,108,826	0	0	0	466,626,586
1.3.3	Women empowerment and skills development	0	0	0	0	0	0	0
	Capacity building for developing skills and promoting increased involvement of women in agribusiness	238,500,000	252,810,000	267,978,600	284,057,316	301,100,755	319,166,800	1,663,613,471
	Capacity building for developing leadership and management skills for women	238,500,000	252,810,000	267,978,600	284,057,316	301,100,755	319,166,800	1,663,613,471

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Fund to support to agribusiness and income generating projects for women (through Agricultural Development Fund)	318,000,000	1,123,600,000	4,764,064,000	5,049,907,840	8,029,353,466	8,511,114,674	27,796,039,979
1.3.4	Youth agribusiness development	0	0	0	0	0	0	0
	Matching grants for youth start-ups or businesses that benefit youth in agriculture (through Agricultural Development Fund)	265,000,000	2,247,200,000	4,764,064,000	5,049,907,840	8,029,353,466	8,511,114,674	28,866,639,979
	Training/mentoring for business incubation	23,850,000	42,135,000	44,663,100	47,342,886	50,183,459	53,194,467	261,368,912
	Training/business development support to assist youth in accessing suitable financial products	39,750,000	126,405,000	133,989,300	142,028,658	150,550,377	159,583,400	752,306,736
	Financial incentives for youth (fiscal regime, tax breaks, procurement policy, etc.)	159,000,000	168,540,000	178,652,400	189,371,544	200,733,837	212,777,867	1,109,075,647
2	Productivity and Resilience	164,144,718,480	212,956,008,675	258,659,289,882	294,802,526,344	366,924,318,241	469,873,355,675	1,767,360,217,296
2.1	Sustainable land husbandry and crop production intensification	38,271,300,000	47,910,304,000	61,176,536,840	71,746,565,637	87,486,497,136	114,234,762,629	420,825,966,241
2.1.1	Sustainable land husbandry and climate smart practices	0	0	0	0	0	0	0
	Progressive terracing	4,452,000,000	4,719,120,000	5,002,267,200	5,302,403,232	5,620,547,426	5,966,291,386	31,062,629,244
	Radical terracing	12,190,000,000	12,921,400,000	13,696,684,000	14,518,485,040	15,389,594,142	22,838,157,707	91,554,320,890
	Biological soil conservation practices	5,300,000,000	5,618,000,000	5,955,080,000	6,312,384,800	6,691,127,888	7,092,595,561	36,969,188,249
	Promotion of adapted seeds adoption	795,000,000	842,700,000	893,262,000	946,857,720	1,003,669,183	1,063,889,334	5,545,378,237
	Training on adoption of climate smart cropping practices	795,000,000	842,700,000	893,262,000	946,857,720	1,003,669,183	1,063,889,334	5,545,378,237
	Agroforestry	265,000,000	2,809,000,000	5,955,080,000	9,468,577,200	13,382,255,776	17,731,488,903	49,611,401,879
2.1.2	Efficient and sustainable use of inputs	0	0	0	0	0	0	0

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Professionalize 700 cooperatives in multiplying seeds	858,600,000	960,678,000	1,286,297,280	1,420,286,580	1,565,723,926	1,787,334,081	7,878,919,867
	Update of seed needs assessment and quantity forecast, adapted supply planning	10,600,000	11,236,000	11,910,160	12,624,770	13,382,256	14,185,191	73,938,376
	Support for the establishment of private inputs shops/agro dealers (cooperatives included)	31,800,000	33,708,000	35,730,480	37,874,309	40,146,767	42,555,573	221,815,129
	Update of fertilizers' needs assessment and quantity forecast, adapted planning supply	10,600,000	11,236,000	11,910,160	12,624,770	13,382,256	14,185,191	73,938,376
	Support in the production of organic fertilizer	1,590,000,000	1,685,400,000	1,786,524,000	1,893,715,440	2,007,338,366	2,127,778,668	11,090,756,475
2.1.3	Promotion of integrated plant protection and pest management	0	0	0	0	0	0	0
	Pest and disease surveillance	1,060,000,000	1,123,600,000	1,191,016,000	1,262,476,960	1,338,225,578	1,418,519,112	7,393,837,650
	IPM promotion	1,060,000,000	1,123,600,000	1,191,016,000	1,262,476,960	1,338,225,578	1,418,519,112	7,393,837,650
	Technical assistance for situation assessment	95,400,000	101,124,000	107,191,440	113,622,926	120,440,302	127,666,720	665,445,388
	Training for farmers, including on safe handling and disposal	1,192,500,000	1,264,050,000	1,339,893,000	1,420,286,580	1,505,503,775	1,595,834,001	8,318,067,356
	Equipment & tools (Number package)	3,180,000,000	6,741,600,000	10,719,144,000	11,362,292,640	12,044,030,198	12,766,672,010	56,813,738,849
2.1.4	Mechanization and technology	0	0	0	0	0	0	0
	Funds to promote mechanisation (through the Agricultural Development Fund)	530,000,000	1,123,600,000	2,382,032,000	5,049,907,840	10,705,804,621	22,696,305,796	42,487,650,257
	Mechanization service centre set-up (PPP included)	0	224,720,000	238,203,200	252,495,392	267,645,116	283,703,822	1,266,767,530
	Demonstration centre for dissemination of adapted technologies	84,800,000	134,832,000	142,921,920	50,499,078	53,529,023	0	466,582,022
2.1.5	Increase Production of Coffee, Tea, and Horticulture	0	0	0	0	0	0	0

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Increasing productivity in coffee	2,120,000,000	2,247,200,000	3,573,048,000	3,787,430,880	5,352,902,310	5,674,076,449	22,754,657,639
	Increasing productivity in tea	2,120,000,000	2,247,200,000	3,573,048,000	3,787,430,880	5,352,902,310	5,674,076,449	22,754,657,639
	Increasing productivity in horticulture	530,000,000	1,123,600,000	1,191,016,000	2,524,953,920	2,676,451,155	2,837,038,225	10,883,059,300
2.2	Effective and efficient irrigation under IWRM frameworks	72,362,861,000	85,890,680,640	98,021,093,206	105,536,508,976	143,049,355,472	201,847,893,375	706,708,392,669
2.2.1	Water resource development	0	0	0	0	0	0	0
	Preparation of participatory watershed management plan	63,600,000	67,416,000	47,640,640	50,499,078	0	0	229,155,718
	Compliance development for water resources framework	0	47,191,200	0	0	0	0	47,191,200
	Development of protected irrigation	1,070,388,000	1,134,611,280	1,202,687,957	1,274,849,234	1,351,340,188	1,432,420,600	7,466,297,259
	Development of hillside lands irrigation within an Integrated Water Resources Management Framework	33,611,805,000	34,382,160,000	36,445,089,600	38,631,794,976	40,949,702,675	43,406,684,835	227,427,237,086
	Development of marshland irrigation	21,624,000,000	22,921,440,000	24,296,726,400	25,754,529,984	27,299,801,783	28,937,789,890	150,834,288,057
	Development of small scale irrigation and water infrastructures (water harvesting)	6,678,000,000	7,078,680,000	7,503,400,800	7,953,604,848	8,430,821,139	8,936,670,407	46,581,177,194
	Rehabilitation and improvement of irrigation systems	1,335,600,000	1,415,736,000	3,001,360,320	3,181,441,939	1,686,164,228	1,787,334,081	12,407,636,568
	Water management training	26,500,000	28,090,000	29,775,400	31,561,924	33,455,639	35,462,978	184,845,941
2.2.2	Promotion of innovative irrigation	0	0	0	0	0	0	0
	Greenhouses (vegetables and flowers) PPP arrangement	7,123,200,000	15,101,184,000	20,009,068,800	21,209,612,928	44,964,379,407	79,437,070,286	187,844,515,422
	Hydroponics (vegetative crops: Irish potatoes, cassava, etc.) PPP arrangement	137,800,000	2,921,360,000	4,644,962,400	6,564,880,192	17,396,932,509	36,881,496,919	68,547,432,019

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Feasibility and standards study	530,000,000	561,800,000	595,508,000	631,238,480	669,112,789	709,259,556	3,696,918,825
2.2.3	Innovative mechanisms for the management of irrigation infrastructure	0	0	0	0	0	0	0
	Technical assistance for PPPP (4P) model development	2,968,000	6,292,160	6,669,690	0	0	0	15,929,850
	Water users' association set-up (support)	106,000,000	112,360,000	119,101,600	126,247,696	133,822,558	141,851,911	739,383,765
	Water users' association training on water management, maintenance, etc.	26,500,000	56,180,000	59,550,800	63,123,848	66,911,279	70,925,956	343,191,882
	Promotion of combined better practices due to irrigation (techniques, new varieties, drainage, improved cropping schedule)	26,500,000	56,180,000	59,550,800	63,123,848	66,911,279	70,925,956	343,191,882
2.3	Animal resources and production systems	17,934,307,480	21,466,591,035	25,454,903,135	25,336,540,305	25,693,791,418	33,312,325,169	149,198,458,542
2.3.1	Sustainable animal nutrition, feeding and husbandry practices	0	0	0	0	0	0	0
	Support to cooperatives to establish small scale animal feed processing	636,000,000	674,160,000	714,609,600	757,486,176	802,935,347	851,111,467	4,436,302,590
	Support to improved forage/fodder seed multipliers	763,200,000	898,880,000	1,048,094,080	1,211,977,882	1,391,754,601	1,588,741,406	6,902,647,968
	Support to cooperatives for improved forage/fodder production, storage, and use	1,590,000,000	1,685,400,000	1,786,524,000	1,893,715,440	2,007,338,366	2,127,778,668	11,090,756,475
	Support to cooperatives to increase the use and conservation of crop residues and by products	1,590,000,000	1,685,400,000	1,786,524,000	1,893,715,440	2,007,338,366	2,127,778,668	11,090,756,475
	Scaling up of SIDESS	0	22,472,000	23,820,320	0	0	0	46,292,320
	Support to establish Livestock-Farmer Field School (in all species)	445,200,000	589,890,000	750,340,080	927,920,566	1,124,109,485	1,340,500,561	5,177,960,692
	Support to establish a digitalized (SMS & web based) tracking system for key livestock service delivery	318,000,000	337,080,000	0	378,743,088	0	425,555,734	1,459,378,822
	Forage/fodder banks set up in districts	636,000,000	674,160,000	714,609,600	757,486,176	802,935,347	851,111,467	4,436,302,590

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Water infrastructure	5,300,000,000	5,618,000,000	5,955,080,000	6,312,384,800	6,691,127,888	7,092,595,561	36,969,188,249
2.3.2	Animal disease control and health management	0	0	0	0	0	0	0
	Support to upgrade Rubirizi national veterinary laboratory and satellite laboratories	106,000,000	56,180,000	0	0	0	0	162,180,000
	Support to satellite laboratories	127,200,000	89,888,000	0	0	0	0	217,088,000
	Support to animal quarantine	106,000,000	112,360,000	59,550,800	0	0	0	277,910,800
	Diagnostic capacity building/infrastructure of laboratories, quarantine stations systems control	0	89,888,000	190,562,560	100,998,157	107,058,046	113,481,529	601,988,292
	Quarantine stations market systems control	106,000,000	56,180,000	59,550,800	63,123,848	0	0	284,854,648
	Support community animal health workers in primary health of livestock	424,000,000	337,080,000	297,754,000	126,247,696	133,822,558	141,851,911	1,460,756,165
	Support to farmers organisations in primary health of livestock	53,000,000	56,180,000	59,550,800	63,123,848	66,911,279	70,925,956	369,691,882
	Enhance, establish, and enforce procedures and systems for animal disease control and animal products	265,000,000	280,900,000	297,754,000	0	0	0	843,654,000
	Support to animal vaccination campaign for major diseases	530,000,000	561,800,000	595,508,000	631,238,480	669,112,789	709,259,556	3,696,918,825
	Promotion of One Health Framework	10,600,000	11,236,000	11,910,160	12,624,770	13,382,256	14,185,191	73,938,376
2.3.3	Improved and high-quality animal genetic resources	0	0	0	0	0	0	0
	Establish and enforce procedures for a national animal identification and performance recording systems	371,000,000	421,350,000	476,406,400	536,552,708	602,201,510	673,796,578	3,081,307,196
	Upgrade national bull stations (facilities, knowledge, and technologies)	1,060,000	1,123,600	1,191,016	0	0	0	3,374,616
	Quality semen production	424,000,000	404,496,000	381,125,120	353,493,549	321,174,139	283,703,822	2,167,992,630

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Improve & increase bovine artificial insemination	477,000,000	471,912,000	464,496,240	454,491,706	441,614,441	4,255,557,337	6,565,071,723
	Training & Capacity building for AI technicians	127,200,000	134,832,000	142,921,920	151,497,235	160,587,069	170,222,293	887,260,518
	Support to acquisition of AI inputs	76,320,000	80,899,200	57,168,768	60,598,894	32,117,414	34,044,459	341,148,735
	Support to development of cooperative breeding programs with an appropriate on-farm herd/flock & performance recording system	254,400,000	269,664,000	285,843,840	302,994,470	321,174,139	340,444,587	1,774,521,036
	Support to national distribution of liquid nitrogen (number litre)	137,967,480	175,494,635	223,229,175	283,947,511	361,181,234	459,422,529	1,641,242,564
	Maintenance of existing liquid nitrogen plants	4,240,000	4,494,400	4,764,064	5,049,908	5,352,902	5,674,076	29,575,351
	Establish standard operating procedures of hatcheries and animal breeder farms	15,900,000	16,854,000	0	0	0	0	32,754,000
	Roll out to cooperatives of standard operating procedures of hatcheries and animal breeder farms	127,200,000	134,832,000	142,921,920	151,497,235	160,587,069	170,222,293	887,260,518
	Support for the introduction of processing equipment for cooperatives	10,600,000	11,236,000	11,910,160	12,624,770	13,382,256	14,185,191	73,938,376
2.3.4	Knowledge-based fisheries and aquaculture development	0	0	0	0	0	0	0
	Training of cooperatives on production technologies	47,700,000	50,562,000	71,460,960	75,748,618	80,293,535	85,111,147	410,876,259
	Technical for the commercial production system mapping and feasibility	42,400,000	11,236,000	0	0	13,382,256	0	67,018,256
	Support increased fingerlings production	1,060,000,000	3,370,800,000	5,955,080,000	3,787,430,880	2,676,451,155	1,418,519,112	18,268,281,147
	Restocking of lakes and ponds (transporting, oxygen, etc.)	106,000,000	134,832,000	166,742,240	201,996,314	240,880,604	283,703,822	1,134,154,980
	Support cooperatives for the creation of storage and processing through PPPs	53,000,000	56,180,000	59,550,800	63,123,848	66,911,279	70,925,956	369,691,882
	Subsidy to fish feeds production	1,113,000,000	1,516,860,000	2,322,481,200	3,408,687,792	4,014,676,733	4,766,224,217	17,141,929,942

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Consultancy services for stock assessment and frame surveys	31,800,000	0	11,910,160	12,624,770	0	14,185,191	70,520,121
2.3.5	Bees production systems and insect farming	0	0	0	0	0	0	0
	Training for cooperatives on commercial insect production (e.g. queen rearing and colonies multiplication)	76,320,000	80,899,200	85,753,152	90,898,341	96,352,242	612,800,256	1,043,023,191
	Distribution of improved hives	265,000,000	168,540,000	119,101,600	126,247,696	133,822,558	1,347,593,157	2,160,305,010
	Support for the introduction of honey and bee products processing equipment	106,000,000	112,360,000	119,101,600	126,247,696	133,822,558	851,111,467	1,448,643,321
2.4	Nutrition-sensitive agriculture	8,448,200,000	9,876,444,000	11,969,710,800	14,101,867,643	15,215,624,817	16,412,266,129	76,024,113,389
2.4.1	Mainstreaming nutrition	0	0	0	0	0	0	0
	Training of MINAGRI, RAB and NAEB staff on NSA mainstreaming	53,000,000	56,180,000	59,550,800	63,123,848	66,911,279	70,925,956	369,691,882
	Technical assistance for promotion of nutrition dense food e.g. iron fortified beans	127,200,000	0	0	0	0	0	127,200,000
	Technical assistance for promotion of PPP models for food fortification	63,600,000	0	71,460,960	0	0	0	135,060,960
	Nutrition education for farming households	190,800,000	337,080,000	595,508,000	883,733,872	1,204,403,020	1,560,371,023	4,771,895,915
2.4.2	Up-scaling of kitchen gardens programme and home-grown school feeding programme	0	0	0	0	0	0	0
	Technical assistance for expanding kitchen garden programme to promote more diversified diets at household level	42,400,000	44,944,000	47,640,640	50,499,078	53,529,023	56,740,764	295,753,506
	Promote urban agriculture and agro-forestry (fruit trees, vegetables, small stock, fish ponds) programme	116,600,000	123,596,000	131,011,760	138,872,466	147,204,814	156,037,102	813,322,141
	Pilot nutrition campaign in kitchen gardens	21,200,000	22,472,000	23,820,320	0	0	0	67,492,320
	Kitchen gardens subsidised	5,300,000,000	5,618,000,000	5,955,080,000	6,312,384,800	6,691,127,888	7,092,595,561	36,969,188,249

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Fruit trees	1,060,000,000	1,123,600,000	1,191,016,000	1,262,476,960	1,338,225,578	1,418,519,112	7,393,837,650
	Development and expansion of school gardens	159,000,000	168,540,000	178,652,400	189,371,544	200,733,837	212,777,867	1,109,075,647
	Technical assistance for integrating nutrition education as part of school curriculum	127,200,000	0	0	0	0	0	127,200,000
	Training on nutrition education as part of school curriculum	127,200,000	134,832,000	142,921,920	151,497,235	160,587,069	170,222,293	887,260,518
	Sourcing of locally produced food for school feeding programme	1,060,000,000	2,247,200,000	3,573,048,000	5,049,907,840	5,352,902,310	5,674,076,449	22,957,134,599
2.5	Mechanisms for increased resilience	27,128,050,000	47,811,989,000	62,037,045,900	78,081,043,784	95,479,049,398	104,066,108,373	414,603,286,454
2.5.1	Enhanced weather and climate services	0	0	0	0	0	0	0
	Joint partnership development (MINAGRI, MoE & Meteo Rwanda) for agricultural weather information production	26,500,000	28,090,000	29,775,400	31,561,924	33,455,639	35,462,978	184,845,941
	Technical assistance for assessment of weather information needs	31,800,000	0	0	25,249,539	0	0	57,049,539
	Synoptic meteorological station	10,600,000	0	11,910,160	0	13,382,256	0	35,892,416
	Production and dissemination of diseases and water-related alerts	31,800,000	33,708,000	35,730,480	37,874,309	40,146,767	42,555,573	221,815,129
	Development of IT infrastructure/systems and applications to disseminate information to farmers	530,000,000	561,800,000	595,508,000	631,238,480	669,112,789	709,259,556	3,696,918,825
	Promotion and use by farmers of early warning systems (using micro-sensors, GPS, GIS, crop calendar)	508,800,000	539,328,000	571,687,680	605,988,941	642,348,277	680,889,174	3,549,042,072
	Development of weather information for government policy and decision making	159,000,000	168,540,000	178,652,400	189,371,544	200,733,837	212,777,867	1,109,075,647
2.5.2	Asset-building of vulnerable groups	0	0	0	0	0	0	0
	Technical assistance for geographic targeting	63,600,000	33,708,000	35,730,480	37,874,309	20,073,384	21,277,787	212,263,959

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Chicken transfer	2,544,000,000	4,044,960,000	5,716,876,800	7,574,861,760	9,635,224,159	11,915,560,543	41,431,483,262
	Pigs transfer	7,950,000,000	25,281,000,000	35,730,480,000	47,342,886,000	60,220,150,992	63,833,360,052	240,357,877,044
	Girinka	14,310,000,000	15,421,410,000	16,614,673,200	18,179,668,224	19,571,549,072	21,065,008,817	105,162,309,313
	Asset transfer of other small-stock (goats and rabbits)	636,000,000	1,348,320,000	2,143,828,800	3,029,944,704	4,014,676,733	5,106,668,804	16,279,439,041
2.5.3	Effective response to disasters for farm communities	0	0	0	0	0	0	0
	Compensation scheme set up	4,770,000	5,056,200	5,359,572	5,681,146	6,022,015	6,383,336	33,272,269
	Development/updating of preparedness plans	0	5,618,000	5,955,080	6,312,385	6,691,128	7,092,596	31,669,188
	Development of rapid need assessment mechanism	3,180,000	3,370,800	3,573,048	3,787,431	4,014,677	4,255,557	22,181,513
	Farm tools and input supply and distribution	159,000,000	168,540,000	178,652,400	189,371,544	200,733,837	212,777,867	1,109,075,647
	Restocking of animal herd (triggered in response to emergencies)	159,000,000	168,540,000	178,652,400	189,371,544	200,733,837	212,777,867	1,109,075,647
3	Inclusive Markets and Value Addition	100,753,982,267	134,586,437,220	128,669,567,485	145,726,600,305	138,195,142,924	164,928,072,798	812,859,802,998
3.1	Market linkages fostered (incl. market and aggregation infrastructure)	90,016,977,267	107,610,767,520	119,608,020,003	136,197,108,591	128,221,013,137	153,993,772,851	735,647,659,370
3.1.1	Strengthened post-harvest handling, aggregation, and pre-processing	0	0	0	0	0	0	0
	Data collection and dissemination on post-harvest losses	108,120,000	0	121,483,632	0	0	144,688,949	374,292,581
	Technical assistance on reducing post-harvest losses	286,200,000	303,372,000	321,574,320	340,868,779	361,320,906	383,000,160	1,996,336,165
	Capacity building on post-harvest handling	795,000,000	842,700,000	893,262,000	946,857,720	1,003,669,183	1,063,889,334	5,545,378,237

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Production and dissemination of post-harvest handling technology	1,060,000,000	1,123,600,000	1,191,016,000	1,262,476,960	1,338,225,578	1,418,519,112	7,393,837,650
	Awareness raising to facilitate private sector investment in post-harvest and processes sing operations	12,720,000	6,741,600	7,146,096	7,574,862	8,029,353	8,511,115	50,723,026
	Technical assistance and support for post-harvest management and processing	286,200,000	303,372,000	321,574,320	340,868,779	361,320,906	383,000,160	1,996,336,165
	Technical assistance and capacity building to cooperatives on marketing and aggregation services	265,000,000	280,900,000	297,754,000	315,619,240	334,556,394	354,629,778	1,848,459,412
	Technical assistance and capacity building to cooperatives on (pre-) processing and related technology	397,500,000	421,350,000	446,631,000	473,428,860	501,834,592	531,944,667	2,772,689,119
	Registration and support to collection centres (per centre)	106,000,000	112,360,000	119,101,600	126,247,696	133,822,558	141,851,911	739,383,765
	Competitive Fund to facilitate private sector in post-harvest and aggregation (through Agricultural Development Fund)	106,000,000	1,123,600,000	2,382,032,000	2,524,953,920	4,014,676,733	4,255,557,337	14,406,819,990
	Competitive Fund to facilitate private sector in (pre-) processing, in particular tea, coffee, horticulture and dairy (through Agricultural Development Fund)	10,600,000	11,236,000	11,910,160	12,624,770	13,382,256	14,185,191	73,938,376
3.1.2	Promotion of productive alliances	0	0	0	0	0	0	0
	Capacity building to cooperatives in support of diversification/graduation into value addition and/or engagement in high end value chains	318,000,000	337,080,000	357,304,800	378,743,088	401,467,673	425,555,734	2,218,151,295
	Competitive Fund to facilitate private sector in input and service markets (through Agricultural Development Fund)	106,000,000	1,123,600,000	2,382,032,000	2,524,953,920	4,014,676,733	4,255,557,337	14,406,819,990
	Technical assistance for profiling agricultural export commodities	190,800,000	202,248,000	214,382,880	227,245,853	240,880,604	255,333,440	1,330,890,777
	Technical assistance on improved quality, grading systems and embedded service provision	53,000,000	56,180,000	0	0	0	0	109,180,000
	Competitive Fund to facilitate contract farming and out grower schemes (through Agricultural Development Fund)	63,600,000	134,832,000	238,203,200	378,743,088	535,290,231	709,259,556	2,059,928,075
	Competitive Fund to facilitate private sector in input and service markets (fertiliser blending, seed production, animal feed, etc.) (through Agricultural Development Fund)	530,000,000	561,800,000	595,508,000	631,238,480	669,112,789	709,259,556	3,696,918,825

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Competitive Fund to facilitate agro dealer network (through Agricultural Development Fund)	424,000,000	449,440,000	476,406,400	504,990,784	535,290,231	567,407,645	2,957,535,060
	Fertilizer targeted subsidies / voucher schemes	22,641,600,000	27,000,108,000	31,800,127,200	37,078,948,315	42,876,747,506	53,024,244,416	214,421,775,438
	Improved seeds targeted subsidies / voucher schemes	16,536,000	17,528,160	18,579,850	19,694,641	20,876,319	22,128,898	115,343,867
3.1.3	Market Information Systems	0	0	0	0	0	0	0
	Awareness raising on e-Soko and e-Soko+ within government structures	15,900,000	0	0	0	0	0	15,900,000
	Technical assistance for e-Soko Patch development and operationalization	869,200	0	0	0	0	0	869,200
	Equipment and software for e-Soko Patch development and operationalization	128,967,550	0	0	0	0	0	128,967,550
	Technical assistance for developing and launching the e-Soko+ operating system	13,038,000	0	0	0	0	0	13,038,000
	Equipment and software for developing and launching the e-Soko+ operating system	1,252,625,850	0	0	0	0	0	1,252,625,850
	Data collection for operating e-Soko+	156,456,000	165,843,360	175,793,962	186,341,599	197,522,095	209,373,421	1,091,330,437
	Technical assistance for developing the government institutional options for e-Soko+ MIS	13,038,000	0	0	0	0	0	13,038,000
3.1.4	Promotion of market infrastructure	0	0	0	0	0	0	0
	Construction, rehabilitation, provision of equipment's and maintenance of drying grounds	1,060,000,000	1,123,600,000	1,191,016,000	1,262,476,960	1,338,225,578	1,418,519,112	7,393,837,650
	Construction, rehabilitation, provision of equipment's and maintenance of metallic silos (capacity of 5,000 MT)	1,060,000,000	1,123,600,000	1,191,016,000	1,262,476,960	1,338,225,578	0	5,975,318,538
	Cold trucks	63,600,000	0	0	151,497,235	0	170,222,293	385,319,529
	Cold collection centres: construction, rehabilitation, provision of equipment's and maintenance	318,000,000	842,700,000	1,071,914,400	1,325,600,808	2,007,338,366	2,127,778,668	7,693,332,243

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Construction, rehabilitation, provision of equipment's and maintenance of collection centres	8,056,000,000	8,539,360,000	9,051,721,600	9,594,824,896	10,170,514,390	10,780,745,253	56,193,166,139
	Construction, rehabilitation, equipment's, and maintenance of warehouses (capacity of 10,000 MT)	5,300,000,000	5,618,000,000	5,955,080,000	5,049,907,840	4,014,676,733	2,837,038,225	28,774,702,797
	Upgrade, rehabilitate and maintenance of export logistics warehouses	1,129,606,667	1,197,383,067	1,269,226,051	0	0	0	3,596,215,784
	Construction, rehabilitation, and maintenance of (mobile) cold chain facilities	318,000,000	674,160,000	357,304,800	0	0	0	1,349,464,800
	Construction of wholesale market with sorting and grading equipment	0	7,958,833,333	8,436,363,333	17,885,090,267	0	10,047,843,712	44,328,130,645
	Construction, rehabilitation and maintenance of cross border markets and facilities	2,120,000,000	2,247,200,000	2,382,032,000	2,524,953,920	0	2,837,038,225	12,111,224,145
	Construction, rehabilitation and maintenance of rural markets and facilities	424,000,000	449,440,000	476,406,400	252,495,392	267,645,116	283,703,822	2,153,690,730
	Construction of feeder roads	37,100,000,000	39,326,000,000	41,685,560,000	44,186,693,600	46,837,895,216	49,648,168,929	258,784,317,745
	Rehabilitation and maintenance of feeder roads	3,710,000,000	3,932,600,000	4,168,556,000	4,418,669,360	4,683,789,522	4,964,816,893	25,878,431,774
3.2	Agricultural market risks and financial services	8,129,405,000	25,335,213,700	7,757,384,962	8,210,203,290	8,843,329,173	9,522,873,430	67,798,409,556
3.2.1	Inclusive agricultural financial services	0	0	0	0	0	0	0
	Pilot National Agriculture Insurance Scheme	0	11,236,000,000	0	0	0	0	11,236,000,000
	Pilot Agricultural Guarantee Schemes, and other relevant financial products	0	5,618,000,000	0	0	0	0	5,618,000,000
	Technical assistance for Agricultural Guarantee Schemes	190,800,000	101,124,000	53,595,720	0	0	0	345,519,720
	Data and information gathering and compilation to support policy making	1,060,000	1,123,600	1,191,016	1,262,477	1,338,226	1,418,519	7,393,838
	Technical assistance on scaling up of innovative value chain financing	95,400,000	50,562,000	53,595,720	0	0	0	199,557,720

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Technical assistance to SACCOs	318,000,000	337,080,000	357,304,800	378,743,088	401,467,673	425,555,734	2,218,151,295
	Promotion of production and trade financing products	5,300,000	5,618,000	5,955,080	6,312,385	6,691,128	7,092,596	36,969,188
	Technical assistance/capacity building for agent banking to enhance outreach of MFI	26,500,000	28,090,000	29,775,400	31,561,924	33,455,639	35,462,978	184,845,941
	Facilitation of saving groups for vulnerable farmers	19,875,000	21,067,500	22,331,550	23,671,443	25,091,730	26,597,233	138,634,456
	Publishing a directory of agribusiness enterprises.	1,060,000	1,123,600	1,191,016	1,262,477	1,338,226	1,418,519	7,393,838
	Pilot for digitalization of payments	1,060,000	0	0	0	0	0	1,060,000
	Targeted capacity building for women farmers and young entrepreneurs	397,500,000	421,350,000	446,631,000	473,428,860	501,834,592	531,944,667	2,772,689,119
3.2.2	Management of agricultural risk and mechanisms	0	0	0	0	0	0	0
	Technical assistance for the development of (micro) insurance products	127,200,000	89,888,000	0	0	0	0	217,088,000
	Capacity building for the financial service sector to evaluate risk	132,500,000	140,450,000	148,877,000	157,809,620	167,278,197	177,314,889	924,229,706
	Pilot innovative risk management mechanisms	1,060,000,000	1,123,600,000	0	0	0	0	2,183,600,000
	Capacity building and awareness raising on benefits of risk management and transfer mechanisms	66,250,000	70,225,000	74,438,500	78,904,810	83,639,099	88,657,445	462,114,853
	Enhanced cooperation with MINICOM on pricing mechanisms	5,300,000	5,618,000	5,955,080	6,312,385	6,691,128	7,092,596	36,969,188
	Regular surveys on production, processing, and export costs	21,200,000	22,472,000	23,820,320	25,249,539	26,764,512	28,370,382	147,876,753
	Technical assistance on upgrading pricing mechanisms	63,600,000	33,708,000	17,865,240	0	0	0	115,173,240
3.2.3	Decentralised Rwandan Strategic Grain Reserve	0	0	0	0	0	0	0

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Running costs of the Rwandan Strategic Grain Reserve (transport, loading/ offloading, insurance, safety, electricity, tools etc.)	795,000,000	859,554,000	928,992,480	1,003,669,183	1,083,962,718	1,170,278,268	5,841,456,649
	Grain reserves purchasing (for 10% of pop for 3 months - 2kg/hh/day grain + 0.75kg/hh/day beans)	4,770,000,000	5,157,324,000	5,573,954,880	6,022,015,099	6,503,776,307	7,021,669,606	35,048,739,892
	Technical assistance for innovative business models, tender mechanisms, storage, and stock maintenance services	31,800,000	11,236,000	11,910,160	0	0	0	54,946,160
3.3	Quality assurance and regulation	2,607,600,000	1,640,456,000	1,304,162,520	1,319,288,423	1,130,800,613	1,411,426,517	9,413,734,073
3.3.1	Sanitary and Phyto Sanitary (SPS) regulation	0	0	0	0	0	0	0
	Required regulations and Standard Operating Procedures (SOPs)	10,600,000	11,236,000	11,910,160	12,624,770	13,382,256	14,185,191	73,938,376
	Technical assistance for surveillance of quarantined pests and diseases	212,000,000	0	0	252,495,392	0	0	464,495,392
	Technical assistance and certification for biosafety control (hack) and establishment of standard for animal feed quality	10,600,000	11,236,000	0	0	0	0	21,836,000
	Support development and preparation of the dossier for livestock to submit for status free from FMD, PPR, CBPP, ASF	212,000,000	224,720,000	238,203,200	189,371,544	200,733,837	0	1,065,028,581
	Registrars for plant varieties and agrochemicals (office, operational costs)	53,000,000	56,180,000	0	0	0	0	109,180,000
	Registrars for plant varieties and agrochemicals (staff)	53,000,000	56,180,000	0	0	0	0	109,180,000
3.3.2	Capacity building, awareness creation and certification	0	0	0	0	0	0	0
	Upgrade the capacities of personnel on private standards (Global GAP, Organic certification, ISO Standards, Fair Trade etc.)	53,000,000	56,180,000	59,550,800	63,123,848	66,911,279	70,925,956	369,691,882
	Competitive Fund to facilitate private sector in relevant certification (Through Agricultural Development Fund)	10,600,000	11,236,000	11,910,160	12,624,770	13,382,256	14,185,191	73,938,376
	Capacity building on SPS measures	318,000,000	337,080,000	357,304,800	378,743,088	401,467,673	425,555,734	2,218,151,295
	Capacity building and awareness creation on SPS issues and private certification	132,500,000	140,450,000	148,877,000	157,809,620	167,278,197	177,314,889	924,229,706

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
3.3.3	SPS Infrastructure	0	0	0	0	0	0	0
	Incinerators	530,000,000	0	0	0	0	709,259,556	1,239,259,556
	Quarantine stations (at airport and cross border stations (Gatuna, Rusumo & Kagitumba))	212,000,000	224,720,000	238,203,200	252,495,392	267,645,116	0	1,195,063,708
	Pest scan detectors	106,000,000	0	238,203,200	0	0	0	344,203,200
	Upgrading post-quarantine laboratory: testing equipment / material, including aflation, antibiotics, pesticides residues and heavy metals.	212,000,000	224,720,000	0	0	0	0	436,720,000
	Organoleptic laboratories for tea and coffee: Upgrading of organoleptic lab equipment / material for testing coffee and tea	190,800,000	202,248,000	0	0	0	0	393,048,000
	Chemical laboratories for pesticide residue, essential oil components and fertiliser quality	212,000,000	0	0	0	0	0	212,000,000
	Memorandum of Understanding for laboratory usage	79,500,000	84,270,000	0	0	0	0	163,770,000
4	Enabling Environment and Responsive Institutions	17,370,326,000	22,655,034,440	25,940,209,378	24,269,983,327	25,841,269,726	26,808,450,851	142,885,273,722
4.1	Agricultural Institutions Development	421,350,000	457,867,000	354,327,260	457,647,898	398,122,109	422,009,436	2,511,323,703
4.1.1	Organisational Reform	0	0	0	0	0	0	0
	Technical assistance on organisational reform	159,000,000	0	0	9,468,577	0	0	168,468,577
	Validation workshop	2,650,000	0	0	0	0	0	2,650,000
	Technical assistance for updating ASCBP	127,200,000	0	0	56,811,463	0	0	184,011,463
	Trainings for public sector institutions	0	280,900,000	297,754,000	315,619,240	334,556,394	354,629,778	1,583,459,412
	Implementation of reform	0	56,180,000	0	15,780,962	0	0	71,960,962

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
4.1.2	Decentralised Capacity Development	0	0	0	0	0	0	0
	Technical assistance for functional review of public services	127,200,000	67,416,000	0	0	0	0	194,616,000
	Technical assistance for developing improvement plans	0	50,562,000	53,595,720	56,811,463	60,220,151	63,833,360	285,022,694
	Validation workshop	5,300,000	2,809,000	2,977,540	3,156,192	3,345,564	3,546,298	21,134,594
4.2	Evidence-based policies development and regulatory framework	806,872,000	522,698,720	520,712,195	564,579,697	589,086,899	620,176,556	3,624,126,067
4.2.1	Policy analysis function	0	0	0	0	0	0	0
	Technical assistance for the creation and start-up of the policy unit	95,400,000	0	0	12,624,770	0	0	108,024,770
	Training on policy analysis and development	53,000,000	56,180,000	59,550,800	63,123,848	66,911,279	70,925,956	369,691,882
	Staff time for intra-sectoral support to policy development	1,908,000	2,022,480	2,143,829	2,272,459	2,408,806	2,553,334	13,308,908
4.2.2	Policy and regulatory framework	0	0	0	0	0	0	0
	Technical assistance	106,000,000	112,360,000	119,101,600	126,247,696	133,822,558	141,851,911	739,383,765
	Staff time for policy review	3,180,000	3,370,800	3,573,048	3,787,431	4,014,677	4,255,557	22,181,513
	Policy frameworks and strategies developed or revised	95,400,000	101,124,000	107,191,440	113,622,926	120,440,302	127,666,720	665,445,388
	Regulatory frameworks developed or revised	15,900,000	10,112,400	10,719,144	11,362,293	12,044,030	12,766,672	72,904,539
	Policy consultations	15,900,000	16,854,000	17,865,240	18,937,154	20,073,384	21,277,787	110,907,565
	Investment appraisal	212,000,000	0	0	0	0	0	212,000,000

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Training on macroeconomic analysis and development	53,000,000	56,180,000	59,550,800	63,123,848	66,911,279	70,925,956	369,691,882
	Technical assistance for review and development of selected government schemes and mechanisms	95,400,000	101,124,000	107,191,440	113,622,926	120,440,302	127,666,720	665,445,388
	Staff time for review and development of selected schemes and mechanisms	954,000	1,011,240	1,071,914	1,136,229	1,204,403	1,276,667	6,654,454
4.2.3	Land-use planning and administration	0	0	0	0	0	0	0
	Technical assistance on land-use planning	15,900,000	16,854,000	17,865,240	18,937,154	20,073,384	21,277,787	110,907,565
	Technical assistance on modalities, e.g. land leasing	10,600,000	11,236,000	0	0	0	0	21,836,000
	Regulatory frameworks developed or revised	3,180,000	3,370,800	0	0	4,014,677	0	10,565,477
	Technical assistance and assessment for land-use and zoning	15,900,000	16,854,000	0	0	0	0	32,754,000
	Capacity building and sensitisation	7,950,000	8,427,000	8,932,620	9,468,577	10,036,692	10,638,893	55,453,782
	ALIS support (agri land information system) annual support	5,300,000	5,618,000	5,955,080	6,312,385	6,691,128	7,092,596	36,969,188
4.3	Strengthened partnership in the commercialisation of agriculture sector value chains products	1,906,728,000	3,187,428,480	5,439,131,869	7,949,564,922	8,426,538,817	8,932,131,146	35,841,523,234
4.3.1	Public Private Dialogue (PPD) and value chain platforms	0	0	0	0	0	0	0
	Facilitating and convening value chain platforms for priority value chains at national level	84,800,000	157,304,000	285,843,840	429,242,166	454,996,696	482,296,498	1,894,483,201
	Facilitating and convening value chain platforms for priority value chains at district level	1,272,000,000	2,359,560,000	4,287,657,600	6,438,632,496	6,824,950,446	7,234,447,473	28,417,248,014
	Technical assistance related to sub sector studies and technical capacity	25,440,000	47,191,200	85,753,152	128,772,650	136,499,009	144,688,949	568,344,960
	Capacity building activities for sector visioning and upgrading	84,800,000	157,304,000	285,843,840	429,242,166	454,996,696	482,296,498	1,894,483,201

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
4.3.2	Agriculture investment promotion and aftercare	0	0	0	0	0	0	0
	Capacity building to strengthen personnel to establish key accounts specialising in foreign and domestic investments, in different markets (input, service, processing)	63,600,000	67,416,000	71,460,960	75,748,618	80,293,535	85,111,147	443,630,259
	Investment round table	21,200,000	22,472,000	23,820,320	25,249,539	26,764,512	28,370,382	147,876,753
	Technical assistance to support investment promotion	12,720,000	13,483,200	14,292,192	15,149,724	16,058,707	17,022,229	88,726,052
	Capacity building on principles of Responsible Investment in Agriculture and Food Systems	31,800,000	33,708,000	35,730,480	37,874,309	40,146,767	42,555,573	221,815,129
	Data and information gathering and compilation	106,000,000	112,360,000	119,101,600	126,247,696	133,822,558	141,851,911	739,383,765
	Promotional material and outreach activities	84,800,000	89,888,000	95,281,280	100,998,157	107,058,046	113,481,529	591,507,012
	Staff time for investment promotion (2 additional staff)	15,264,000	16,179,840	17,150,630	18,179,668	19,270,448	20,426,675	106,471,262
4.3.3	Development of PPP and alternative models	0	0	0	0	0	0	0
	Technical assistance for profiling and mapping potential zones and models of investment	31,800,000	33,708,000	35,730,480	37,874,309	40,146,767	42,555,573	221,815,129
	Technical assistance for identification of potential investors in agriculture	25,440,000	26,966,400	28,584,384	30,299,447	32,117,414	34,044,459	177,452,104
	Staff time/technical assistance for facilitation for land acquisition, water, and energy	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Training and capacity building on PPP models and implementation	21,200,000	22,472,000	23,820,320	25,249,539	26,764,512	28,370,382	147,876,753
	Staff time/technical assistance for cooperation with relevant ministries on tax incentives, concessionary loans, and other incentives	7,632,000	8,089,920	8,575,315	9,089,834	9,635,224	10,213,338	53,235,631
	Technical assistance and establishment of the Agricultural Development Fund (individual windows are financed under different priority areas)	10,600,000	11,236,000	11,910,160	12,624,770	13,382,256	14,185,191	73,938,376

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
4.4	Planning, coordination, and budgeting	11,146,430,000	11,815,215,800	12,524,128,748	13,275,576,473	14,072,111,061	14,916,437,725	77,749,899,807
4.4.1	Planning and budgeting	0	0	0	0	0	0	0
	Sectoral planning meetings	4,240,000	4,494,400	4,764,064	5,049,908	5,352,902	5,674,076	29,575,351
	Programme and project development meetings	10,600,000	11,236,000	11,910,160	12,624,770	13,382,256	14,185,191	73,938,376
	Budgeting meetings	10,600,000	11,236,000	11,910,160	12,624,770	13,382,256	14,185,191	73,938,376
	Technical assistance for project formulation and appraisal	15,900,000	16,854,000	17,865,240	18,937,154	20,073,384	21,277,787	110,907,565
	Technical assistance for capacity building in project development	15,900,000	16,854,000	17,865,240	18,937,154	20,073,384	21,277,787	110,907,565
4.4.2	Synergies and Coordination	0	0	0	0	0	0	0
	Intra-sectoral coordination meetings	31,800,000	33,708,000	35,730,480	37,874,309	40,146,767	42,555,573	221,815,129
	Support forums for farmers	10,600,000,000	11,236,000,000	11,910,160,000	12,624,769,600	13,382,255,776	14,185,191,123	73,938,376,499
	Inter-sectoral coordination meetings	25,440,000	26,966,400	28,584,384	30,299,447	32,117,414	34,044,459	177,452,104
	Policy dialogue events	13,250,000	14,045,000	14,887,700	15,780,962	16,727,820	17,731,489	92,422,971
	Joint planning	15,900,000	16,854,000	17,865,240	18,937,154	20,073,384	21,277,787	110,907,565
	Training on mainstreaming	53,000,000	56,180,000	59,550,800	63,123,848	66,911,279	70,925,956	369,691,882
	Technical assistance on mainstreaming	349,800,000	370,788,000	393,035,280	416,617,397	441,614,441	468,111,307	2,439,966,424
4.5	M&E&L, Information Systems, and Statistics	3,088,946,000	6,671,824,440	7,101,909,306	2,022,614,338	2,355,410,839	1,917,695,988	23,158,400,911

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
4.5.1	M&E&L	0	0	0	0	0	0	0
	Training on M&E	7,950,000	8,427,000	11,910,160	9,468,577	10,036,692	14,185,191	61,977,620
	Technical assistance for sectoral analysis and impact assessment	25,440,000	26,966,400	38,112,512	30,299,447	32,117,414	45,392,612	198,328,384
	Technical assistance/staff time to capture best practices and lessons learnt	15,264,000	16,179,840	22,867,507	18,179,668	19,270,448	27,235,567	118,997,031
	Internal knowledge sharing events	12,720,000	13,483,200	19,056,256	15,149,724	16,058,707	22,696,306	99,164,192
	External communication on improved approaches, best practices, tools, etc.	7,950,000	8,427,000	11,910,160	9,468,577	10,036,692	14,185,191	61,977,620
	Impact Evaluations	636,000,000	449,440,000	238,203,200	252,495,392	535,290,231	0	2,111,428,823
	ICT equipment for data collection	6,360,000	5,393,280	7,146,096	7,574,862	4,014,677	4,255,557	34,744,472
	Upgrading of M&E system	152,640,000	161,798,400	171,506,304	181,796,682	192,704,483	204,266,752	1,064,712,622
	Training on M&E	2,650,000	2,809,000	2,977,540	3,156,192	3,345,564	3,546,298	18,484,594
	Women Empowerment in Agriculture Index survey	0	89,888,000	0	0	0	113,481,529	203,369,529
4.5.2	Smart Agricultural Information Systems (SAIS) and Statistical Capacity	0	0	0	0	0	0	0
	Development of an integrated agricultural statistics platform	4,240,000	4,494,400	4,764,064	5,049,908	5,352,902	5,674,076	29,575,351
	ICT equipment for data collection	3,180,000	3,370,800	3,573,048	3,787,431	4,014,677	4,255,557	22,181,513
	Training on SAIS	5,300,000	5,618,000	5,955,080	6,312,385	6,691,128	7,092,596	36,969,188
	Developing and maintaining common data warehouse (per SAIS implementation plan)	198,220,000	229,214,400	92,899,248	64,386,325	141,851,911	80,855,589	807,427,474

	Item	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Total
	Satellite and drone imagery (per SAIS implementation plan)	91,160,000	134,832,000	107,191,440	121,197,788	136,499,009	153,200,064	744,080,301
	Land profiling and farmer registration (per SAIS implementation plan)	1,060,000,000	1,123,600,000	1,191,016,000	100,998,157	120,440,302	141,851,911	3,737,906,370
	Input distribution system (per SAIS implementation plan)	0	112,360,000	23,820,320	25,249,539	26,764,512	28,370,382	216,564,753
	Farmer feedback system (per SAIS implementation plan)	0	101,124,000	3,692,149,600	12,624,770	0	21,277,787	3,827,176,156
	Livestock registration system (per SAIS implementation plan)	95,400,000	3,370,800,000	595,508,000	252,495,392	133,822,558	0	4,448,025,950
	Coordination meetings with NISR	6,360,000	6,741,600	7,146,096	7,574,862	8,029,353	8,511,115	44,363,026
	Statistical surveys to support SAS	106,000,000	112,360,000	119,101,600	126,247,696	133,822,558	141,851,911	739,383,765
4.5.3	Agriculture sector visibility and Public Relations	0	0	0	0	0	0	0
	Organising exhibitions, agriculture open days, study tours & field visits	148,400,000	157,304,000	166,742,240	176,746,774	187,351,581	198,592,676	1,035,137,271
	Production of branded visibility and promotional materials	31,800,000	26,966,400	38,112,512	30,299,447	32,117,414	45,392,612	204,688,384
	Organizing community outreach and sensitization/awareness campaigns	74,200,000	78,652,000	83,371,120	88,373,387	93,675,790	99,296,338	517,568,635
	Generation and dissemination information through mass media (On-line, print, Radio, and TV programs)	312,912,000	331,686,720	351,587,923	372,683,199	395,044,191	418,746,842	2,182,660,874
	Generation and dissemination of information through social media (Twitter, Facebook, YouTube, Instagram, Flickr)	5,300,000	5,618,000	5,955,080	6,312,385	6,691,128	7,092,596	36,969,188
	Strengthening the capacity of Rwandan journalists working on agriculture related assignments	79,500,000	84,270,000	89,326,200	94,685,772	100,366,918	106,388,933	554,537,824

ANNEX 4: PROGRAMME STRUCTURE

Programs	Sub Programmes	Outputs	Implementing Institution
Outcome1. Farmers and rural value chain actors are engaged in innovative agricultural practices and improved business management			
Priority 1: Innovation and Extension		Outputs	
1. AGRICULTURE RESEARCH AND EXTENSION	1.1. Research and Innovation	1. Improved research capacity developed, and innovative research findings produced	
	1.2. Extension Services and Technology Adaptation and Skills Development	1. Effective extension services established and implemented 2. Skills developed for agriculture value chain actors, including farmer organisations, women, and youth	RAB
Outcome2. Increased productivity, nutritional value and resilience through sustainable, diversified, and integrated crop, livestock, and fish production systems			
Priority 2: Productivity and Resilience		Outputs	
2: SUSTAINABLE CROPS AND ANIMAL RESOURCES PRODUCTION AND PRODUCTIVITY	2.1. Sustainable, Diversified and Climate Smart Crop Production and Productivity	1. Sustainable, diversified, and climate smart crop practices implemented 2. Effective and efficient irrigation developed under an IWRM framework	RAB
	2.2. Sustainable Animal Resources Production and Productivity	1. Animal resources and fisheries production systems improved	RAB
	2.3. Nutrition sensitive agriculture and Resilience Mechanisms	1. Nutrition sensitive agriculture enhanced 2. Mechanisms for increased resilience developed and implemented	RAB

Programs	Sub Programmes	Outputs	Implementing Institution
Outcome1. Farmers and rural value chain actors are engaged in innovative agricultural practices and improved business management			
Priority 1: Innovation and Extension		Outputs	
Outcome 3: Increased competitiveness and value addition of diversified agricultural commodities for more inclusive domestic and international markets			
Priority 3: Inclusive Markets and Value Addition		Outputs	
3: VALUE ADDITION AND COMPETITIVENESS OF CROPS AND ANIMAL RESOURCES	3.1. Food Systems for domestic market supply	1. Agricultural Market Risk management systems and Financial Services developed	MINAGRI Central
	3.2. Traditional Export Crop Development	1. Strengthened partnership in the commercialisation of agriculture sector value chains products	NAEB
	3.3. Export Diversification		NAEB
	3.4. Quality Assurance and Regulation	1. Quality Assurance and Regulation mechanisms established	MINAGRI Central
	3.5. Farmers Market linkages infrastructures	1. Strengthened agricultural market linkages and market infrastructure	RAB

Outcome 4: Effective and efficient public and private sector services delivery in the agriculture sector			
Priority 4: Enabling Environment and Responsive Institutions		Outputs	
4: ENABLING ENVIRONMENT AND RESPONSIVE INSTITUTIONS	4.1. Agriculture Sector Planning, Coordination, Financing, and Information Systems	1. Sector Institutions strengthened to become responsive to stakeholder needs	MINAGRI Central
		2. Evidence-based policies and regulatory framework developed and implemented	
		3. Effective planning, coordination, and budgeting systems in place	
	4.2. Animal Resources Policy, Strategies Development and monitoring of their implementation	4. Monitoring, evaluation, and evidence-based knowledge management and learning undertaken, supported by effective information systems	
4.3. Crop Policy and Strategies Development and monitoring of their implementation			
Outcome 5. Improved efficiency of the Institution through the provision of better administrative and management support services			MINAGRI Central, RAB and NAEB
5. ADMINISTRATION AND SUPPORT SERVICES	1. Administration and Support Services	MINAGRI Central, RAB and NAEB	

ANNEX 5: JOINT IMIHIGO ITEMS

Colour coding	Green means the institution plays a key role for implementation																
	Yellow means the institution plays a n important role for implementation																
	Blue means the institution is relevant for implementation																
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
Innovation and Extension	Upgrading of research stations, post-harvest research facilities and laboratories, maintenance of laboratories, and purchase lab equipment	Green	Yellow	Yellow				Yellow		Green		Green				Green	
	Conservation of plant & animal genetic resources	Green	Yellow					Yellow		Green						Green	
	Seed drying, sorting, treatment, and storage facilities	Green	Blue							Green		Green				Green	Green
	Upgrading greenhouses and hydroponic facilities	Green	Blue					Yellow		Green						Green	Green

Colour coding		Green means the institution plays a key role for implementation															
		Yellow means the institution plays a n important role for implementation															
		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINSANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	Rewarding system for outstanding scientists' achievements																
	Support ICT4Agriculture innovations and initiatives and purchase ICT equipment ICT/Upgrading MINAGRI websites/Extension website (Noz'Ubuhinzi), call centre: Collection of feedback from farmers and other stakeholders																
	Pilot for a competitiveness hub at RAB and challenge fund																

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		Yellow means the institution plays a n important role for implementation																
		Blue means the institution is relevant for implementation																
Priority Areas	Item	Stakeholders																
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs	
	to promote development and testing of innovations developed under partnerships/PPPs																	
	Scientists access to high world-class research facilities, exchange visits of world leading scientists or staff/technical assistance time																	
	Joint supervision of postgraduates' students/research and Limnology studies and acquisition of patents and																	

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		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/Academicians	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	licensing through networks																
	Upscale agroforestry and evergreen agriculture practices for climate change adaptation and urban forestry through promoting fruit trees																
	Set-up a national extension coordination unit in RAB and technical backstopping and FFS activities supervision																

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		Yellow means the institution plays a n important role for implementation																
		Blue means the institution is relevant for implementation																
Priority Areas	Item	Stakeholders																
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROFEM	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs	
	Operational planning and review meetings at sector level: 400 SECTORS																	
	Research & innovation into use platforms, coordination and relation building meetings between producers and private extension workers																	
	Capacity building to provide support services to fisheries and aquaculture, to FFS facilitators, for gender responsiveness																	

Colour coding		Green means the institution plays a key role for implementation															
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		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	and targeting in extension (FPs and FFSEs, district/RAB extension staff) and for improving veterinary extension services (master trainers/ RAB extension staff)																
	Capacity building on management, organizational and entrepreneurial capacities of farmer organization and cooperatives to provide services to their members																

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		Yellow means the institution plays a n important role for implementation															
		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROFESS	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	Technical assistance for developing a performance-based incentives mechanism																
	Technical assistance for updating training curriculum and materials to integrate crosscutting themes, development of extension materials																
	Incentive scheme for farmers to access private sector-delivered support services																

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		Yellow means the institution plays a n important role for implementation															
		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	Exchange visits of farmer organizations and cooperatives																
	Capacity building for developing skills and promoting increased involvement of women in agribusiness and for business incubation																
	Capacity building for developing leadership and management skills for women and introducing a fund for support to agribusiness project for																

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		Yellow means the institution plays a n important role for implementation																
		Blue means the institution is relevant for implementation																
Priority Areas	Item	Stakeholders																
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROFEM	MINEDUC/Academicians	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs	
	women and for youth start-ups																	
Productivity and Resilience	Terracing and other erosion control measures																	
	Promotion of adapted seeds adoption and training for adoption of resilient cropping practices																	
	Biological soil conservation practices development																	
	Update of seed and fertilizers (including the organic fertilizer) needs																	

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		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	assessment and quantity forecast, adapted supply planning through private agro dealership (coops included)																
	Pest and disease surveillance and IPM promotion, technical assistance for situational assessment and training farmers on safe handling and disposal, avail equipment and tools, establish demonstration centre for dissemination of adapted technologies																

Colour coding	Green means the institution plays a key role for implementation																		
	Yellow means the institution plays an important role for implementation																		
	Blue means the institution is relevant for implementation																		
Priority Areas	Item	Stakeholders																PRIVATE SECTOR	CSOs
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB				
	Development of hillsides and marshlands irrigation within an Integrated Water Resources Management Framework: including protected irrigated areas and development of hillside and marshland irrigation and small-scale irrigation and water harvesting.	Green	Green	Green				Green		Green		Yellow					Green	Green	
	Feasibility and standards study for irrigation systems rehabilitation	Green	Blue	Green				Green		Green		Yellow					Yellow	Green	

Colour coding		Green means the institution plays a key role for implementation															
		Yellow means the institution plays a n important role for implementation															
		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/Academicians	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	and improvement and water management and maintenance trainings to technicians and WUAs	Green	Blue	Green			Yellow	Green		Green		Yellow				Yellow	Green
	Technical assistance for PPPP (4P) model development and promotion of combined better practices tanks to irrigation (techniques, new varieties, drainage, improved cropping schedule)	Green	Blue	Green		Green	Blue	Green		Green		Yellow			Green		Green

Colour coding		Green means the institution plays a key role for implementation															
		Yellow means the institution plays a n important role for implementation															
		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	Support to biosafety control (HACCP) and establishment of standard norms for Animal Feed Quality. Establishment of appropriate storage facilities for raw material to supply feed processing industries																
	Support to improved forage/fodder seed multipliers: improving grazing land through over-sowing with proper feeding through																

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		Yellow means the institution plays a n important role for implementation																
		Blue means the institution is relevant for implementation																
Priority Areas	Item	Stakeholders																
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs	
	forage/fodder seed and avail required technologies through users' capacity building for forage harvesting and conservation.																	
	Support to Livestock Watering Infrastructures (LWI)																	
	Support to establish Livestock-Farmer Field School (in all species) and establish a digitalized (SMS & web based) tracking system																	

Colour coding		Green means the institution plays a key role for implementation																
		Yellow means the institution plays a n important role for implementation																
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Priority Areas	Item	Stakeholders																
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/Academicians	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs	
	for key livestock service delivery																	
	Forage/Fodder bank set up, support to upgrade Rubirizi national veterinary laboratory and satellite laboratories																	
	Support to animal quarantine, diagnostic capacity building of laboratories, quarantine stations systems control, quarantine stations market systems control, support																	

Colour coding		Green means the institution plays a key role for implementation																
		Yellow means the institution plays a n important role for implementation																
		Blue means the institution is relevant for implementation																
Priority Areas	Item	Stakeholders																
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGPROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs	
	community animal health workers and farmers organisations in primary health																	
	Enhance, establish, and enforce procedure and system for animal disease control and animal products (identification, traceability, animal information sharing and movement of animals), support development and preparation of the dossier to submit for																	

Colour coding		Green means the institution plays a key role for implementation															
		Yellow means the institution plays a n important role for implementation															
		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	status free from FMD, PPR, CBPP, ASF																
	Support to animal vaccination campaign for major diseases. promotion of One Health framework																
	Support to strengthen animal health research (casual labours, animals, materials, infrastructure, and required lab equipment)																

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		Yellow means the institution plays a n important role for implementation																
		Blue means the institution is relevant for implementation																
Priority Areas	Item	Stakeholders																
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs	
	Upgrade national bull station for quality bulls, knowledge, technologies, methods, and facilities to produce sufficient quality semen. Improve & increase bovine artificial insemination and support to acquisition of AI inputs and training to breeding practices.																	
	Support to strengthen livestock conservation and breeding research centres																	

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		Yellow means the institution plays a n important role for implementation															
		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/Academicians	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	(researchers, casual labourers, animals, materials, infrastructure, and required lab equipment)																
	Establish standard operating procedures of hatcheries and animal breeder farms. Support for the introduction of processing equipment for cooperatives																
	Support increased fingerlings production, restocking of lakes and ponds																

Colour coding		Green means the institution plays a key role for implementation															
		Yellow means the institution plays a n important role for implementation															
		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	(transporting, oxygen, etc.), support cooperatives for the creation of storage and processing units																
	Training for bees and commercial insect production, support to queen rearing and colonies multiplication, distribution of improved hives, support for the introduction of honey and bee products processing equipment for cooperatives																

Colour coding	Green means the institution plays a key role for implementation																		
	Yellow means the institution plays a n important role for implementation																		
	Blue means the institution is relevant for implementation																		
Priority Areas	Item	Stakeholders																PRIVATE SECTOR	CSOs
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB				
	Technical assistance for promotion of PPP models for food fortification, technical assistance for promotion of iron fortified beans	Green	Green		Yellow		Yellow			Green		Green			Green		Green		
	Technical assistance for expanding kitchen garden programme to promote more diversified diets at household level, pilot nutrition campaign in kitchen gardens and expansion of school gardens,	Green	Green	Green			Green	Green			Blue	Green					Green		

Colour coding		Green means the institution plays a key role for implementation															
		Yellow means the institution plays a n important role for implementation															
		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/Academicians	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	sourcing of locally produced food for school feeding programme, promote urban horticulture and agro-forestry.																
	Nutrition education for rural households, technical assistance for integrating nutrition education as part of school curriculum, training for integrating nutrition education as part of school curriculum																

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		Blue means the institution is relevant for implementation																
Priority Areas	Item	Stakeholders																
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINSANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/Academicians	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs	
	Asset transfer scheme implementation : (Girinka and small livestock), package (Girinka & small stock) and compensation scheme set up, restocking of animal herd																	
Inclusive Markets and Value Addition	Reduce post-harvest losses: data collection and dissemination, technical assistance for post-harvest and pre-processing, capacity building, production and dissemination of																	

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		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	post-harvest handling technology, awareness raising to facilitate private sector investment.																
	Technical assistance and capacity building to cooperatives on marketing and aggregation services, capacity building to cooperatives on improved standards, grading and technology, registration, and support to																

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		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	collection centres																
	Technique assistance for profiling agricultural export commodities, on improved quality, grading systems and embedded service provision, for e-Soko patch development and operationalization																
	Competitive fund to facilitate private sector in																

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		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	input and service markets (fertiliser blending, seed production, animal feed, etc.), and to facility agro dealer network																
	Awareness raising on within government structures, equipment, and software for e-Soko Patch development and operationalization																
	Technical assistance for developing and launching the e-Soko+ operating system+ MIS,																

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	Yellow means the institution plays an important role for implementation																
	Blue means the institution is relevant for implementation																
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	and data collection for operating e-Soko+																
	Construction, rehabilitation, provision of equipment's and maintenance of drying grounds, construction, rehabilitation, provision of equipment's and maintenance of metallic silos, collection centres, export logistics warehouses, wholesale market with sorting and grading																

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Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	equipment, cross border and rural community markets and cold chain facilities																
	Capacity building and awareness raising on benefits of risk management and transfer mechanisms																
	Enhanced cooperation with MINEACOM in pricing mechanisms and regular surveys on production, processing, and																

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		Yellow means the institution plays a n important role for implementation																
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Priority Areas	Item	Stakeholders																
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINSANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs	
	export costs and upgrading pricing mechanisms																	
	Grain reserves purchasing (for 10% of population for 3 months - 2kg/hh/day grain + 0.75kg/hh/day beans)																	
	Upgrade the capacities of personnel on private standards (Global GAP, Organic certification, Rain forest alliance, UTZ, ISO Standards, Fair Trade etc...)																	

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Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	capacity building on Sanitary and Phytosanitary measures (SPS measures) and private certification	Green	Green		Green	Yellow				Green						Green	Green
	Incinerators (Maintain conducive environment by destroying unwanted products), quarantine stations (at Kigali airports, cross border stations (Gatuna, Rusumo &Kagitumba), pest scan detectors	Green	Green		Green			Yellow		Green						Green	Green

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		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROFEMP	MINEDUC/Academicians	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	Upgrading post quarantine laboratory, organoleptic laboratories for tea and coffee, chemical laboratories for pesticide residue, essential oil components and fertiliser quality, Memorandum of Understanding for Laboratory Usage																
Enabling Environment and Responsiv	Technical assistance on organisational reform, for updating ASCBP, for functional review of public																

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Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	services, for developing improvement plans, trainings for public sector institutions																
	Technical assistance for the creation and start-up of the policy unit, training on policy analysis and development, and training on macroeconomic analysis and development																
	Policy and regulatory frameworks and strategies developed or revised and policy																

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Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	consultations and policy dialogue events																
	Technical assistance for review and development of selected schemes and mechanisms: investment appraisal, seeds subsidies, fertilizers																
	ALIS support (agri land information system) annual support, technical assistance on land-use planning, and on modalities, and																

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Priority Areas	Item	Stakeholders																
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs	
Enabling Environment and Responsive Institutions	for land-use and zoning																	
	Facilitating and convening value chain platforms for priority value chains at national level and district level																	
	Technical assistance for profiling and mapping potential zones of investment and for identification of potential investors in agriculture and training and capacity building on PPP																	

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Priority Areas	Item	Stakeholders																
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs	
	models and implementation	Green	Green	Blue	Green		Blue	Blue		Green					Green	Green	Green	
	Sectoral planning and budgeting meetings, intra and intersectoral coordination meetings and mainstreaming crosscuttings issues meetings	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	
	Technical assistance for project formulation and appraisal and for capacity building in project development	Green								Green						Green	Green	

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		Yellow means the institution plays a n important role for implementation															
		Blue means the institution is relevant for implementation															
Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/Academicians	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	Technical assistance for sectoral analysis and impact assessment, to capture best practices and lessons learnt, internal knowledge sharing events																
	ICT equipment for data collection, upgrading of M&E system (incentive to data collectors),																
	SAIS implementation plan: developing and maintaining common data warehouse, satellite and drone imagery,																

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	Yellow means the institution plays a n important role for implementation																		
	Blue means the institution is relevant for implementation																		
Priority Areas	Item	Stakeholders																PRIVATE SECTOR	CSOs
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROFEM	MINEDUC/ Academics	MIFOTRA	NISR	RDB				
	land profiling and farmer registration, input distribution system, farmer feedback system, livestock registration system	Green	Green	Blue	White	White	Green	Green	Blue	Green	White	Green	White	Green	White	Green	Green		
	Statistical surveys to support SAS: Women Empowerment in Agriculture Index survey, development of an integrated agricultural statistics platform, impact evaluation for MINAGRI	Green	Green	Green	Green	White	Green	Green	White	Green	Blue	Green	White	Green	Green	Green	Green		

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Priority Areas	Item	Stakeholders															
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGEPROFE	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs
	Projects (RSSP; RCSP; FRDP; PRICE; PASP; RDDP; BUFFET; GAKO; SGR), coordination meetings with NISR																
	Production of branded visibility and promotional materials, strengthening the capacity of Rwandan journalists working on agriculture related assignments																
	Dissemination of information through mass media (on-line, print, radio, and																

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Priority Areas	Item	Stakeholders																
		MINECOFIN	MINALOC	MININFRA	MINEACO	MINISANTE	MINILAF	MOE	MYICT	MINAGRI	MIGROF	MINEDUC/ Academics	MIFOTRA	NISR	RDB	PRIVATE SECTOR	CSOs	
	TV programs), social media (Twitter, Facebook, YouTube, Instagram, Flickr)																	

ANNEX 6: DATA SUMMARY
Area under cultivation by major crops (ha.)

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2030	2035	2050
Maize	237,658	237,658	237,658	237,658	237,658	237,658	237,658	237,658	237,658	237,658	237,658	237,658	237,658
Sorghum	165,872	165,872	165,872	165,872	165,872	165,872	165,872	165,872	165,872	165,872	165,872	165,872	165,872
Paddy rice	33,431	34,724	35,199	39,953	40,429	45,183	45,658	50,412	50,888	55,642	45,545	45,545	45,545
Wheat	11,631	11,631	11,631	11,631	11,631	11,631	11,631	11,631	11,631	11,631	11,631	11,631	11,631
Cassava	565,853	565,853	565,853	565,853	565,853	565,853	565,853	565,853	565,853	565,853	565,853	565,853	565,853
Sweet Potatoes	135,574	135,574	135,574	135,574	135,574	135,574	135,574	135,574	135,574	135,574	135,574	135,574	135,574
Irish Potatoes	106,236	106,236	106,236	106,236	106,236	106,236	106,236	106,236	106,236	106,236	106,236	106,236	106,236
Yams & Taro	40,103	40,103	40,103	40,103	40,103	40,103	40,103	40,103	40,103	40,103	40,103	40,103	40,103
Cooking Banana	229,490	229,490	229,490	229,490	229,490	229,490	229,490	229,490	229,490	229,490	229,490	229,490	229,490
Dessert banana	71,562	71,562	71,562	71,562	71,562	71,562	71,562	71,562	71,562	71,562	71,562	71,562	71,562
Banana for beer	331,613	331,613	331,613	331,613	331,613	331,613	331,613	331,613	331,613	331,613	331,613	331,613	331,613
Beans	508,624	508,624	508,624	508,624	508,624	508,624	508,624	508,624	508,624	508,624	508,624	508,624	508,624
Groundnuts	26,064	26,064	26,064	26,064	26,064	26,064	26,064	26,064	26,064	26,064	26,064	26,064	26,064
Soya beans	45,545	45,545	45,545	45,545	45,545	45,545	45,545	45,545	45,545	45,545	45,545	45,545	45,545
Vegetables	28,262	28,262	28,262	28,262	28,262	28,262	28,262	28,262	28,262	28,262	28,262	28,262	28,262
Fruits	16,742	16,742	16,742	16,742	16,742	16,742	16,742	16,742	16,742	16,742	16,742	16,742	16,742

Projected yields (MT/ha)

	2016/17	2017/2018	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Maize	1.43	1.57	1.75	1.96	2.22	2.53	2.90	3.20
Sorghum	1.11	1.16	1.22	1.28	1.35	1.42	1.49	1.56
Paddy rice	3.32	3.34	3.36	3.39	3.42	3.45	3.48	3.52
Wheat	0.85	0.88	0.90	0.93	0.96	0.99	1.02	1.05
Cassava	1.73	2.29	2.71	3.20	3.77	4.45	5.25	6.19
Sweet Potatoes	6.65	6.85	7.06	7.27	7.49	7.71	7.94	8.18
Irish Potatoes	6.38	7.15	8.00	8.96	10.04	11.25	12.59	14.00
Yams & Taro	3.88	4.07	4.19	4.32	4.45	4.58	4.72	4.86
Cooking banana	3.36	3.70	4.07	4.47	4.92	5.41	5.95	6.55
Banana Desert	2.62	2.89	3.18	3.49	3.84	4.23	4.65	5.11
Banana for beer	2.82	3.11	3.42	3.76	4.13	4.55	5.00	5.50
Beans	1.03	1.11	1.20	1.30	1.40	1.51	1.63	1.77
Groundnuts	0.44	0.46	0.48	0.51	0.53	0.56	0.59	0.62
Soya beans	0.48	0.51	0.53	0.56	0.59	0.62	0.65	0.68
Vegetables	9.36	9.55	9.74	9.94	10.13	10.34	10.54	10.76
Fruits	2.72	2.86	3.00	3.15	3.31	3.48	3.65	3.83

Projected production MT

	2016/17	2017/2018	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Maize	340,326	373,123	415,902	465,810	527,601	601,275	689,208	760,506
Sorghum	183,952	193,150	202,807	212,947	223,595	234,775	246,513	258,839
Paddy rice	110,824	115,854	118,269	135,286	138,067	155,755	159,025	177,584
Wheat	9,921	10,219	10,525	10,841	11,166	11,501	11,846	12,202
Cassava	979,152	979,152	1,295,803	1,533,462	1,810,730	2,133,266	2,518,046	2,970,728
Sweet Potatoes	901,838	928,893	956,760	985,463	1,015,027	1,045,478	1,076,842	1,109,147
Irish Potatoes	677,892	759,239	850,348	952,389	1,066,676	1,194,677	1,338,038	1,487,304
Yams & Taro	155,519	163,295	168,194	173,240	178,437	183,790	189,304	194,983
Cooking Banana	771,086	848,195	933,015	1,026,316	1,128,948	1,241,842	1,366,027	1,502,629
Dessert banana	187,814	206,596	227,256	249,981	274,979	302,477	332,725	365,997
Banana for beer	936,475	1,030,123	1,133,135	1,246,448	1,371,093	1,508,203	1,659,023	1,824,925
Beans	523,883	565,793	611,057	659,941	712,737	769,756	831,336	897,843
Groundnuts	11,416	11,987	12,586	13,215	13,876	14,570	15,299	16,064
Soya beans	21,953	23,050	24,203	25,413	26,684	28,018	29,419	30,890
Vegetables	264,617	269,909	275,308	280,814	286,430	292,159	298,002	303,962
Fruits	45,614	47,894	50,289	52,803	55,444	58,216	61,127	64,183
Milk	776,284	855,164	934,044	1,012,924	1,091,803	1,170,683	1,249,563	1,274,554
Beef	42,696	44,515	46,547	48,813	51,328	54,113	57,035	59,887

Goat	12,255	13,297	14,427	15,653	16,984	18,428	19,165	20,456
Sheep	2,771	2,932	3,102	3,282	3,473	3,674	3,747	3,949
Poultry	15,026	18,421	21,614	25,388	29,859	35,170	40,586	42,209
Pork	17,797	21,525	23,677	27,591	37,420	67,676	77,151	78,684
Eggs	7,475	8,720	9,965	11,211	13,078	14,946	16,814	19,403
Fish	26,500	35,000	45,000	65,000	90,000	100,000	112,000	127,681
Honey	5,535	5,889	6,242	6,595	6,988	7,302	7,655	8,611
Rabbit	5,913	6,397	6,880	7,364	7,848	8,331	8,815	9,873
Coffee	23,000	24,500	26,000	27,000	29,000	29,500	31,000	32,500
Tea	28,000	30,240	32,659	35,109	37,566	40,572	43,817	46,361
Pyrethrum	30	40	50	57	67	73	80	84

Post-harvest Losses %

	2015/16	2016/17	2017/2018(Baseline)	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Maize	26.5	26.5	26.5	26.5	23.9	21.5	19.3	17.4	13.3
Sorghum	26.5	26.5	26.5	26.5	23.9	21.5	19.3	17.4	13.3
Paddy rice	17.7	17.7	17.7	17.7	15.9	14.3	12.9	11.6	8.9
Wheat	25.0	25.0	25.0	25.0	22.5	20.3	18.2	16.4	12.5
Cassava	43.0	43.0	43.0	43.0	38.7	34.8	31.3	28.2	21.5
Sweet Potatoes	30.0	30.0	30.0	28.0	26.0	24.0	22.0	20.0	18.0
Irish Potatoes	45.5	45.5	45.5	45.5	41.0	36.9	33.2	29.9	22.8
Yams & Taro	20.0	20.0	20.0	18.0	16.0	14.0	12.0	10.0	8.0
Cooking Banana	15.0	15.0	15.0	14.0	13.0	12.0	11.0	10.0	9.0
Dessert banana	15.0	15.0	15.0	14.0	13.0	12.0	11.0	10.0	9.0
Banana for beer	15.0	15.0	15.0	14.0	13.0	12.0	11.0	10.0	9.0
Beans	15.0	15.0	15.0	15.0	13.5	12.2	10.9	9.8	7.5
Groundnuts	20.0	20.0	20.0	18.0	16.0	14.0	12.0	10.0	8.0
Soya beans	15.0	15.0	15.0	15.0	13.5	12.2	10.9	9.8	7.5
Vegetables	45.5	45.5	45.5	45.5	41.0	36.9	33.2	29.9	22.8
Fruits	40.0	40.0	40.0	38.0	36.0	34.0	32.0	30.0	28.0

Projected annual growth in net production

	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Average annual growth
Maize	11.5%	12.0%	13.3%	14.0%	14.6%	10.3%	12.6%
Sorghum	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Paddy rice	2.1%	14.4%	2.1%	12.8%	2.1%	11.7%	7.4%
Wheat	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Cassava	32.3%	18.3%	18.1%	17.8%	18.0%	18.0%	20.3%
Sweet Potatoes	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Irish Potatoes	12.0%	12.0%	12.0%	12.0%	12.0%	11.2%	11.9%
Yams & Taro	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Cooking Banana	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Dessert banana	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Banana for beer	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Beans	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%
Groundnuts	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Soya beans	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Vegetables	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Fruits	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Milk	9.2%	8.4%	7.8%	7.2%	6.7%	2.0%	6.9%
Beef	4.6%	4.9%	5.2%	5.4%	5.4%	5.0%	5.1%
Goat	8.5%	8.5%	8.5%	8.5%	4.0%	6.7%	7.4%

	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Average annual growth
Sheep	5.8%	5.8%	5.8%	5.8%	2.0%	5.4%	5.1%
Poultry	17.3%	17.5%	17.6%	17.8%	15.4%	4.0%	14.8%
Pork	10.0%	16.5%	35.6%	80.9%	14.0%	2.0%	24.1%
Eggs	14.3%	12.5%	16.7%	14.3%	12.5%	15.4%	14.3%
Fish	28.6%	44.4%	38.5%	11.1%	12.0%	14.0%	24.1%
Honey	6.0%	5.7%	6.0%	4.5%	4.8%	12.5%	6.5%
Rabbit	7.6%	7.0%	6.6%	6.2%	5.8%	12.0%	7.5%
Coffee	6.1%	3.8%	7.4%	1.7%	5.1%	4.8%	4.8%
Tea	8.0%	7.5%	7.0%	8.0%	8.0%	5.8%	7.4%
Pyrethrum	25.0%	14.0%	17.5%	9.0%	9.6%	5.1%	13.2%

Net Production (MT)

	2016/17	2017/2018	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Maize	250,140	274,245	305,688	342,370	401,768	472,211	556,064	628,279
Sorghum	135,205	141,965	149,063	156,516	170,267	184,380	198,891	213,836
Paddy rice	91,208	95,348	97,336	111,341	116,073	133,424	138,505	156,962
Wheat	7,441	7,664	7,894	8,131	8,654	9,172	9,687	10,200
Cassava	558,117	558,117	738,608	874,073	1,109,977	1,390,249	1,728,714	2,132,617
Sweet Potatoes	631,287	650,225	669,732	709,533	751,120	794,563	839,937	887,318
Irish Potatoes	369,451	413,785	463,439	519,052	629,872	754,379	894,218	1,043,306
Yams & Taro	124,416	130,636	134,555	142,057	149,887	158,060	166,588	175,485
Cooking Banana	655,423	720,966	793,062	882,632	982,184	1,092,821	1,215,764	1,352,366
Dessert banana	159,642	175,607	193,167	214,984	239,232	266,180	296,125	329,398
Banana for beer	796,004	875,604	963,165	1,071,946	1,192,851	1,327,218	1,476,530	1,642,433
Beans	445,300	480,924	519,398	560,950	616,517	676,230	740,429	809,482
Groundnuts	9,133	9,589	10,069	10,837	11,656	12,530	13,463	14,457
Soya beans	18,660	19,593	20,572	21,601	23,081	24,614	26,202	27,850
Vegetables	144,216	147,101	150,043	153,044	169,137	184,484	199,156	213,222
Fruits	27,368	28,737	30,173	32,738	35,484	38,422	41,566	44,928
Milk	776,284	855,164	934,044	1,012,924	1,091,803	1,170,683	1,249,563	1,333,758
Beef	42,696	44,515	46,547	48,813	51,328	54,113	57,035	60,115
Goat	12,255	13,297	14,427	15,653	16,984	18,428	19,165	19,932
Sheep	2,771	2,932	3,102	3,282	3,473	3,674	3,747	3,822
Poultry	15,026	18,421	21,614	25,388	29,859	35,170	40,586	46,836

	2016/17	2017/2018	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Pork	17,797	21,525	23,677	27,591	37,420	67,676	77,151	87,952
Eggs	7,475	8,720	9,965	11,211	13,078	14,946	16,814	18,915
Fish	26,500	35,000	45,000	65,000	90,000	100,000	112,000	127,681
Honey	5,535	5,889	6,242	6,595	6,988	7,302	7,655	8,611
Rabbit	5,913	6,397	6,880	7,364	7,848	8,331	8,815	9,873
Coffee	23,000	24,500	26,000	27,000	29,000	29,500	31,000	32,500
Tea	28,000	30,240	32,659	35,109	37,566	40,572	43,817	46,361
Pyrethrum	30	40	50	57	67	73	80	84

Projected growth in revenues (real 2014 prices)

	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	Average annual growth
Food Crops	9.8%	10.3%	12.8%	13.3%	12.7%	12.7%	11.9%
Livestock products	11.0%	13.3%	15.2%	16.3%	9.5%	9.9%	12.5%
Export crops	6.9%	5.4%	7.3%	4.3%	6.3%	5.3%	5.9%
Total	10.2%	11.4%	13.6%	14.4%	11.4%	11.6%	12.1%

Consumption Requirements with population growth and the national food basket defined in EICV4 (MT)

	2016/17	2017/2018	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Maize	205,887	211,964	217,212	222,580	228,065	233,669	239,394	245,235
Sorghum	190,483	196,105	200,960	205,926	211,001	216,186	221,482	226,886
Paddy rice	30,054	30,941	31,707	32,491	33,291	34,110	34,945	35,798
Wheat	-	-	-	-	-	-	-	-
Cassava	1,695,622	1,745,668	1,788,887	1,833,095	1,878,272	1,924,425	1,971,572	2,019,678
Sweet Potatoes	796,686	820,199	840,506	861,277	882,503	904,188	926,340	948,943
Irish Potatoes	210,882	217,107	222,482	227,980	233,598	239,338	245,202	251,185
Yams & Taro	659,805	679,279	696,097	713,299	730,878	748,837	767,184	785,903
Cooking Banana	197,660	203,494	208,532	213,686	218,952	224,332	229,828	235,436
Dessert banana	24,052	24,762	25,375	26,002	26,642	27,297	27,966	28,648
Banana for beer	17,713	18,236	18,688	19,150	19,622	20,104	20,596	21,099
Beans	659,763	679,236	696,052	713,253	730,832	748,790	767,135	785,853
Groundnuts	798	821	841	862	883	905	927	950
Soya beans	3,316	3,414	3,498	3,585	3,673	3,763	3,856	3,950
Vegetables	428,187	440,825	451,739	462,902	474,311	485,965	497,871	510,019
Fruits	520,196	535,550	548,809	562,371	576,231	590,390	604,854	619,613
Milk	100,068	103,022	105,573	108,181	110,848	113,571	116,354	119,193
Beef	294	302	310	318	325	333	342	350
Goat	3,946	4,062	4,163	4,266	4,371	4,478	4,588	4,700
Sheep	7,933	8,167	8,370	8,576	8,788	9,004	9,224	9,449
Poultry	294	302	310	318	325	333	342	350

	2016/17	2017/2018	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Pork	336	346	354	363	372	381	390	400
Eggs	8,143	8,383	8,591	8,803	9,020	9,242	9,468	9,699
Fish	110,772	114,041	116,865	119,753	122,704	125,719	128,799	131,942
Honey	-	-	-	-	-	-	-	-
Rabbit	3,946	4,062	4,163	4,266	4,371	4,478	4,588	4,700

Nutrient value per MT by product

	kcal/MT	proteins (gr/MT)	fats (gr/MT)	Calcium (mg/MT)	Iron (mg/MT)	Phosphor (mg/MT)
Maize	3,560,000	95,000	43,000	490,000	2,700	202,000
Sorghum	3,430,000	101,000	33,000	18,000	4,500	290,000
Paddy rice	3,600,000	67,000	7,000	22,000	1,500	200,000
Wheat	3,640,000	109,000	11,000	480,000	4,900	288,000
Cassava	1,090,000	9,000	2,000	33,000	600	55,600
Sweet Potatoes	920,000	7,000	2,000	46,000	210	47,000
Irish Potatoes	670,000	16,000	1,000	10,000	410	57,000
Yams & Taro	935,000	14,000	2,000	35,000	1,190	76,000
Cooking Banana	750,000	8,000	3,000	5,000	260	22,000
Dessert banana	750,000	8,000	3,000	5,000	260	22,000
Banana for beer	750,000	8,000	3,000	5,000	260	22,000
Beans	3,410,000	221,000	17,000	101,000	7,600	383,000
Groundnuts	5,670,000	257,000	492,000	90,000	2,500	107,000
Soya beans	3,350,000	380,000	180,000	240,000	10,400	-
Vegetables	310,000	11,000	2,000	397,000	750	557,000
Fruits	750,000	8,000	3,000	10,000	400	22,000
Milk	600,000	32,200	32,500	90,000	90,000	200,000
Beef	2,170,000	261,900	118,000	190,000	15,000	800,000
Goat	1,430,000	270,000	30,000	193,000	12,000	3,700,000
Sheep	2,940,000	248,100	210,000	180,000	12,000	1,900,000
Poultry	1,650,000	310,000	36,000	195,000	15,000	1,300,000

	kcal/MT	proteins (gr/MT)	fats (gr/MT)	Calcium (mg/MT)	Iron (mg/MT)	Phosphor (mg/MT)
Pork	2,520,000	270,000	140,000	200,000	30,000	2,200,000
Eggs	1,550,000	130,000	110,000	220,000	60,000	2,100,000
Fish	2,050,000	220,000	120,000	141,000	47,300	3,710,000
Honey	3,040,000	3,000	-	4,000	4,000	690,000
Rabbit	1,460,000	205,000	63,000	150,000	17,000	2,100,000

Projected Nutrient Production

SUMMARY								
Totals	2016/17	2017/2018	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Energy (kcal)	6,914,082,917,191	7,431,058,517,472	8,187,802,277,627	9,056,583,846,731	10,244,221,871,055	11,635,009,177,329	13,095,905,422,454	14,705,863,609,952
Protein (g)	241,647,666,405	263,056,201,660	287,440,859,756	317,119,236,022	357,520,283,817	404,228,899,586	448,155,588,504	495,844,713,454
Fats (g)	78,185,322,870	85,737,317,782	94,062,269,888	104,507,746,162	118,338,010,499	134,165,384,495	148,140,420,203	163,003,597,412
Calcium (mg)	395,566,390,758	425,686,521,125	465,639,710,847	510,606,055,220	579,790,991,302	658,855,219,276	742,770,979,683	825,683,248,191
Iron (mg)	79,633,427,134	87,882,036,109	96,308,096,787	105,327,615,974	115,102,532,154	124,920,797,106	134,307,866,252	144,509,119,093
Phosphor (mg)	918,197,723,162	1,018,100,152,227	1,133,174,899,553	1,295,386,095,466	1,518,699,434,264	1,742,994,349,123	1,933,021,529,590	2,151,128,299,701

Food Needs vs Production

	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Population forecast	11553188	11839420	12100000	12400000	12700000	13100000	13400000	13700000
Energy								
	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Production per person kcal/day	1,640	1,720	1,854	2,001	2,210	2,433	2,678	2,941
Daily recommended intake per kcal/person/day	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
Protein								
	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Production per g/person/day	57	61	65	70	77	85	92	99
Daily recommended intake g/person/day	75	75	75	75	75	75	75	75
Fats								
	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Production per g/person/day	19	20	21	23	26	28	30	33
Daily recommended intake g/per person	50	50	50	50	50	50	50	50
Calcium								
	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Production mg/person/day	94	99	105	113	125	138	152	165
Daily recommended intake mg/person/day	130	130	130	130	130	130	130	130
Iron								
	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Production per mg/person/day	19	20	22	23	25	26	27	29
Daily recommended intake according to WHO (pregnant women) mg/person/day	27	27	27	27	27	27	27	27
Phosphorus								
	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Production mg/person/day	218	236	257	286	328	365	395	430
Daily recommended intake mg/person/day	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000

	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Crops		2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24

Food production on drought resilient irrigated land

		2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
Marshland								
Rice	Area (ha)	32,869	35,569	38,269	40,969	43,669	46,369	49,069
	Yield (ton/ha)	5	5	6	6	6	6	7
	Total production(MT)	161,058	184,958	210,479	237,620	266,380	296,761	333,669
	Energy	376,874,807,400	432,802,375,200	492,520,743,000	556,029,910,800	623,329,878,600	694,420,646,400	780,784,336,800
Maize	Area	19,721	21,341	22,961	24,581	26,201	27,821	29,441
	Yield	4	4	4	5	5	5	6
	Tot. Production	72,969	85,365	98,734	113,074	128,387	144,671	161,927
	Energy	259,769,490,480	303,900,681,600	351,492,192,720	402,544,023,840	457,056,174,960	515,028,646,080	576,461,437,200
Beans	Area	5,916	6,402	6,888	7,374	7,860	8,346	8,832
	Yield	2	2	2	3	3	3	3
	Total production	13,016	14,085	16,532	19,173	22,009	24,205	27,380
	Energy	44,384,847,804	48,030,819,804	56,374,681,968	65,381,448,132	75,051,118,296	82,537,569,378	93,367,321,542
Hillside								
Maize	Area	12,305	15,665	19,025	22,385	25,745	29,105	32,465
	Yield	4	4	4	5	5	5	6
	Tot. Production	45,527	62,658	81,806	102,969	126,149	151,344	178,555
	Energy	162,076,191,200	223,063,904,000	291,228,576,800	366,570,209,600	449,088,802,400	538,784,355,200	635,656,868,000
Beans	Area	3,516	4,476	5,436	6,396	7,356	8,316	9,276
	Yield	2	2	3	3	3	3	3
	Tot. Production	7,734	10,741	14,133	17,908	22,067	26,610	31,537
	Energy	26,374,031,200	36,628,310,400	48,192,029,600	61,065,188,800	75,247,788,000	90,739,827,200	107,541,306,400
Small-scale irrigation								
Maize	Area	5,785	8,425	11,065	13,705	16,345	18,985	21,625
	Yield	2	3	3	3	3	4	4
	Tot. Production	12,727	21,063	30,982	42,486	55,573	70,245	86,500
	Energy	45,309,059,840	74,983,568,000	110,297,116,160	151,249,704,320	197,841,332,480	250,072,000,640	307,941,708,800
Beans	Area	2,893	4,213	5,533	6,853	8,173	9,493	10,813
	Yield	2	2	3	3	3	3	3

		2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
	Tot. Production	6,364	10,110	14,385	19,187	24,518	30,376	36,763
	Energy	21,699,985,120	34,475,591,040	49,051,676,960	65,428,242,880	83,605,288,800	103,582,814,720	125,360,820,640

ANNEX 7: 7 YEAR GOVERNMENT PLAN TARGETS

Overall Objective	Specific Objectives	Indicator	Baseline	2020 target	2024 Target	Key Interventions to achieve targets
Increase the quality, productivity and production of agriculture and livestock						
<i>Outcome: Sustainable increase in crop productivity and farmers profitability</i>						
	Area under priority crops (food and export)	Ha of land	635,603	980,000	980,000	<ul style="list-style-type: none"> -Farmer data base -Farmer mobilization on season preparation -Agriculture land information system (ALIS) <p>Key projects:</p> <ul style="list-style-type: none"> (i)Crop intensification program (CIP) Target: 1,047,200 ha under food and export crops Location: All districts (ii) Tea Expansion project: Target: 32,800 ha from 26,879 ha Location: Nyaruguru, Karongi and Nyamasheke (iii) Increased Coffee Production and Productivity: Target: 40,000 ha from 37,500 ha Location: Gakenke, Nyamagabe, Huye, Rulindo, Kirehe, Gatsibo and Gisagara
	Inputs use	% of farmers using improved seeds on consolidated sites	52	60	75	<ul style="list-style-type: none"> -Farmers mobilization in Twigire groups -Ensure timely supply of inputs to all farmers -Mobilize local companies and local seed multipliers to invest in seed production -Up-scaling input for work approach -organize and monitor the agriculture inputs distribution system -Provide Technical Support in lime application and compost production
		Quantity of inorganic fertilisers used (kg/ha)	32	45	75	

						-Mobilize the private sector to produce locally seeds and to carry out extension services -Inputs decentralization Key Project: CIP
Agricultural mechanization	Ha of land mechanized	35,000	40,000	100,000		-Deliver tractor and other farm machinery hiring services -Initiate subsidy on purchasing and hiring of agricultural farm machinery -Monitor and evaluate mechanization operations -Promote and facilitate private sector investment in mechanization -Repair and maintain of existing fleet of farm machinery -Purchase agricultural equipment -Build capacities (trainings and demonstrations) -Work with WDA and the private sector to produce locally spare parts Key Project: Mechanization Project
Outcome2: Production infrastructure and related technologies developed						
The land area covered by terraces (radical)	Ha of radical terraces constructed	110,905.95	120,500	142,500		-Mobilize other stakeholders and Non-government organization to contribute in progressive terraces development -Increase earmarked transfers in radical terracing and joint planning with all stakeholders involved in terraces development -Put in place strategies aiming at valorising the land under terraces -To increase farmers involvement in soil conservation - Develop and implement incentives to bring the private sector to protect lands against erosion.
Progressive terraces developed	Ha of progressive terraces developed	923,604	947,500	1,007,624		
Ensure optimal use of terraces for crop production	Ha of terraces under production	98,681	116,680	139,800		
Irrigated land under marshland, SSIT and hillside development	Ha of irrigated land	48,308	66,434	102,284		Develop, Operate & Maintain Marshland Irrigation schemes below; Mwura-Agatara/Gisagara (101.67ha); Rubuyenge-Burakari/Ruhango (416.67ha); Makera/Muhanga (109ha); Nzavu/Nyamagabe (75.4ha) Urwonja/Nyaruguru (105ha) Key Project: GIF

						<p>Develop, Operate & Maintain Hillside Irrigation Schemes below; Ndego/Kayonza (500ha); Rwimiyaga-Karangazi/Nyagatare (500ha), Mugesera-Sake/Ngoma (1,000ha); Rilima/Bugesera (2,835Ha), Rweru/Bugesera:(4,797Ha), Cyohoha</p> <p>South/Bugesera:(3,000Ha), Gabiro/Gatsibo (5,000Ha); Nyabarongo_II/Rulindo, Gasabo, Bugesera (10,000); Gako/Bugesera(3,000ha); Mpanga/Kirehe (600ha), Mahama/Kirehe (1,200) Karambi-Gacaca/Kayonza (700Ha)</p> <p>-Mobilize farmers for small scale irrigation technology (SSIT) adoption (All Districts-15,000ha)</p> <p>Develop protected irrigation targeting prioritized high value chains (400ha in various Districts)</p> <p>- Work with the private sector in irrigation (Implement PPP for the development and O&M of hillside and marshland (various districts 20,000ha)</p>
Outcome 3: Fostered farmers market linkages						
To build storage facilities across the country	MT of grains (maize and beans) stored as strategic grains reserve	184,814	260,490		278,998	<p>-Mobilize and support the private sector to build and run storage facilities -Sensitize famers to store the production -Provide Technical support</p> <p>Key projects: Post-harvest and agribusiness support project (PASP) Target: Warehouses of 20,000 MT capacities constructed</p>
	Capacity (MT) of storage facilities constructed	295,495	320,582		350,431	
Increase the production of high- value crops	MT of production produced per year					<p>-Increase the number of farmers reached by extensions services, provide incentive to extension agents and awareness on Twigire-Muhinzi groups -Involvement of local government in farmers mobilization for land consolidation.</p>
	MT of Maize	373,970	465,810		760,506	
	MT of Rice	110,544	135,286		177,584	

		MT of Beans	523,883	659,941	897,843	<p>-Promote research in diseases control and high yielding and resistant varieties.</p> <p>-Increase the use of fertilisers and pesticide</p> <p>-Increase the area under targeted crops plantation</p> <p>-Adopt innovative system of combating climatic change</p>
		MT of I. potatoes	677,892	952,389	1,487,304	
		MT of Soybean	21,529	25,415	30,890	
		MT of Cassava	979,152	1,533,464	2,970,728	
		MT of Wheat	9,923	10,841	12,202	
		MT of Coffee	23,000	27,000	32,500	
		MT of Tea	28,000	35,109	46361	
	To add value to agricultural produce	MT of raw material supplied to agro-processing industries	Maize: 47,050 MT	50,000	60,000	<p>-Reinforcement of CIP (dedicated consolidated land).</p> <p>-Increase value addition for the exportable commodities.</p> <p>-Organized sector into professional organizations.</p> <p>-Commodity exchange use for grain marketing</p> <p>-Mobilize private to invest in agro-processing industries</p> <p>- Reinforce the contract farming</p> <p>-Organize Agriculture Public Private dialogues</p> <p>-Set up a forum of farmers 'organization</p>
			Soybean: 3,855 MT	15,000	25,000	
			Cassava: 7500	15,000	35,000	
		Milk: 66,390,754	70,390,754	75,000,000	<p>To reinforce the milk supply agreement between cattle breeders with processors</p> <p>-Strengthen the milk value chain</p> <p>-Use IT tools to permit farmers to get financial services through the produced and supplied milk</p>	
		Number of export crops factories constructed	Tea:16	17	20	<p>Fast-track the implementation of the coffee zoning policy in all districts to increase fully washed coffee from 59% to 80%.</p> <p>-Sensitize growers to increase productivity through an increased use of Mineral and organic fertilizer and pesticide application to manage pests and diseases;</p> <p>-Mobilize private to invest in factories construction</p> <p>Key Projects:</p> <ul style="list-style-type: none"> - Tea expansion <p>Coffee Production and productivity</p>
	Coffee (CWS): 291		297	305		

Outcome: Strengthened partnership in commercialization of agriculture sector value chains products						
Increased flower Production	Number of flowers stems produced	8,500,000	17,052,000	34,104,000	-Expand area under flowers. Key Project: Flower Park Project Target: 65 new hectares to get additional 25,604,000 stems Location: Rwamagana (55 ha) and Nyacyonga in Gasabo District (10 ha)	
Increased export of Horticulture (Fruits & Vegetables)	MT of horticulture exported	32,000	37,044	46,314	-Use Twigire Muhinzi Model -Sensitize and enforce the use of contract farming Key Projects: Horticulture, floriculture and other emerging value chains Target: 46,314 MT Location: Country	
Improve the professionalization of livestock and improve the quality, production and productivity of their output						
Outcome: Accelerated increase of animal resources and aquaculture and fisheries production and productivity						
Milk production increased	MT of milk	776,284	1,012,924	1,274,554	-Implement Genetic Improvement Policy -Animal health improvement -Increase animal feed production.	
	Number of dairy cows distributed under Girinka program	297,230	350,000	486,230 ¹⁶⁷	-Mobilize different partners' groups mobilized to support -Girinka program -Organize Girinka week and pass on events. Key project: Girinka Program Targets: 189,000 cows Location: all districts	
	Number of MCCs constructed, equipped and operational	56	120	177	-Mobilize private sector investment in the MCCs construction and operationalization -Reinforcement of the implementation of milk supply regulations Key project: Rwanda dairy development project Target: 77 MCCs constructed	

¹⁶⁷ From 2007 up to 2016/17 we distributed 27,000 cows per year in average, in the 7 Year, additional 189,000 cows will be distributed.

Meat production	MT of meat produced	96,457	128,091	215,058	-Increase number of heads of animal passing through feedlots -Private sector investment in meat production -Increase beef breed Key project: Gako beef project Location: Bugesera
Fish production increased	MT of fish produced	26,500	65,000	127681	-Strengthen fish farming; -Strengthen fingerling production -Restock lakes; -Facilitate the restocking of fish ponds, dams and cages -Regular Monitor the fish production Provide incentive and stimulants to investors -Fight against illegal and uncontrolled fishing -Organize and assist technically fishermen cooperatives -Promote investment in Aquaculture. Key project: Aquaculture and fisheries project
	Ha of fish ponds under production	250	700	1,250	
	M ³ of cages under production	6,400	700,000	1,400,000	
	M ³ of fish tanks under production	24	100,000	167,000	
	Number of fingerlings produced (Million)	4	120	240	
Eggs production	MT of eggs produced	7,475	11,211	19,403	Mobilize private sector investment
Honey production increased	MT of honey produced	5,535	6,595	8,611	Mobilize private sector investment
Hide and skins	MT of hide and skins produced	6781	9,560	13,477	Mobilize private sector investment
Animal genetic improvement	Number of cows inseminated per year	77,221	127,620	171,068	-Produce and process quality semen -Ensure and Monitor supply of semen and AI inputs to public and private inseminators -Organize and facilitate AI campaign -To improve artificial insemination delivery -Carry out embryo transfer Key project: -RDDP Project -LIP Project
Animal nutrition improvement	Number of animal feed constructed and operational	4	5	8	Mobilize private sector investment

		Ha of forage planted	570	1200	2,000	Mobilize farmers
Outcome: Research and innovation development						
	Accelerated and sustained agriculture growth through enhanced use of technologies and innovations	Number of technologies and innovations released for crop improvement and protection, soil health and fertility, animal resources development, climate resilient agriculture and value addition.	*High yielding varieties (34) *Studies reports on fertilizer recommendations *Studies reports on animal resources development *Study reports on postharvest management	40 new crop varieties developed *5 pests and diseases effectively controlled * 5 animal resources development technologies developed *5 soil health and fertility improvement technologies developed *5 agro-processing technologies developed	* 80 new crop varieties developed for priority crops *At least 10 pests and diseases effectively controlled *At least 10 animal resources development technologies developed *At least 10 soil health and fertility improvement technologies developed *At least 10 agro-processing technologies developed	-Upgrading Rwanda's agriculture research capacity (biotechnology, precision agriculture & Climate smart agriculture) -Development research related projects for increased research financing (at least 1% of Agricultural GDP) -Development of high yielding disease tolerant and climate change resilient crop varieties -Development of crop and animal pest and disease management technologies -Development of rapid and disease-free seed multiplication systems -Development of animal resources improvement and nutrition technologies -Introduction and Development of postharvest processing and management technologies Key project: -Development of market responsive plant varieties and seed systems -Climate resilience- soil- water- agroforestry project

ANNEX 8: POTENTIAL OPPORTUNITIES FOR PROFITABLE PRIVATE SECTOR INVESTMENTS IN THE FRAMEWORK OF PSTA 4

INNOVATION AND EXTENSION

- Mobile labs for soil tests against payment for service (pH, humus, PNK) and provision of fertilization pattern according to soil
- Developing and propagating improved seeds and breeds
- Setting up private advisory service providers that show farmers a quick return on investment: on-farm as well as advisory on value addition and business management
- Plants for production of certified fertilisers, government incentives at start-up to ensure price competitiveness against subsidized imported chemical NPK
- Commercial plant for production of insects for biological pests control and for commercial use (including regional trading)
- Production and processing of niche high value products like essential oils
- Production of high yielding seedlings for coffee and tea

LIVESTOCK

- Production of vet inputs like medicines and vaccines
- Feeds processing plants
- Production of micronutrients for poultry, pork, fishery, etc.
- Establishment of qualified private laboratories for analysis of compliance to SPS, meat, milk and packed food
- Backward and forward milk business: establishment/running of milk collection centres, cold truck, production of milk by-products
- Meat production and meat packing facilities

HIGH FEED CONVERSION RATE (FCR) SMALL ANIMAL HUSBANDRY

- Specialised Chicks production factories
- Setting up medium scale poultry farms for eggs production
- Pigs fattening
- Certified meat slaughterhouses
- Processing of animal products
- Processing of animal by-products for example for animal feeding industries, soap production

IRRIGATION

- Establishment and run of water reservoirs for public irrigation schemes on a fee
- Establishment of individual/community based pumping system associated to small scale irrigation system solar energy powered with water saving technology like drip irrigation on a user fee

MECHANISATION

- Set up mechanisation services rent basis (eg ploughing, harrowing, pesticide distribution and or fertigation, mechanical harvesting)
- Set up workshops to produce spare parts for agriculture machines

AQUACULTURE AND FISHERIES

- Production of quality fingerlings
- Commercialization of equipment used in fishing and in aquaculture like nets, cages, tanks, etc.
- Fish processing technologies
- Production of fish feeds

CROP

- Investments in high-productive technologies to feed cities: soilless production, hydroponic production, green houses/protecting sheds for high value horticulture products
- PPP for improved rice seeds production by rice milling factories (Seeds + inputs + agronomic TA + mechanisation) linked with outgrower schemes to feed rice mill factories (scaling up out grower schemes + contract enforcement)
- Post-harvest technologies: mobile dryers, warehouses
- Aggregation and logistics services for staples as well as niche products
- Processing of crop products
- Seed production

CROSSCUTTING AREAS

- Providing new financial services for farmers (Agro-Fintech)
- Providing assurance services to access SPS/Standards certification
- Providing information services to farmers (i.e. markets, prices, weather etc.)
IT solutions in agriculture

NST Pillar 1: Economic Transformation	NST Pillar 2: Social Transformation
<p><i>Priority Area 4: Attain a Structural Shift in the Export Base to High-value Goods</i></p> <p>By promoting production, value addition and marketing of agricultural export products</p>	<p><i>Priority Area 1: Enhancing Graduation from Poverty and Extreme Poverty and Promoting Resilience</i></p> <p>By increasing production and incomes for farmers and providing productive assets (i.e. Girinka project)</p>
<p><i>Priority Area 6: Modernise and Increase the Productivity of Agriculture and Livestock</i></p> <p>This objective is at the core of all PSTA 4 interventions</p>	<p><i>Priority Area 2: Eradicating Malnutrition</i></p> <p>By promoting nutrition sensitive agriculture and food security</p>

ANNEX 10: LINK BETWEEN PSTA 4 PRIORITY AREAS AND NATIONAL AGRICULTURE POLICY PILLARS

NATIONAL AGRICULTURE POLICY PILLARS					
		P1: Productivity and Sustainability	P2: Inclusive Markets and Off-Farm Opportunities	P3: Technology Upgrading and Skills Development	P4: Enabling Environment and Responsive Institutions
PSTA 4 Priority Areas(PA)	PA 1: Innovation and Extension	<ul style="list-style-type: none"> - Innovation Fund and Mechanisation - Flexible extension models 		<ul style="list-style-type: none"> - Skills development - Youth and women in agribusiness 	
	PA 2: Inclusive Markets and Value Chains	- Value Chain development: market info, linkages, PPD, infrastructure, standards, marketing	Strategic Grain reserve enhanced	Farmer associations	
	PA3: Productivity and Resilience	Inputs, Irrigation land husbandry, Livestock Masterplan Implementation	Climate Smart Agriculture Asset transfers for social protection Small-scale irrigation	Productivity	
	PA 4: Enabling Environment and Responsive Institutions	PPPs with private sector for commercialisation and transformation			<ul style="list-style-type: none"> - Market Enabler - Improved capacity for policy analysis and statistics - Joint planning enhanced

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