REPUBLIC OF RWANDA

Transformation of Agriculture Sector Program 4 Phase 2

Technical Assessment

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ABBREVIATIONS AND ACRONYMS

ADF	Agriculture Development Fund
AfDB	African Development Bank
AgPER	Agriculture Public Expenditure Review
ALIS	Agriculture Land Information System
BDF	Business Development Fund
CAADP	Comprehensive Africa Agriculture Development Program
CIP	Crop Intensification Program
CBSD	Cassava brown streak disease
CSA	Climate Smart Agriculture
EAC	East African Community
ERR	Economic Rate of Return
DLI	Disbursement-Linked Indicator
DPs	Development Partners
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GoR	Government of Rwanda
Ha	Hectare
IFAD	International Fund for Agricultural Development
Kg	Kilogram
IWRM	Integrated Water Resources Management
LWH	Land Husbandry, Water Harvesting and Hillside Irrigation Project
M&E	Monitoring and Evaluation
MDAs	Ministry/Department/Agency
MFD	Maximizing Finance for Development
MINAGRI	Ministry of Agriculture and Animal Resources
MINECOFIN	Ministry of Financing and Planning
MTEFs	Medium-Term Expenditure Frameworks
NAEB	National Agricultural Export Development Board
NAP	National Agricultural Policy
NEPAD	New Partnership for Africa's Development
NPL	Non-Performing Loans
NPV	Net Present Value
NST	National Strategy for Transformation
ODP	Organizational Develop Plan
PAP	Program Action Plan
PFM	Public Financial Management
PforR	Program for Results Financing
PPD	Public Private Dialogue
PPP	Private Public Partnership
PSTA	Strategy Plan for Agriculture Transformation
RAB	Rwanda Agriculture and Animal Resources Board
RSSP	Rural Sector Support Project

RWF	Rwandan Franc
SMART	Simple, Measurable, Accurate, Representative & Timely
SPIUs	Single Project Implementation Unit
SSIT	Small-Scale Technologies
TA	Technical Assistance
USAID	United States Agency for International Development

Transformation of Agriculture Sector Program 4 PforR
Technical Assessment

1. Program Description

The proposed Transformation of Agriculture Sector Program 4 PforR (the "PforR Program") will assist the Government of Rwanda (GoR) to improve the performance of its Strategic Plan for Agricultural Transformation (PSTA4). The PforR Program seeks to support the transformational aspects of the PSTA4 by focusing on resources around building a stronger role of private sector (including farmers) with the Government shifting from market actor to market enabler. The Program design draws on socially inclusive commercial agriculture model of investment and the Maximizing Finance for Development (MFD) by focusing on the overall policy context (Results Area 1), recognizing that a key element of the new National Agriculture Policy (NAP)/PSTA4 is leveraging private sector investment in the commercialization agenda (Results Area 2), but that there remains a need for the public provision of services alongside the greater use of private sector delivery mechanisms (Results Area 3) and where public provision remains, improving the effectiveness of those public services – including value chain infrastructure – is key (Results Area 4).

A. Government Program

Current Situation in Rwanda's Agriculture Sector

Agriculture has been a major driver of economic growth and poverty reduction in Rwanda. It accounts for 70 percent of employment, more than 30 percent of GDP and more than 50 percent of export receipts. Agricultural value added has increased by over 5 percent per annum (p.a.) over the last 15 years, driven in part by sustained improvements in productivity. This globally impressive performance has likely driven the expansion of other sectors (because of strong multiplier effects) which has then drawn labor away into higher-productivity tasks: this sectoral labor migration accounted for 3.2 percentage points of Rwanda's 4.4 percent p.a. increase in labor productivity over 1999 – 2016.

The Government's focus has traditionally been on the food staples, which reflects a legacy of malnutrition, food insecurity and the imperative of improving calorific intake. Productivity of these staple crops has increased substantially over the last two-decades, although yield gaps remain. The Crop Intensification Program (CIP) and similar interventions helped to ramp up food staple yields with input intensification being a driving factor of overall agricultural growth from 2001 – 2010. More recently, this has been complemented with area expansion from marshland development, with a greater impact from total factor productivity growth in the last decade too. A large-scale subsidized fertilizer program was launched as part of CIP, with government procurement and – from 2010 – a private sector distribution/retail system. Imports were privatized in 2013 although the state retains active involvement in the fertilizer market.

Coffee and tea are Rwanda's major export crops, with ready access to world markets. Both are essentially small-holder based, with federated cooperatives and out-grower schemes ensuring producers are linked with processors and exporters in a reasonably efficient manner. Recent reforms in pricing regimes – especially for tea – have led to some further improvements in the functioning of the sector. The Government has made several attempts to initiate a horticulture industry both for (expanding urban) domestic markets and for high-value exports, especially floriculture – seeking to mirror the success of other East African countries. Land was allocated and subsidized loans provided, and cold-chain infrastructure has been constructed at the airport. Nevertheless, experience has been mixed. Small-scale vegetable production for domestic market has expanded, driven by easily accessible market opportunities. Floriculture has been a greater challenge, with no clear success stories emerging in what is an extremely competitive global supply chain.

Rwanda is densely populated and small land holdings pose a major constraint to sector development. Mean farm size is 0.35ha and 85 percent of all rural households have holdings of one hectare or less. Just over 5 percent of Rwanda's cultivable land is farmed by 30 percent of households each with less than 0.2ha. Half of these households have less than 0.1ha. The poverty rate among this group is 51 percent. These farms are typically too small to produce any marketable surplus – 64 percent of households within this group who do not sell their output are poor. Conversely, the 25 percent of households with farm sizes above 0.7ha harm 65 percent of national farmland and the 15 percent with more than 1ha – Rwanda's 'large' farmers but globally still small-holder farmers – manage half of Rwanda's agricultural land. The majority of these households are already engaged with the market. Small holdings are concentrated among ten districts in the Western, Northern and Southern provinces with extremely small holdings (less than 0.2ha), common in the Western region especially around Rubavu. Land titling is robust, following a major effort from 2009 – 2013 in which 10.7 million parcels were titled, covering 90 percent of agricultural plots. Titling has improved tenure security and increased on-farm investments, although land markets remain thin.

Efforts at land consolidation – aggregating production systems without necessarily consolidating land holdings – remain a key feature of agricultural policy. It has been a feature of the CIP as well as interventions on land management (terracing) and land expansion with irrigation (marshland development). From the origins of the CIP in 2008 through 2012, land consolidation expanded from 28,788ha (2007) to 502,916ha (2016). Land consolidation has been pursued alongside cooperative development, as a mechanism for organizing value chains and securing economies of scale in production, logistics and/or marketing. Cooperatives have worked better in some sectors (coffee, tea) than others (staples), reflecting the asymmetries in value chain structures among different crops. Nevertheless, crop and livestock cooperatives account for over half of the roughly 8,000 cooperatives currently registered in Rwanda. That said, less than one-in-five farmers are members of cooperatives (2016). Membership of cooperatives is often a condition for eligibility to Government input programs such as subsidized fertilizer and seeds. Ostensibly established to assist aggregation, membership rates of cooperatives are higher for larger farmers (70 percent of farmers with farms more than 10ha).

Farm households that are able to generate cash income are less poor than purely subsistence farmers. Among all rural households with less than 0.1ha of land, the poverty rate was significantly higher if no produce was sold to the market. Around 60 percent of rural households are dependent only on agriculture for their incomes whereas a further one-third augment farm income with non-farm incomes – especially informal sector jobs. Poverty rates amongst these groups are 44 percent and 33

percent respectively, indicating non-farm rural employment is a significant route to improved well-being. Some (9 percent) rural households leave farming all together (while remaining in rural areas) to establish food trading and processing enterprises, and poverty amongst this group is significantly lower still, at around 22 percent.

Food insecurity remains a concern, especially for below-subsistence households, and stunting continues to be a concern attracting high-level political interest. According to the latest figures, 20 percent of households remain food insecure. The 'one cow one family program' (known as *Girinka*) was launched in 2006 to provide additional livelihood opportunities. Ownership increased rapidly to 174,900 households by 2012 but has steadied at around 200,000 and remains short of the target of 350,000 households because of funding shortfalls. Milk production has increased substantially from just over 150,000mt in 2006 to over 700,000mt in 2014. Rates of stunting declined substantially since 2005, but it remains a major concern with rates of 36.7 percent currently. It is particularly prevalent between 6 – 24 months. Causes are varied, with prenatal care a factor and lack of complementary feeding of infants is a major cause. Environmental health also appears to be a serious contributing factor.

Rwanda's non-farm enterprise sector has been growing from a small base. The number of business establishments has increased to 149,404 in 2014 – an increase of 18 percent since 2011 – providing employment to 361,901 workers in 2014.[1]

Despite the observed growth, the non-farm enterprise sector maintains a limited presence. Employment in business establishments represented only a small portion of overall employment in Rwanda, with agriculture still being the dominant activity. The enterprise sector provided employment to 6.2 percent of working-age Rwandans in 2014 (361,901 jobs of a labor force of 5,785,000). In addition, enterprises are mostly small. There is limited presence of medium- and large-sized (private) firms, and a vibrancy in the sector is yet to fully emerge.

Table 1: Number of Firms and Employment

	Formal and Informal				One-person		2+ Firms			
	All Firms		2+ Firms		Formal	Informal	Formal		Informal	
	N	Emp	N	Emp	N/Emp	N/Emp	N	Emp	N	Emp
2011	122225	263439	33117	174331	1704	87404	4549	66717	28568	107614
2014	149404	361901	52583	265080	1889	94932	8618	141453	43965	123627
Total	271629	625340	85700	439411	3593	182336	13167	208170	72533	231241

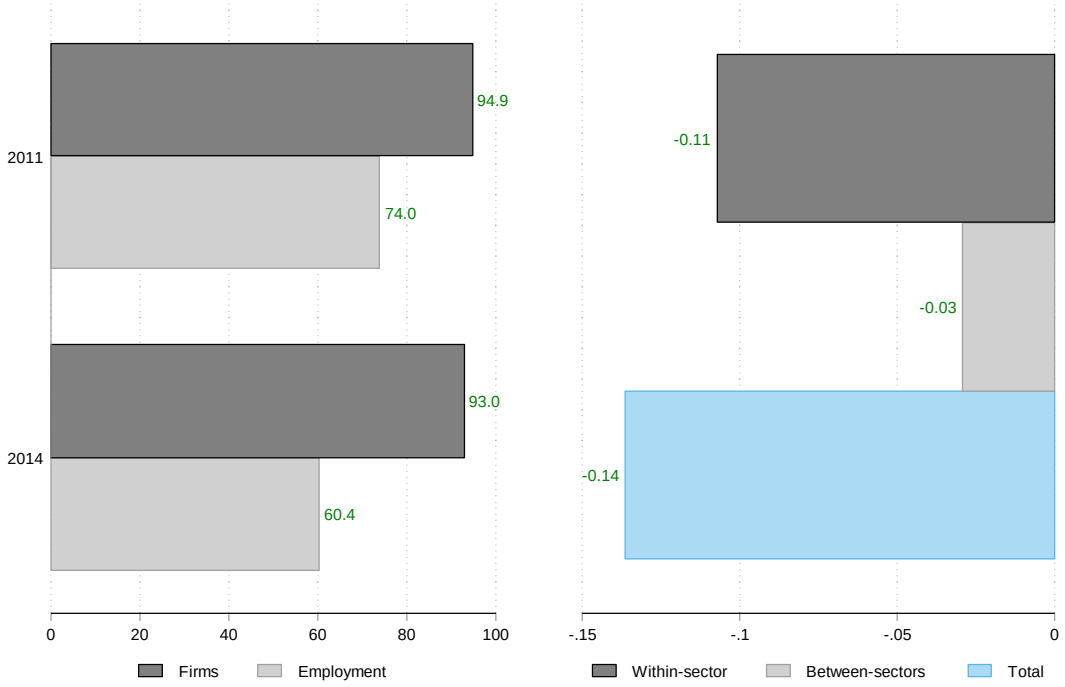
Like many other low-income countries, informality is pervasive in Rwanda.[2] By head count, more than 92 percent of non-farm enterprises were informal, accounting for 74 percent of employment in 2011 (

[1] Excludes establishments in the health, education, public administration and defense sectors. The analysis also excludes observations in which establishments are flagged as permanently closed.

[2] Although the country carried out a number of reforms intended for firms to start-up businesses, such as one-stop shop, a large number of firms remain informal.

Figure 1). So, their performance is key for creating productive employment and boosting aggregate productivity. Moreover, the allocation of resources between informal and formal firms could play an important role in boosting aggregate employment and productivity.

Figure 1: Share of firms and employment in informal firms



Note: WB Staff Calculations based on the 2011 and 2014 Census of Business Establishments.

However, the share of employment in informal firms has declined between 2011 and 2014. The decline in the share of informal employment can be the result of: (i) formalization of previously informal enterprises; and (ii) expansion of existing formal firms in the formal sector and/or entry of large firms to the formal sector. The changes in the total employment in the informal sector can be driven by changes in employment across industries or from within-industry reallocation of workers across firms.[3] The between-sector component accounts for 79 percent of the aggregate decline (right-panel of
Figure 1).

[3] Following McCaig and Pavcnik (2014) , the change in the share of employment in informal firms in total employment between 2011 and 2014, ΔI , can be decomposed into two components: within-sector and between-sector changes, $\Delta I = \sum \Delta M_{st} H_s + \sum \Delta H_{st} M_s$, where H_{st} and M_{st} denote the share of sector s's employment in total employment and the share of workers in informal businesses in total employment in sectors , respectively. $\Delta M_{st} = .5(M_{s2014} + M_{s2011})$, and $\Delta H_{st} = .5(H_{s2014} + H_{s2011})$. The first term captures the within-sector of change in employment and the second term captures the between-industry change sources of changes in aggregate employment in informal businesses.

Improving opportunities for firms in the formal sector can further facilitate the reallocation of labor from less productive informal to formal firms. Recent work by McCaig and Pavcnik (2014)[4] has shown that new export opportunities increased employment opportunities in the formal sector in Vietnam, inducing reallocation of workers from household businesses toward more productive firms in the registered enterprise sector.

Rwandan agriculture enjoys several significant growth opportunities. Properly harnessed, these will continue to drive overall economic growth, shared prosperity and poverty reduction into the future. Rwanda is a small country within the East Africa Community (EAC) and is well placed to penetrate regional markets. An expanding urban population, with increasing purchasing power and more sophisticated food preferences, present ready markets for higher value vegetables, basic agro-processed products and premiums for safe and nutritious food.

Yet there are threats too. Climate change will alter agro-ecological conditions and likely shift land suitability for existing crops. Although climate change projections for rainfall and temperature are uncertain, it is likely that more extreme weather events will occur. Existing agricultural practices are not 'climate smart': on-farm practices are themselves unsustainable (e.g. contributing to soil erosion) and/or are not climate resilient (e.g. the absence of attention on water productivity). Further population growth combined with the loss of agricultural land for urban development will compound pressure on land holdings. Consumer demands for higher standards, better food safety and product traceability impose additional organizational challenges that can add to costs. Rwanda has ambitions for future growth and development, and agriculture must provide a solid foundation for such aspirations – no country has developed without building on its agricultural base.

Addressing these challenges and realizing this potential requires a different role of the state compared to the past. The exclusive focus on food staples and on productivity will fail to address contemporary challenges or fully realize Rwanda's agricultural potential. Instead there is a need for the Government to:

- Encourage private sector involvement in the agriculture and food system, create more space for their participation and innovation and re-calibrate the role of the Government to: (i) leverage their involvement; and (ii) focus public efforts on those areas where private sector activity is unlikely;
- Where continued public intervention is warranted, focus needs to expand beyond basic food staples to reflect dietary diversity and export agriculture and ensure that public support efforts no longer explicitly or implicitly discriminate against these non-staple crops; and
- Marshall the considerable capacity across Government to improve coordination and collaboration and avoid a trend for centralized delivery by individual institutions.

[4] McCaig, B. and Pavcnik, N., 2014. *Export markets and labor allocation in a low-income country* (No. w20455). National Bureau of Economic Research.

Adequacy of the Government Program

The Government's approach to agriculture, the food system and rural development are conveyed in several policy documents and strategies that have been prepared or are being finalized. The four most important are listed in order of increasing specificity:

- A new national development strategy is currently being prepared – known as the National Strategy for Transformation (NST1) – to follow from previous poverty reduction strategies[5] and a Vision 2020 document that has framed Rwanda's transformation over the last two decades;
- The Government is partnering with the World Bank in preparing a new ambitious Future Sources of Growth strategy with a time horizon of 2050 to input into the Vision 2050 and new NST1;
- The new NAP has been updated (from the previous 2004 version) and is pending Cabinet approval. The NAP conveys the Government's vision as "*a nation that enjoys food security, nutritional health and sustainable agricultural growth from a productive, green and market-led agricultural sector towards 2030*"; and
- A fourth PSTA4[6] from 2018 - 2024 is currently being finalized and will constitute the Government's program for the purposes of the PforR operation.

The PSTA4 was prepared with inputs from a wide range of stakeholders including technical support from the World Bank and Food and Agriculture Organization (FAO), amongst others. A technical workshop was held in June 2017 that brought together a wide range of Rwandan and international experts over two days to review achievements of PSTA3 and propose the focus areas for PSTA4. Further technical inputs have been provided by development partners (DPs) throughout the preparation process. FAO supported the drafting of the PSTA4, with a particular focus on the results framework and the program costings.

New Partnership for Africa's Development (NEPAD) has provided an independent technical review of the draft PSTA4, as part of the Comprehensive Africa Agriculture Development Project (CAADP) process, concluding positively. The assessment notes that PSTA4 is "well aligned to the new vision encapsulated in the Malabo Declaration (January 31,2014); provides a good account of the strategic direction towards transforming its agriculture [and] the priorities for the Government are clear and well contained.[7]" The review reinforced the need to reduce reliance on external technical assistance (TA), as has been done in the past, and to improve operational realism especially around the costings/investment plans with a particular concern on the proposed high public investments in irrigation.

[5] The first Poverty Reduction Strategy Paper set out their development strategy for 2002 – 2007. Two Economic Development and Poverty Reduction Strategies followed from 2008 – 2012 and 2013 – 2018.
[6] Based on the French acronym.
[7] See NEPAD/ CAADP: Independent Technical Review of the Fourth Strategic Plan for Agricultural Transformation 4, December 2017.

PSTA4 presents a considerable departure from previous Strategies[8] in that it explicitly establishes a new strategic orientation with clear principles for determining public investment (see below). It is positioned explicitly as the strategic plan for implementing the NAP and restates the latter's vision statement. The objective of PSTA4 is 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.*"

The PSTA4 constitutes the Government program for the purposes of the PforR operation in the following ways:

- *Stronger role of private sector (including farmers) with government shifting from market actor to market enabler.* PSTA4 emphasizes the provision of public goods while downsizing the 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 commercialization.* PSTA4 recognizes that limited land resources and growing population requires an increased focus on economic land productivity as this will be the key to increased returns on capital and labor. Economic land productivity and incomes will increase by introducing 'land-saving technologies' to: (i) increase yields; (ii) improve logistics and diminish post-harvest losses; (iii) access new markets; and (iv) adopt crops and animal products generating higher returns on investment and labor.
- *Use of the 'food systems approach' for enhanced nutrition and household food security.* In the PSTA4, Ministry of Agriculture and Animal Resources (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.
- *Enhance climate smart production.* PSTA4 seeks to build resilience through on-farm measures and enabling actions to increase productivity. Firstly, maintaining and promoting farmers' practice of mixing crop varieties mitigates certain risks, including the spread of pest and diseases as well as ensuring dietary diversity. Secondly, PSTA4 emphasizes alternative land management to complement terracing with comprehensive climate smart soil and integrated watershed management.
- *Focus on diversified higher value agricultural products (horticulture, vegetable, poultry, pork, fisheries).* PSTA4 focuses on facilitating private sector investment in fruit and vegetable production though upgrading provision of Sanitary Phytosanitary Standard/quality standards as well as supporting demonstration of better technologies such as green houses, hydroponics and other small-scale irrigation solutions.
- *Strengthen Innovation and Extension.* Agricultural 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,

[8] Previous Strategies include PSTA 1 [2004-2009], PSTA 2 [2009-2012] and PSTA3 [2013-2018].

and value addition. nformation and Communication Technology can increase the impact of extension and improve market information, service delivery, financial inclusion, climate risk adaptation, and farmer feedback.

- *Emphasis on collaboration among stakeholders.* PSTA4 seeks to also redefine the way MINAGRI works with key stakeholders in the sector. Specifically, efforts are focused on clarifying, adjusting or establishing coordination mechanisms that are required for more effective and efficient management of public investments and significant increases in private sector investment.
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Nevertheless, achieving the anticipated results of PSTA4 are not straightforward and require substantial efforts on the part of the Government both in terms of operating modalities and resources. Hence the importance of the Bank's support under the PforR instrument.

2. Description and Assessment of Program Strategic Relevance and Technical Soundness

A. Strategic Relevance

The PforR Program seeks to support the delivery of PSTA4 by focusing on the Stronger role of private sector (including farmers) with the Government shifting from market actor to market enabler. The Program design draws on the MFD by focusing on the overall policy context (Results Area 1), recognizing that a key element of the new NAP/PSTA4 is leveraging private sector investment in the commercialization agenda (Results Area 2), but that there remains a need for the public provision of services alongside the greater use of private sector delivery mechanisms (Results Area 3) and that where public provision remains, improving the effectiveness of those public services – including value chain infrastructure – is key (Results Area 4).

A summary of the activities contained in each result area is as follows:

Results Area 1: Policy and Organizational Reform – aligned with PSTA4 Priority Area 4: The PforR Program will seek to improve the structure and capability of MINAGRI in order to strengthen sector analysis, associated policy reforms and design/introduce relevant financing mechanisms/business models for attracting private sector investment. MINAGRI will demonstrate this new capacity by producing a framework document to guide the processes that will leverage private sector financing. In addition, the foundations for digital data systems will be developed to improve management information and enable greater innovation. Furthermore, a new mechanism will be established to enable greater interagency coordination (including key stakeholders such as Ministry of Trade, Financial sector actors, etc.) and communication.

Results Area 2: Enabling Agric Commercialization - aligned with PSTA4 Priority Area 4: The second PforR Program Results Area focuses on specific interventions to improve the quality of public investments in essential value chain services to leverage commercial agriculture. This includes key areas such as infrastructure and research, by introducing new business models that will link public investments to commercial markets and leverage increased levels of private sector investments. PSTA4 advocates for maximizing the effectiveness and efficiency of public investment by leveraging

increased private sector investment in service provision and delivery/management of agricultural infrastructure.

Results Area 3: Delivery of Improved Agric Value Chain Services - aligned with PSTA4 Priority Areas 3 & 4. The PforR Program will support fostering competitive agricultural value chains, which requires the public sector to provide critical services to support production, processing, logistics, marketing and the like. This approach is consistent with MFD principles; The public function supported by the PforR Program is to introduce and accelerate the expansion of services that de-risk agricultural investments by improving dialogue between private and public actions, increasing the use of private sector service delivery (e.g. out-grower schemes and productive partnerships), and expanding access to information and financial services. These measures will help achieve a key anticipated outcome from PSTA4 that will be improved productivity and inclusiveness of agricultural market systems and increased value addition and competitiveness of diversified agricultural commodities, for domestic, regional, and international markets.

Results Area 4: Efficiency in Public Expenditures - aligned with PSTA4 Priority Area 4. The PforR Program seeks to incentivize the dual approach of supporting: (i) a very specific action that demonstrates improved efficiency in public expenditure of the core delivery agency Rwanda Agriculture and Animal Resources Board (RAB); and (ii) a more general effort to improve the overall expenditure among the three main agencies that account for the largest share of sector expenditure. Since RAB is the agency responsible for key services, improvements in the budget execution system will be undertaken with the goal of improving their delivery function. Standards for budget execution help to maximize the impact of Government spending and the ability to meet such standards signals weaknesses that undermines value for money. It also undermines the argument for additional public resources since there are associated concerns over malfeasance in execution that render Ministry of Financing and Planning (MINECOFIN) reluctant to allocate additional resources. Previous audits of RAB have not been approved because of non-compliance in several important areas. Prior qualified audits have highlighted in detail where weaknesses lie and both agencies are aware of where improvements are needed.

B. Technical Soundness

The World Bank's Agriculture Global Practice has been supporting socially inclusive commercial agriculture through investment operations in countries across Africa including: Ghana, Zambia, Cameroon, Niger, Tanzania, Morocco, and Uganda. The content of the interventions in the PSTA4 that are being supported directly under the PforR Program draws upon this rich experience that have proven to be technically sound and have delivered results.

The PforR Program design also draws on innovation and experience of work being tested in Rwanda. For example, matching grants are being provided to farmers and agribusiness Small Medium Enterprises to stimulate technology adoption, increased input use, and commercialization. The major sources of matching grants include projects managed by the International Fund for Agricultural Development (IFAD) and bilateral projects managed by the U.S. Agency for International Development (USAID). The Business Development Fund (BDF), an entity jointly owned by the GoR and the Development Bank of Rwanda is responsible for managing these grants.

The PforR program seeks to scale up pilots developed and lessons learned under current and past World Bank operations in Rwanda. These operations have demonstrated that links between public infrastructure investment and commercial opportunities can be developed and sustained.

In summary, elements of the PforR Program have been deployed in Rwanda previously, they have been on a small-scale and typically supported by external partners. The PforR Program is innovative in (i) taking these approaches to scale and (ii) integrating them into the Government program through the PforR instrument.

C. Institutional Arrangements

Rwanda's agricultural sector is dominated by three primary institutions with a number of important subordinate institutions playing other important roles: MINAGRI is the apex policy institution with ultimate accountability for delivering results in the agricultural sector; the RAB which overseas research and extension in food crops; and the National Agriculture Export Board (NAEB). Delivering on PSTA4 requires coordinated interventions from other parts of the Government. Of note is Rwanda Development Board which has a mandate for supporting investment in agriculture and agribusiness, (MINECOFIN, Ministry of Trade, and Ministry of Public Service and Labor.

The required change in institutional roles of all stakeholders implied by the new approach will present a major challenge. An institutional assessment undertaken as part of World Bank's support for the preparation of PSTA4 states clearly that "this transition will take time and will benefit from capacity building support."[9]

In addition, there are several other ministries, state agencies and other state organizations that impact on agriculture outcomes. As reported in the Agriculture Public Expenditure Review (AgPER), even applying a functional classification of expenditures as per the Classification of Functions of Government nomenclature, expenditure data reveals a large number of ministries and agencies with some agriculture-related spending. Many of these have formal mandates that directly reference agriculture while others will be responsible for cross-cutting issues that nevertheless have important agriculture-sector consequences.

The financial sector is also critical for agriculture, and the Government's program seeks to expand existing efforts to provide financial services to farmers. While the overall credit-to-Gross Domestic Product (GDP) ratio is around 20 percent, credit to agriculture (including agri-businesses) as a share of agricultural GDP is less than 5 percent.

3. Description and Assessment of Program Expenditure Framework

1. Introduction

The expenditure framework assessment includes the following dimensions: (i) fiscal sustainability and resource predictability; and (ii) selected management and efficiency issues. The assessment concludes with some recommendations in areas where public expenditure on agriculture could be strengthened to ensure effectiveness and medium-terms sustainability for the Program.

[9] Risner (2017: 11)

The analysis covers the period 2011-2016 and is based on the dataset of the 2016 PER Agriculture. The assessment makes also extensive use of the 2016 Rwanda Public Expenditure and Financial Accountability framework. The assessment focuses on the appropriations and actual spending of the (MINAGRI and its agencies, RAB and the Rwanda NAEB as well as the districts[10] (excluding district own revenue sources), given that: *i.* the bulk of public agriculture resources are managed by these budget agencies and; *ii*. the World Bank PforR will support interventions and specific expenditures implemented by these entities. Data limitations make it difficult to establish a complete picture of agriculture expenditures because donor-funded projects and own revenues of some agencies are either only partially or not at all included in the Integrated Financial Management Information System and are managed outside of the Government's budget[11].

The expenditure framework presents an adequate basis for the Program. To ensure effectiveness and sustainability of the Program some areas should be strengthened and closely monitored: i. commitment of the Government and translation of the Strategic Plan for Agriculture Transformation, 20018-2024 (PSTA4) into Medium-Term Expenditure Frameworks (MTEFs) and annual budgets; ii. realistic planning and costing of the PSTA4 considering actual agriculture expenditure were significantly lower than in the PSTA3 (2013/14-2017/18); iii. clear alignment of budget inputs to outputs and outcomes to ensure, in the short term, the achievement of the Disbursement Link Indicators (DLIs) and the impact and leverage of the PforR Program on the Government program. Furthermore, the Program should streamline institutional arrangements, fiscal relations and provide information that will improve resource predictability, budget systems and alignment with government priorities in the agriculture sector while creating complementarity with other public financial management (PFM) projects supported by the World Bank. Finally, the recommendations of the expenditure assessment are closely aligned and complementary to those presented in the fiduciary assessment.

II. Program expenditure framework

The Program boundaries. The PSTA4 has 4 priority areas and 12 sub-priority areas. The PforR Program supports 9 out of 12-sub priority areas of the strategy and this defines the Program boundaries (table 2).

Table 2: PSTA4 priority and sub-priority areas and PforR Program support

PSTA4 priorities and sub-priorities		Included in the PforR
1	Innovation and Extension	
1.1	Research and innovation development	NO

[10] Other Ministries are also involved in the agriculture sector, but fund only a few programs. These include: The Ministry of Health (MINISANTE, MoH), The Ministry of Environment and Natural Resources (MINIRENA), the Ministry of Infrastructures (MININFRA), the Ministry of Commerce (MINICOM) and the Ministry of Local Government (MINALOC) through the Local Development Agency (LODA). Furthermore, the Districts, through their own revenue sources, contribute to the agriculture sector spending.

[11] The data set of the 2016 Rwanda Agriculture Public Expenditure Review includes only a selected number of donor projects and programs, and excludes some agencies' revenues (for instance RAB).

1.2	Proximity extension and advisory services	NO
1.3	Skills developed for agriculture value chain actors	YES
2	Productivity and Resilience	
2.1	Sustainable land husbandry and crop production intensification	YES
2.2	Effective and efficient under IWRM frameworks	YES
2.3	Animal resources and production systems	NO
2.4	Nutrition sensitive agriculture	NO
2.5	Mechanisms for increased resilience	NO
3	Inclusive Markets and Value Addition	
3.1	Market linkages fostered (incl. market and aggregation infrastructure)	YES
3.2	Agricultural market risks and financial services	NO
3.3	Quality assurance and regulation	NO
4	Enabling Environment and Responsive Institutions	
4.1	Agricultural Institutions Development	YES
4.2	Evidence based policies development and regulatory framework	YES
4.3	Strengthened partnership in the commercialization of agricultural sector value chains products	YES
4.4	Planning, coordination and budgeting	YES
4.5	M&E and Learning, Information Systems and Statistics	YES

Source: PSTA4

The PSTA4 is a 6-year strategy (2018-2024) while the PforR Program covers the period 2018/19-2020/21. The estimated cost of the PSTA4 for the overall period is 2,756 billion RWF (US$3,7 billion).

The Rwanda budget is program-based. The Government expenditure framework is determined by selecting the budget sub-programs that relate to the implementation of the PSTA4. The relevant budget sub-programs are mentioned in Table 3 below. The ‘Administrative and Support Service’ budget sub-programs provide funding for the implementation of the PSTA4.

Table 3: Mapping PSTA4 to Ministry/Department/Agency's MDA's) budget sub-programs

	PSTA4 Priority and sub-priority Areas	MINAGRI-RAB-NAEB-DISTRICTS Budget sub-programs
1	**Innovation and Extension**	
1.1	**Research and innovation development**	RAB 0901EH01 Research and Innovation
		MINAGRI EE01 Agriculture Sector Planning, Coordinator, Financing
1.2	**Proximity extension and advisory services**	RAB 0901EH01 Research and Innovation
		DISTRICTS Program: Agriculture Research and Extension Subprogram: Extension Services and Technology Adaptation and Skills Development*
1.3	**Skills developed for agriculture value chain actors**	RAB 0901EH02 Extension Services and Technology Adaptation and Skills Development
2	**Productivity and Resilience**	
2.1	**Sustainable land husbandry and crop production intensification**	MINAGRI 0900EE03 Crop Policies and Strategies Development;
		RAB 0901EG01 Sustainable, Diversified and Climate Smart Crop Production and Productivity
		DISTRICTS Program: Sustainable Crops and Animal Resource Production and Productivity Subprogram: Area of land protected against soil erosion and productivity of the terraced area increased*
		DISTRICTS Program: Sustainable Crops and Animal Resource Production and Productivity Subprogram: Area developed through small-scale technologies (SSIT) increased*
		DISTRICTS Program: Sustainable Crops and Animal Resource Production and Productivity Subprogram: Agricultural productivity in the acidic soils of Rwanda increased*
2.2	**Effective and efficient under IWRM frameworks**	RAB 0901EG01 Sustainable, Diversified and Climate Smart Crop Production and Productivity
		DISTRICTS Program: Sustainable Crops and Animal Resource Production and Productivity Subprogram: Area developed through small-scale technologies (SSIT) increased*
2.3	**Animal resources and production systems**	MINAGRI 0900EE02 Animal Resources Policy, Strategies Development
		RAB 0901EG02 Sustainable Animal Resources Production and Productivity

		DISTRICTS Program: Sustainable Animal Resources Production and Productivity Subprogram: Agricultural productivity increased through genetic improvement and vaccination*
2.4	**Nutrition sensitive agriculture**	RAB 0901EG03 Nutrition sensitive agriculture and Resilience Mechanisms
		DISTRICTS Program: Nutrition sensitive agriculture and Resilience Mechanisms Subprogram: Malnutrition reduced among households*
2.5	**Mechanisms for increased resilience**	RAB 0901EG03 Nutrition sensitive agriculture and Resilience Mechanisms
		DISTRICTS Program: Nutrition sensitive agriculture and Resilience Mechanisms Subprogram: Malnutrition reduced among households*
3	**Inclusive Markets and Value Addition**	
3.1	**Market linkages fostered (incl. market and aggregation infrastructure)**	RAB 0901EF05 Farmers -Market linkages infrastructures
		NAEB 0902EF03 Export Diversification
		MINAGRI 0900EE01 Agriculture Sector Planning, Coordination, Financing and Information Systems
		MINAGRI 0900EF01 Food Systems for domestic market supply
		NAEB 0902EF02 Traditional Export Crop Development
3.2	**Agricultural market risks and financial services**	MINAGRI 0900EE01 Agriculture Sector Planning, Coordination, Financing and Information Systems
3.3	**Quality assurance and regulation**	MINAGRI 0900EF04 Quality Assurance and Regulation
4	**Enabling Environment and Responsive Institutions**	
4.1	**Agricultural Institutions Development**	MINAGRI 0900EE01 Agriculture Sector Planning, Coordination, Financing and Information Systems
4.2	**Evidence-based policies development and regulatory framework**	MINAGRI 0900EE01 Agriculture Sector Planning, Coordination, Financing and Information Systems
4.3	**Strengthened partnership in the commercialization of agricultural sector value chains products**	NAEB 0902EF03 Export Diversification
4.4	**Planning, coordination and budgeting**	MINAGRI 0900EE01 Agriculture Sector Planning, Coordination, Financing and Information Systems
4.5	**M&E&L, Information Systems and Statistics**	MINAGRI 0900EE01 Agriculture Sector Planning, Coordination, Financing and Information Systems
		MINAGRI 09000101 Administrative and Support Services

		RAB 09010101 Administrative and Support Services
		NAEB 09020101 Administrative and Support Services

Source: PSTA4 and MINECOFIN

Note: *The Agriculture earmarked transfers are subsumed in the district's budget therefore having a different budget code for each district. Those codes are available.

Based on the budget sub-programs in the table 3 above, the table below presents the expenditure framework for the Government's program. The Expenditure framework is based on the budget line items in the Chart of Accounts in the 2018/19–2020/2021 Government Budget proposal[12]. The table shows the Total Program Expenditure, which is constituted of the planned medium-term expenditure from the 2019/20 MTEF funded by the Government and other development partners. The total is 279,9 billion RWF (US$377.8 million).

[12] The MTEF 2018/19-2020/2021 has not yet been approved by Parliament.

Table 4: Government program expenditure framework for 2018/19-2020/21 (RWF billion)

MINAGRI-RAB-NAEB-DISTRICTS budget sub-programs	2018/19	2019/20	2020/21	Total
RAB 0901EH01 Research and Innovation	4.03	9.29	17.81	31.12
MINAGRI EE01 Agriculture Sector Planning, Coordinator, Financing	3.31	4.85	4.86	13.02
DISTRICTS Agriculture Research and Extension (Extension Services and Technology Adaptation and Skills Development)	0.55	0.66	0.83	2.04
RAB 0901EH02 Extension Services and Technology Adaptation and Skills Development	0.11	0.10	0.10	0.31
MINAGRI 0900EE03 Crop Policies and Strategies Development	0.09	0.09	0.09	0.26
RAB 0901EG01 Sustainable, Diversified and Climate Smart Crop Production and Productivity	21.99	22.71	23.03	67.73
DISTRICTS Sustainable Crops and Animal Resource Production and Productivity (Area of land protected against soil erosion and productivity of the terraced area increased)	1.20	1.44	1.80	4.44
DISTRICTS Sustainable Crops and Animal Resource Production and Productivity (Agricultural productivity in the acidic soils of Rwanda increased)	0.94	1.13	1.41	3.49
DISTRICTS Sustainable Crops and Animal Resource Production and Productivity [Area developed through small-scale technologies (SSIT) increased]	0.98	1.18	1.47	3.63
MINAGRI 0900EE02 Animal Resources Policy, Strategies Development	0.12	0.14	0.14	0.39

RAB 0901EG02 Sustainable Animal Resources Production and Productivity	2.29	2.38	1.75	6.42
DISTRICTS Sustainable Animal Resources Production and Productivity (Agricultural productivity increased through genetic improvement and vaccination)	0.32	0.38	0.48	1.18
RAB 0901EG03 Nutrition sensitive agriculture and Resilience Mechanisms	14.07	14.40	14.07	42.54
DISTRICTS Nutrition sensitive agriculture and Resilience Mechanisms (Malnutrition reduced among households)	7.12	8.54	10.68	26.34
RAB 0901EF05 Farmers -Market linkages infrastructures	2.50	2.50	2.50	7.49
NAEB 0902EF03 Export Diversification	4.19	5.08	6.19	15.46
MINAGRI 0900EF01 Food Systems for domestic market supply	3.21	3.76	4.84	11.81
NAEB 0902EF02 Traditional Export Crop Development	4.17	6.98	7.40	18.55
MINAGRI 0900EF04 Quality Assurance and Regulation	0.05	0.05	0.26	0.36
MINAGRI 09000101 Administrative and Support Services	1.53	1.68	1.94	5.15
RAB 09010101 Administrative and Support Services	4.47	4.72	5.10	14.28
NAEB 09020101 Administrative and Support Services	1.22	1.30	1.44	3.97
TOTAL	78.45	93.34	108.17	**279.97**

Source: MINECOFIN

Table 5 below shows the Total Program Expenditure for the part of the Program supported by the PforR[13]. This is constituted by the original planned medium-term expenditure from the 2018/19-2020/21 MTEF funded by the Government and other development partners[14]plus increased allocation

[13] A more disaggregated PforR expenditure framework at output and activity (budget line) level will be drawn during the implementation of the Program.

[14] The PforR supports a subset of the PSTA4 strategy, as outlined in Table 1 above, therefore only the relevant budget sub-programs are considered.

from the proposed PforR Program[15]. The total budget for the PforR Operation amounts to 214.8 billion (RWF) (US$289.92 million).

Table 5: The program expenditure framework for the program supported by the PforR operation for 2018/19-2020/21 (RWF billion)

MINAGRI-RAB-NAEB-DISTRICTS budget sub-programs	2018/19	2019/20	2020/21	Total
MINAGRI EE01 Agriculture Sector Planning, Coordinator, Financing	6.8	8.3	8.3	23.4
DISTRICTS Agriculture Research and Extension (Extension Services and Technology Adaptation and Skills Development)	2.0	2.1	2.2	6.3
RAB 0901EH02 Extension Services and Technology Adaptation and Skills Development	0.4	0.4	0.4	1.3
MINAGRI 0900EE03 Crop Policies and Strategies Development	1.3	1.3	1.3	4.0
RAB 0901EG01 Sustainable, Diversified and Climate Smart Crop Production and Productivity	26.9	27.7	28.0	82.6
DISTRICTS Sustainable Crops and Animal Resource Production and Productivity (Area of land protected against soil erosion and productivity of the terraced area increased)	4.6	4.8	5.2	14.6
DISTRICTS Sustainable Crops and Animal Resource Production and Productivity (Agricultural productivity in the acidic soils of Rwanda increased)	2.6	2.8	3.1	8.5
DISTRICTS Sustainable Crops and Animal Resource Production and Productivity (Area developed through small-scale technologies (SSIT) increased)	2.6	2.8	3.1	8.6
NAEB 0902EF03 Export Diversification	7.3	8.2	9.3	24.9
MINAGRI 0900EF01 Food Systems for domestic market supply	5.7	6.2	7.3	19.2
NAEB 0902EF02 Traditional Export Crop Development	5.2	8.0	8.4	21.6
TOTAL	65.4	72.7	76.7	**214.8**

Source: MINECOFIN

Type of expenditures. The Government is funding 'fixed and variable costs'. The 'fix costs' include the operational costs of the relevant budget/spending agencies involved in the roll out of the PSTA4. These allocations enable the MDAs to manage and roll out the strategy. Expenditure types include salaries and overheads. The 'variable costs' include expenditure like consultancy services, hardware, software training, etc. The PforR Program is funding only 'variable inputs' associated with the roll out of the PSTA4.

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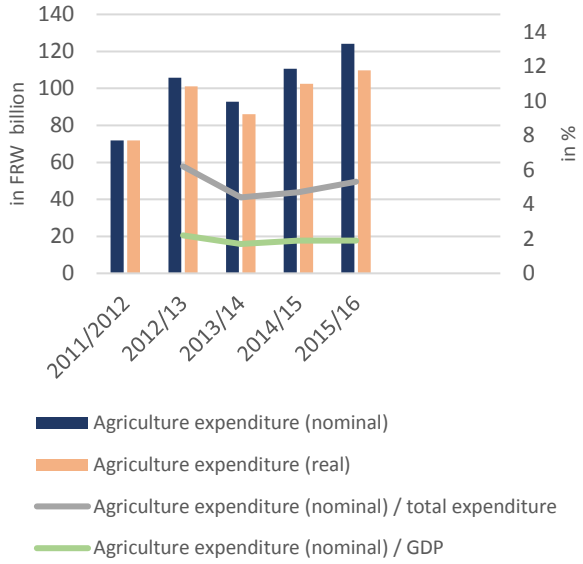
II. Fiscal sustainability and resource predictability

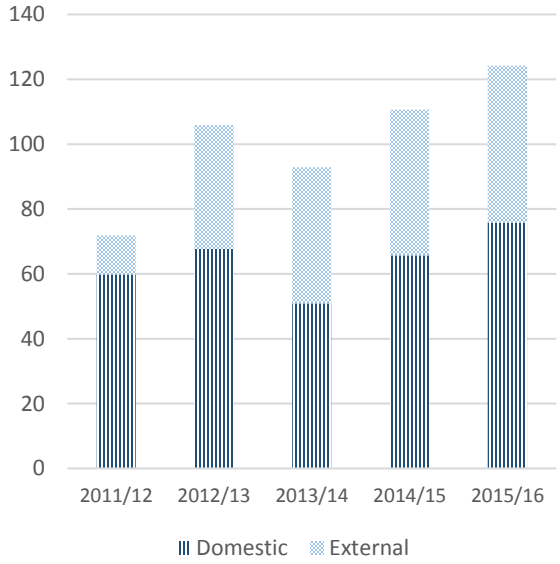
The total expenditures (both domestic and external) for the agriculture sector almost doubled in nominal terms during the years 2011/12-2015/16. In real-terms, the total expenditure for the agriculture sector increased by 52 percent between 2011/12 and 2015/2016 (figure 1). By 2015/16, the agriculture sector accounted for 5.3 percent of the national budget, and 1.9 percent of GDP. This upward trend is wholly attributable to a doubling in external resources over this time period. Allocations of domestic resources to the agriculture sector increased by 33 percent in nominal terms, that is, from RWF 59.8 billion (US$69.0 million) in 2011 to RWF 75.8 billion (US$87.4 million) in 2016 (figure 2). Furthermore, expenditure of other sectors such as education, infrastructure and health did increase over the same period (figure 3). This suggests that the Government prioritized other sectors in domestic resource allocation, possibly due to the preference of donors in funding agriculture[16].

Figure 2: Public Agriculture Expenditure (domestic and external), 2011/12-2015/16



Source: Dataset PER Agriculture 2016

Figure 3: Agriculture Expenditure by Financing Source, 2011/12-2015/16 (RWF billion)



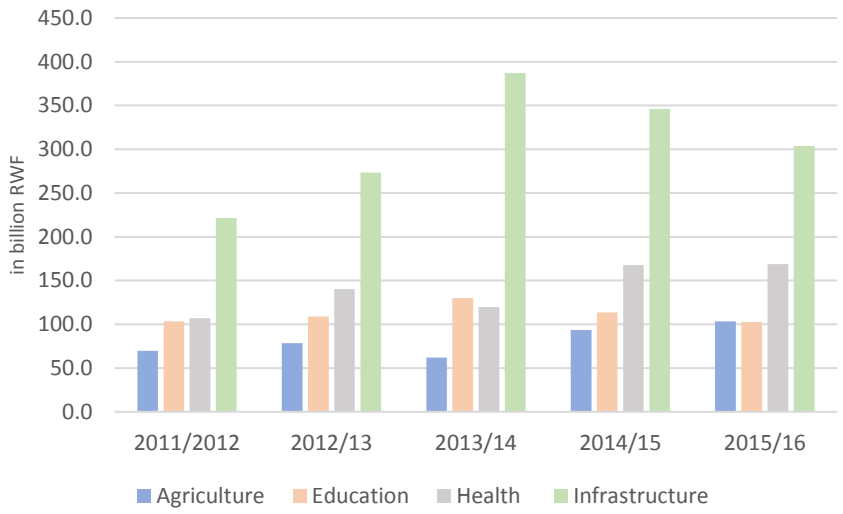
Source: Dataset PER Agriculture 2016
Note: District own revenue funding is not included; 'domestic resources' include 'direct budget support'.

Donor aid is an important source of agriculture sector financing, making the country particularly vulnerable to the fluctuation and unpredictability of aid flows. In 2016, donor assistance accounted for 39 percent of total agriculture sector while Government domestic resources for 61 percent (figure 2). The decrease in agriculture spending by 15 percent between 2012/13 and 2013/2014 clearly shows the high level of aid dependence. In that year, the contraction in domestic spending by 27 percent in

[16] Rwanda Agriculture Public Expenditure Review, MINECOFIN, 2016

real-terms was not sufficiently offset by increases in external resources which failed to meet the projected level. Indeed, 2013/2014 was the first year of PSTA3 with initial difficulties to mobilize pledged resources from external contributors.

Figure 4: Appropriations by Selected Sectors, 2011-2016 (RWF billion)



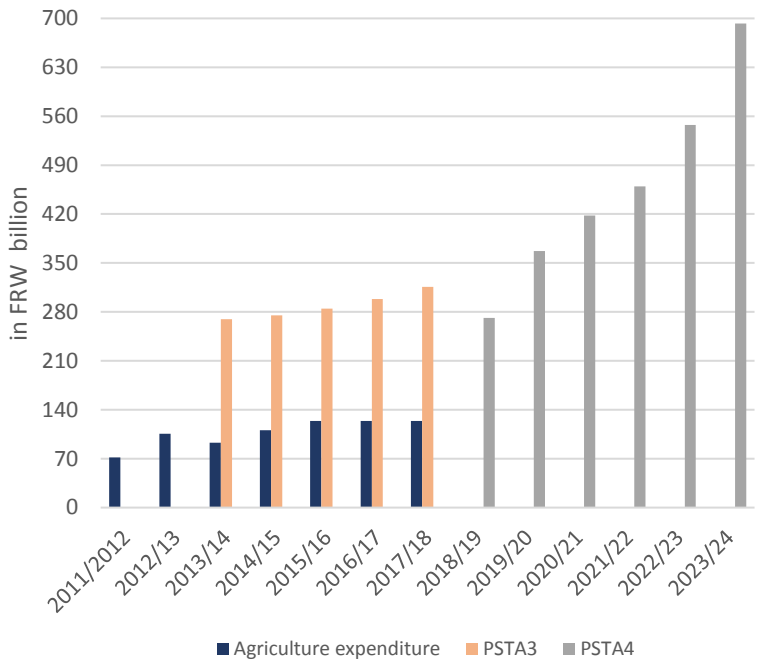
Source: MINECOFIN Revised Financial Laws 2011/12-2015/2016

A more stable and predictable flow of external resources and effective prioritization of the domestic funding to the agriculture sector is particularly needed to ensure sustainability and effective implementation of the PforR program. Actual expenditure in the agriculture sector were significantly lower than indicated in the PSTA3 Financing Plan (2013/14-2017/18) (figure 4). Despite the upward trend until 2015/16 (except in 2013/14), agriculture expenditure remained short of what was required to finance key interventions envisaged in the PSTA3. Over the period 2011/12-2017/18 actual expenditure amounted in total roughly to RWF 753 billion (US$1 billion)[17]. Hence, PSTA3 falls short of about one-third of the required resources. The low level of sustained funding is one of the factors that have undermined the achievement of the PSTA3.

In addition, a more careful planning and costing of PSTA4 is required. The annual financing requirements estimated for PSTA4 amount to a substantial increase compared to the PSTA3 period (figure 5). Whereas expenditure increased in nominal terms at an average annual rate of 16 percent over the period 2011/12-2015-16, the program's compound annual growth rate for the PSTA4 period is 19 percent. Furthermore, not only the projected investments expected to be markedly higher at the start of the PSTA4 period, they are also projected to increase considerably faster than observed in PSTA3 years.

[17] Assuming that the level of actual expenditure in agriculture for 2016/17-2017/18 would be at the same level of 2015/2016.

Figure 5: Agriculture Expenditure Compared to Funding Needed by the PSTA3, PSTA4 2011/12-2023/24 (RWF billion)



Sources: MINAGRI PSTA3 Financial Plan (2013/14-2017/18) and PSTA4 2018-2024, Dataset PER Agriculture 2016
Note: Agriculture spending for 2015/16 -2016/17 are assumed to be at the same level of 2015/2016

III. Selected management and efficiency issues

Given substantial budget deviations in the agriculture sector in the past, systematic Program monitoring will be needed to ensure targets are met in budget execution, especially in 2018/2019 (owing to the launching of PSTA4). Past implementation performance of agriculture expenditures has shown an increasing negative deviation from the original budget (from -0.6 percent in 2012/13 to -8.3 percent in 2015/16) (Table 1). This could be explained by budget management issues such as weaknesses in preparing realistic budgets, delays in the release of funds or poor implementation capacities. Furthermore, the annual practice of revisiting the budget has resulted in positive deviations implying a good performance but effectively aggravating the problem by concealing and institutionalizing planning weaknesses and inefficiencies in the budget process. Poor implementation performance has been more acute for the non-treasury expenditures managed by the Single Project Implementation Units (SPIUs), which show a high budget deviation (on average -28 percent from original and 214 percent from revised budget), in part owing to difficulties with aid predications, planning, release and execution of donor aid. While the Program will be implemented through the treasury managed expenditures, past performance shows that increases in funding for the sector during PSTA3 slowed down implementation performance across all categories and sources.

Table 6: Execution of original and revised budget by sources and economic classification 2011/12-2015/16

	2011/12	2012/13	2013/14	2014/15	2015/16	Averg.
			Executed budget /original budget (in %)			
Total	14.0	-0.6	-3.2	-5.5	-8.3	-0.72
Recurrent	18.4	-20.7	-0.5	-1.3	-6.2	-2.1
Development	4	3.6	-0.4	-7.2	-8.9	-1.8
Treasury managed	14.5	-0.6	-3.1	-5.4	-7.7	-0.5
Non-treasury managed	-53.3	-16.6	-18.8	-18.2	-34.1	-28.2
			Executed budget /revised budget (in %)			
Total	9.6	4.2	4.1	-5.0	-8.0	1.0
Recurrent	13.2	-5.9	0.4	-1.3	-6.7	-0.1
Development	1.3	7.5	5.3	-6.6	-8.4	-0.2
Treasury managed	9.6	4.2	3.6	-5	-7.8	0.9
Non-treasury managed	282.9	9	440.3	322.7	16.2	214.2

Source: PER Agriculture

Results Program's achievement will depend on effective alignment of agriculture expenditures to PSTA 4 priorities. MINAGRI's expenditures are in line with PSTA3 large spending programs but there is critical underspending on research and development (table 6). The bulk of MINAGRI expenditures has fallen under the program Agriculture and Animal Resource intensification (64 percent), followed by activities spent under the program value chain development and private sector development (26 percent) – this is largely in line with the PSTA3 spending priorities. In contrast, spending on activities like research, technology transfer, advisory services and professionalization of farmers has been low (only 0.6 percent) against a PSTA3 commitment of 1.2 percent. This is worrisome as important determinants of agriculture productivity such as research and development are largely underfunded.

Table 7: Agriculture expenditures of MINAGRI entities agencies by programs compared to PSTA3 funding priorities

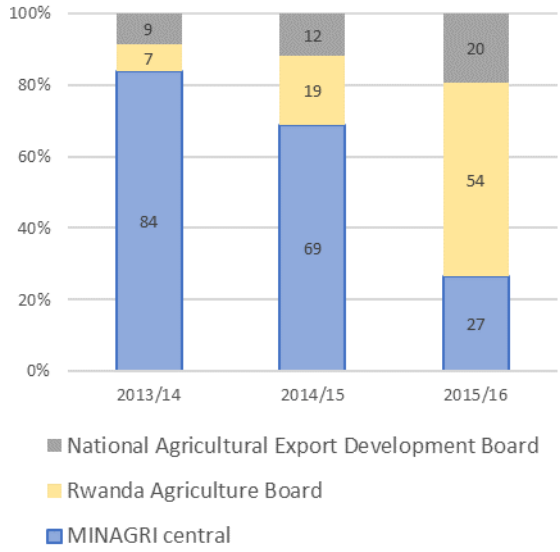
	2013/14	2014/15	2015/16	Avg. share of expend.	PSTA3costing	PSTA3costing
	in RWF billions			in%	in RWF billions	in %
Agriculture and Animal Resource Intensification	20.4	21.2	26.8	64.3	808.7	74.2
Research, Technological Transfer, Advisory Services and Professionalizatio n of Farmers	0.3	0.1	0.4	0.6	12.8	1.2
Value Chain Development and Private Sector Investment	8.9	6.6	13.4	26.5	254.4	23.3
Administrative and Support Services	2.9	3.0	3.1	8.5	0.0	0.0
Institutional Development and Agricultural cross cutting issues				14.2	14.2	1.3
TOTAL	**32.5**	**30.9**	**43.7**	**100.0**	**1090.2**	**100.0**

Source: PER Agriculture

Note: The agriculture expenditures include here only MINAGRI and its agencies

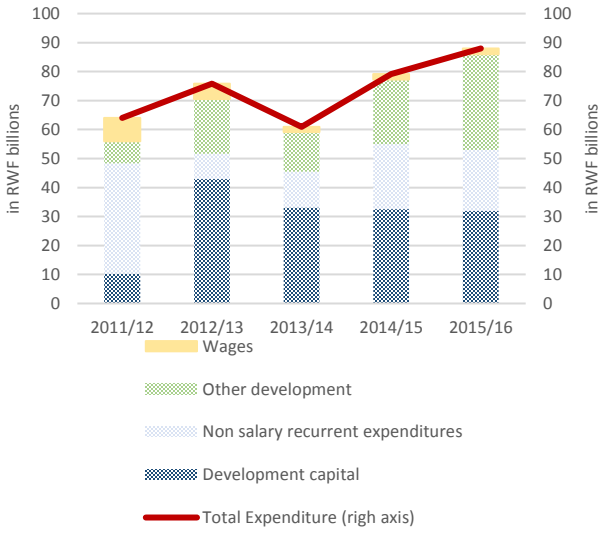
The agricultural intra-sectoral budget allocation and absorption capacity may pose challenges for meeting aggregate expenditure outputs for the Program indicators. Comparing the distribution of resources between MINAGRI and its agencies, the Ministry's expenditures increased mainly in favor of resources in favor of the RAB (figure 6). This reflects the Government's efforts to adopt good practice of separating policy making and coordination from implementing. However, the quick transition has raised concerns about the agencies absorption capacity and adequacy in capacity building.

Figure 6: MINAGRI by agency



Source: PER Agriculture

Figure 7: Agriculture expenditures by economic classification (RWF billions)



Source: PER Agriculture

The imbalanced trend between capital and recurrent may suggest a lack of fiscal space to support the increased investment during the PSTA-4 implementation, and erodes human resource capacity and Operations & Management and thus hampering PforR Program. A review of the economic classification shows an increase by 59 percent in development spending (accounting on average 66 percent) at the expense of recurrent expenditures (in particular wages) that declined by 3 percent over the same period (Figure 7). A particular concern is the decline in wages as a share and in real-terms (declining from RWF 8 billion to RWF 2 billion in 2015/16). Development expenditures are even higher if taking into consideration SPIUS. While a substantial amount of the non-treasury amount contribution to Rwanda is substantial but difficult to capture, the imbalance raises issues related to aid dependency and sustainability of the sector's investments. Some of the key development partners include the World Bank, the European Union, Department for International Development, the African Development Bank (AfDB), IFAD, and USAID.

IV. Recommendation

The expenditure framework for the Program appears to be adequate but, to be effective, the Program needs to consider the issues highlighted in assessment and adopt mitigation measures.

- Monitor the preparation of MINAGRI MTEF 2018/19- 2020/21 and following FYs to ensure that Program supported intervention are duly reflected in budget line items and at sufficient granularity to link to Program's outcomes.
- Realistic planning and costing of the PSTA4 activities in line with the macro-fiscal framework will be vital to inform budget preparation and prioritization.
- Improve mapping between PSTA4 activities and the budget will strengthen expenditure monitoring.

- Programs of PSTA-4 should be mapped to budget program and sub-program for prioritization and traceability's purposes. The improved alignment between budget inputs and PSTA4 activities will facilitate the monitoring and achievements of the Program's DLIs and enhance its impact on the PSTA-4 implementation.
- Lessons learned from the past PSTA3 implementation can be used to strengthen budget management issues in the agriculture sector. Past implementation performance shows the need for capacity strengthening when funding levels are substantially increased.
- PSTA4 makes reference to proposed ADF. This fund may provide the opportunity to streamline and strengthen this funding mechanism with central and local funding arrangements to enhance the efficient and effective use of the Program's resources. However, the feasibility of the ADF needs to carefully be assessed.
- Improve in agriculture expenditure control to closely monitor execution challenges. Substantial budget deviations hamper expenditure control and may affect Program's impact.
- Better reporting and monitoring in particular of the non-treasury contribution, coupled with improved timely release of funds, could strengthen budget planning and implementation.
- Districts have a substantive role in the implementation of some of the Program's priority areas (terracing). Timely and reliable earmarked and inter- agency transfers' arrangements should be strengthened to enhance alignment of district' budgets and Execution to PSTA-4 activities.

4. Description and Assessment of Program Results Framework and M&E

Defining the PforR Program

The World Bank has been working with MINAGRI to define the platform and roadmap within the PforR Program that will help the Government achieve the long-term goals set out in PSTA4. The PforR Program is constructed around four results areas nested within PSTA4. These four results areas emerged during preparation based on the application of the following three-phase decision tree: (i) what are the most important constraints to MINAGRI delivering on the agenda set out in PSTA4 that can be realistically implemented within the three-year timeframe? (ii) what specific solutions can the World Bank support[18] that reflect the Bank's comparative advantage and are not already being supported by other means – with a specific reference to the Bank's focus on private sector investment in agribusiness and the application of MFD principles and (iii) are there technical, feasible solutions that are amenable to support by the World Bank under a PforR instrument?

The program design is consistent with the World Bank Group's approach to Maximizing Financing for Development (MFD). The PforR program is "MFD-enabling" as it is aims to strengthen the capacity of MINAGRI to increase private sector investment and to enable the commercialization of key agriculture value chains in Rwanda's agriculture sector. These opportunities were identified

[18] It is expected that the operation will be co-financed by one or more development partners (DPs and their support will be acknowledged). However, consistent with co-financing modalities, additional financing DPs still leverages Bank competence and expertise.

through value chain diagnostics. The program will help facilitate the Government's plan to leverage private sector investment in the commercialization agenda, which is expected within three years of the project's closing date.

The four results areas focus on a combination of policy and institutional elements, resource allocation decisions, and reconfiguring the role of MINAGRI to an enabling function rather than a direct intervenor in the sector. The associated problem statements and PforR Program solutions underpinning this strategic focus reflect a theory of change developed with technical inputs from MINAGRI, the Bank task team and other key stakeholders and are summarized in **Table 7**. These are discussed in detail in the following sections.

Table 8: Summary of PforR Results Areas

The Results Chain is structured into four Results Areas. These reflect the concept of Maximizing Finance for Development by focusing on the overall policy context (Results Area 1), recognizing that a key element of the new NAP/PSTA4 is leveraging private sector investment in the commercialization agenda (Results Area 2), but that there remains a need for the public provision of services alongside the greater use of private sector delivery mechanisms (Results Area 3) and that where public provision remains, improving the effectiveness of those public services – including value chain infrastructure – is key (Results Area 4).	
Results Area 1: Policy and Organizational Reform – aligned with PSTA4 Priority Area 4	
Problem Statement: MINAGRI (including RAB & NAEB) organizational structure and its various specialties limits the capacity of the ministry to fully fulfil its mandate in policy development, sector coordination, resource mobilization and M&E.	PforR Solution: Improved capability of MINAGRI reflected in new organizational structure and internal/external incentives that facilitates improved sector analysis and associated policy and investment responses by MINAGRI, NAEB and RAB. MINAGRI recognized within GoR for policy leadership on agric and food system including on how to leverage the private sector.
Results Area 2: Enabling Agric Commercialization - aligned with PSTA4 Priority Area 4	
Problem Statement: Access to key infrastructure (irrigation, post-harvest technology, etc.) remains limited. Levels of private sector investment have consistently fallen below targets set by MINAGRI. Input supply system are not sufficiently responsive to the demand of production systems.	PforR Solution: A framework investment promotes widespread utilization of new business models for delivering key services. Increased role for private sector in research, input markets and services based on clear and predictable rules and collaboration and the reform of subsidy regime.
Results Area 3: Delivery of Improved Agric Value Chain Services - aligned with PSTA4 Priority Areas 3 & 4	
Problem Statement: The state services/interventions are strongly supply driven. The majority of sector expenditures channeled into production-focused extension tasks delivered by the state. Insufficient incentives for agribusinesses to collaborate with farmer groups.	PforR Solution: MINAGRI deploys a range of instruments to de-risk agric investments, including through key stakeholders. Greater use of private sector delivery agents and collaborate agric research. Better use of scarce public funds to leverage private investment through a range of Private Public Partnerships. Effective support for off-setting establishment costs of inclusive business models (e.g. out-grower schemes and productive partnerships).

Results Area 4: Efficiency in Public Expenditures - aligned with PSTA4 Priority Area 4	
Problem Statement: Need for increased measurements of efficiency and improvements in the budget process (including execution). Centralized spending decisions encourage dislocation from end-users/beneficiaries.	PforR Solution: Improved efficiency in public spending. Targeted spending on areas unlikely to solicit private sector investments. Improved budget preparation and execution procedures. Calibration of intra-sector spending in line with NAP/ PSTA4 policy priorities.

The PforR Results areas relate directly to several priority areas of the NST 1 and to the Priority Areas of the PSTA4. Although the organizing framework for the PforR Program is different, it is based on the strategic focus of the PforR Program. There is a clear mapping of the PforR Results Areas with the PSTA Priority Areas described above; therefore, the PforR expected results contribute directly to the goals of the PSTA4. This is summarized in Table 9.

Table 9: Mapping of PforR Expected Outcomes to PSTA4 Priority Areas.

PforR Results Area	PforR Expected Outcomes	PSTA4 Priority Area (associated outcomes)
1. Policy and Organizational Reform	Improved functional capacity* of MINAGRI, RAB and NAEB to fulfill its mandate of transforming and modernizing agriculture in Rwanda MINAGRI recognized within GoR for policy leadership on agric and food systems, including on how to leverage private sector.	**Priority Area 4** Effective and efficient public services delivery and enabling environment in the agriculture sector
2. Enabling Agricultural Commercialization	Agricultural commercialization enabled	**Priority Area 4** Increased competitiveness and value addition of diversified agricultural commodities for more inclusive domestic and international markets
3. Delivery of Improved Agricultural Value Chains	Increased private sector investment into agricultural value chain services	**Priority Area 3 &4** Increased competitiveness and value addition of diversified agricultural commodities for more inclusive domestic and international markets
4. Efficiency in Public Expenditures	Improved efficiency of public spending	**Priority area 4** Effective and efficient public services delivery and enabling environment in the agriculture sector

A mapping of the PforR Results Areas with PSTA4 sub-programs illustrates the significance of the PforR Program to the Government's program. The PforR Program is fully nested within the Government's program, with the PforR Program constituting a portion across both dimensions of scope (i.e. selected sub-programs) and time (i.e. the first three years of a six-year strategy). The PforR Program directly supports outcomes of the PSTA4 with a demonstrable logical connection between the expected outcomes of the PforR Program (for which the PforR Program will be evaluated after three years) and the proposed outcomes to be achieved by the PSTA4 over 6 years. PforR Program resources are non-trivial for the implementation of the first three years of the PSTA4 agenda, since the PforR Program accounts for 76.7 percent of the investment plan over 2018 – 2021.

The design of the PforR Program reflects lessons learned in the evaluation of the first Rwanda Agriculture PforR. Key lessons include: (i) greater attention at the design stage to the dual objectives of reaching the program objectives and the instrument-specific goals with an appropriate balance between the two; (ii) the imperative of a functioning Monitoring and Evaluation (M&E) system to underpin the verification process; (iii) broader participation in the PforR steering committee including outside MINAGRI and DPs. These are being incorporated into the current program in the following ways:

- According to the data sources specified in the PAD, the PforR Program achieved positive results – particularly related to the DLIs. Specifically, during the four years of support, targets were exceeded for DLIs related to improving productivity-related performance and results included: the protection of 168,592ha of land against soil erosion; irrigation of 15,757ha on hillsides and marshlands; development and introduction to farmers of 14 enhanced agricultural innovation technologies with an increase in the adoption rate from 25 percent to 61.8 percent; and the improvement of the average crop yield for cassava and coffee as well as average daily yields of milk per cow. MINAGRI also made steady progress on increasing agri-finance lending for farmers and agriculture enterprise investments, fully achieving the 7 percent target;
- The PforR Program managed to lift the partnership with the GoR, facilitating a constructive dialogue on essential reforms required for agricultural development. The Government acknowledges the application of the PforR financing instrument as a signal of trust and confidence in country systems; and
- The PforR Program also successfully encouraged the Government to initiate urgently needed policy reforms.

However, the review of the previous PforR Program noted that some areas for improvements related to individual design elements:

- Results need to be more focused – particularly regarding thematic areas – to increase strategic leverage and impact. Applying a stronger thematic focus would provide an opportunity for the current operation to steer PSTA4 in certain directions. These could be for example areas that faced challenges during the previous PSTA phases or where the World Bank sees constraints for agricultural development. PSTA3 revealed that the area of private sector development in Rwanda faces many challenges that were not addressed by the first PforR operation;
- The PforR operation clearly incentivized GoR to focus on results, which fits well with the overall performance focus of public institutions in the country. However, the implication is that other PforR instrument-specific objectives, such as capacity building, institutional strengthening and enhanced partnerships (e.g. with private sector entities and CSOs/NGOs) might be partly neglected. The design of current operation should incentivize a more balanced approach to harmonize these different PforR objectives, for example by the appropriate selection and formulation of DLIs;
- A more robust verification system should be viewed as an opportunity for increased accountability and transparency by MINAGRI. The DLI verification process should be more thorough, transparent and involve a credible verification entity. DLI

verification is probably the single most important process of the PforR operation. It determines disbursement and directly affects the credibility of the instrument;

- The results framework should reflect causal linkages and constitute of truly Simple, Measurable, Accurate, Representative, & Timely (SMART) indicators. In addition to formulating adequate outcomes, the design of a second PforR operation should be very specific about the causal linkages, i.e. how these outcomes are supposed to be achieved. It appears that, for example, in the case of private sector development this could have been specified further as part of the first PforR operation. Further, to avoid delays in reporting, changing of methodologies or even cancellation of indicators the design must make sure that the formulated indicators are truly SMART; and
- A revision of the PforR Program Management and Steering Structure would further increase ownership and buy-in from other key stakeholders beyond MINAGRI's Planning Department. While daily management of the operations could still be with MINAGRI's Planning Department, the ministry could form a small management team that provides guidance on the PforR operation. Such a management team could meet periodically (e.g. once a month) and consist of the Heads of MINAGRI's department, and the DG/CEO of RAB and NAEB. Further, a small Steering Committee could be set-up to provide overall guidance and ensure active participation from other key ministries (e.g. MINECOFIN, MINALOC), plus one representative from the private sector and one from NGOs/CSOs. With respect to the implementing entities a more concise role of RAB might be adequate in the future.

While the PforR Program explicitly contributes to the Outcomes set forth in the PSTA4 by virtue of its contributions to the Priority Areas, the assessment of impact will be determined against the specific PforR Program Results Framework. Achieving these expected outcomes requires the attainment of intermediate outcomes which themselves are the consequence of actions and outputs in accordance with an established theory of change. The theory of change that connects Government action with results must be technically robust, politically feasible and institutionally viable. Results chains emerged in the development of the PSTA4 and subject to particular scrutiny in the preparation of the PforR operation. For each PforR Results Area, a specific results chain was developed with a clear exposition of (i) the necessary technical work and (ii) managerial decision points required to deliver the expected output.

Results Area 1: Policy and Organizational Reform

The PforR Program focus for Results Area 1 is to support directly the Priority Area 4 of the new PSTA that focuses on Enabling Environment and Responsive Institutions. This Priority Area requires strengthening of the agricultural sector institutional framework in terms of organization development, policy and regulatory framework coherence, sector capacity building (district level included), cross sector synergy and private sector involvement, and M&E, knowledge building and learning and communication and information sharing. The PforR Program will focus on select priority areas.

The primary focus of this results area is a restructuring and organization development (OD) plan for MINAGRI and separate ones for its agencies (NAEB and RAB). These plans are to be prepared and

implemented based on the requirements of the NAP and PSTA4 and drawing on the range of analysis and recommendations made in recent years. These OD plans should ensure that the functions, structures, and ways of working of the system's entities (ministries, agencies, and other actors) support the delivery of their mandates (including joint mandates). They will address entities' relationships and information flows, the effectiveness of coordination and joint actions, and any capacity or information gaps. The OD plans will also fine-tune working modalities, processes, and performance management necessary. The organizational development plans (ODPs) enable MINAGRI and associated agencies to be more responsive to stakeholder needs. In addition, the process of organizational change will enable MINAGRI to build increased capacity to forecast, analyze and respond to emerging risks (including climate-related hazards) in the agriculture sector.

This process of organizational strengthening and change is logically frontloaded in the early period of PSTA4 implementation. It builds on the restructuring of MINAGRI and its agencies undertaken so far. The Agricultural Sector Capacity Building Plan is updated to address the priority skills required for the PSTA4 implementation, particularly relating to private sector business development. With the roles of specific entities evolving, the skills, competencies, and ways of working with the people within these entities also need to adapt.

MINAGRI's commitment to enabling private sector will require 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 ODP. A central function that must be strengthen and fulfilled is analysis of strategic mechanisms that will inform and influence investment how private investment will be leveraged.

A specific output will include a Private Sector Leveraging Strategy that will guide and inform MINAGRI's decisions related to: (i) the allocations of public investment, (ii) the criteria for using public funds to leverage private investment, and (iii) approaches to tracking the impact/outcomes of private public partnership. The core principles to be incorporated into MINAGRI's approach to leveraging private sector investment should consider: (i) investments with established linkages to water, energy, infrastructure and ICT; (ii) individual but joined financial and technical interventions in production, logistics, processing, marketing and retail to gain an overall development return across a value chain; (iii) an understanding that agriculture production offers seasonal and variable returns therefore cash flow is erratic which makes investment returns risky and harder to achieve; (iv) an understanding that local processing is dependent on an efficient raw material procurement and supply network (in cases where the local supply chain does not meet the demands of the processing units who either operate inefficiently or are dependent on imported raw materials – this creates the need for investment in the raw material supply chain to bolster production, improve quality and facilitate the private sector to invest in out-grower support programs); and (v) the application of value chain diagnostic tool that can be applied to clearly define the areas of both public and private sector investments to maximize development and returns for all across the value chain.

The Private Sector Leveraging Strategy will establish the selection and performance criteria for participating private sector entities, consistent with the Environment Social Implementation Manual and overall national environmental and social government regulations. In the addition, the Strategy will include conditions for Private Public Partnership design, such as land acquisition and compensation management to be done by public sector (continuing the good practices established

under publicly financed MINAGRI projects). In preparation of the Strategy, review the quality and impact of Environmental & Social assessments of the existing private sector investments and provide recommendations on the scope of their inclusion into the Private Sector assessment process.
Additional actions under this first Results Area inlude:

- *MINAGRI publish flagship Private Investment Report.* The report will outline MINAGRI's performance in (i) leveraging private resources; (ii) improving the agriculture business environment, and (iii) highlighting reforms to public sector services;
- *A Review of subsidiy regimes.* MINAGRI will lead a review of all agricultural input subsidy schemes, and alternative models for increasing efficiency assessed, reforms agreed and implemented;
- *Updated Expenditure Analysis:* MINAGRI will undertake a Public Expenditure Review 'lite' to assess the efficiency and effectiveness of current subsidy schemes as soon as possible, and commission a policy paper analyzing different models and the launch of a reformed input subsidy scheme(s).

In addition, the successful development of new policies and strategies will further demonstrate MINAGRI capacity to respond to new/emerging challenges including climate change.

Under the PforR Program, MINAGRI will be implementing an initiative to integrate agricultural data management and analysis into a unit. This initiative integrated existing data collection systems and establishes a Common Data Warehouse, which integrates existing and new data, hence providing opportunities for matching data in new ways. This approach seeks to ensure that data collection will be more effective and efficient. The approach builds the foundation for smartphones to be used to collect feedback from farmers and sector agronomists and veterinarians on, for example, project implementation or ongoing disease outbreaks. Together with farmer registration, geospatial information can be used to improve effectiveness and transparency in important programs on inputs subsidies and to track progress on *Imihigos* and PSTA indicators at the local level.

The entry point for the PforR operation will be to support the Agriculture Land Information System. This is a USAID supported initiative that incorporates information on all 57,000 parcels of land owned by MINAGRI throughout the country. Through ALIS, prospective investors will be able to locate land that meets the selection criteria for their investment ideas. Information such as plot size, agro-ecological conditions, and proximity to water sources, feeder or main roads is available in ALIS. ALIS will also be an important tool for MINAGRI to help monitor and track usage of available arable land and get up-to-date information on available infrastructure in the field. With this information, MINAGRI will be able to appropriately prioritize, plan, and budget for profitable public-private partnerships or prospective potential privatization projects.

The PforR Program will incentivize the collection and management of the data in the following areas:

- *Land Profiling:* This activity build a profile of land, ecology and weather patterns. It determines whether plots are suitable for cultivation or new investment i.e. the legal and de facto use of the land and evaluation as to whether actions can be taken

to improve the use of each plot. It is an ongoing exercise informed by the other data collection tools. The aim is to ensure optimal use of each plot.

- *Digital Farmer Registration:* The combination of satellite imagery and farmer registration can enhance transparency, for example the input subsidy programs. To plan and monitor input subsidies programs and strengthen cooperatives, the ongoing farmer registration census needs to be enhanced. The main activity will be to train and deploy enumerators to collect the relevant data.
- *Cow registration system:* This database tracks vaccinations, disease outbreaks and breeding patterns. Cattle tagging and registration is a prerequisite for exporting to overseas markets and helps to contain animal disease epidemics. Therefore, regulations are underway to ensure Rwandan cattle is properly registered. The system and initial census will be provided by public funding. Subsequent registration of new-bred cattle will be provided against a fee.

Improvements in the systems to collect and manage data related to weather and production patterns will enable MINAGRI to ensure climate-related policies are strongly evidence-based. Furthermore, improvements to the collection and management of data related to land use and livestock will improve MINAGRI's capacity for monitoring and early response to potential impacts of climate-related risks and hazards such as crop and livestock pests and diseases.

DLI Justification

DLI 1 Organizational Development Plan. Past efforts to address capacity constraints have yet to be fully implemented. For instance, MINAGRI and its agencies (NAEB and RAB in particular) were included in the Government's Agriculture Sector Capacity Building Plan 2013 – 2018. While this set out capacity development needs, its implementation remains pending and as such capacity constraints remain.[19] A more recent capacity assessment confirmed similar conditions.[20] The inclusion of DLIs focused on organizational change will create an incentive for MINAGRI to great ownership of the change process and to ensure the process is through to completion.

DLI 2. Improved analytical and policy reform competencies demonstrated. A mandated function of MINAGRI will be the development of strategic mechanisms to inform and influence investment on how private investment will be leveraged. The indicators of this increased capacity will include: a) the development of a tool kit/strategy/policy process that will guide Private Sector, is a critical demonstration of MINAGRI commitment and capacity; b) the development of flagship report on agribusiness; and c) reforms to input subsidy.

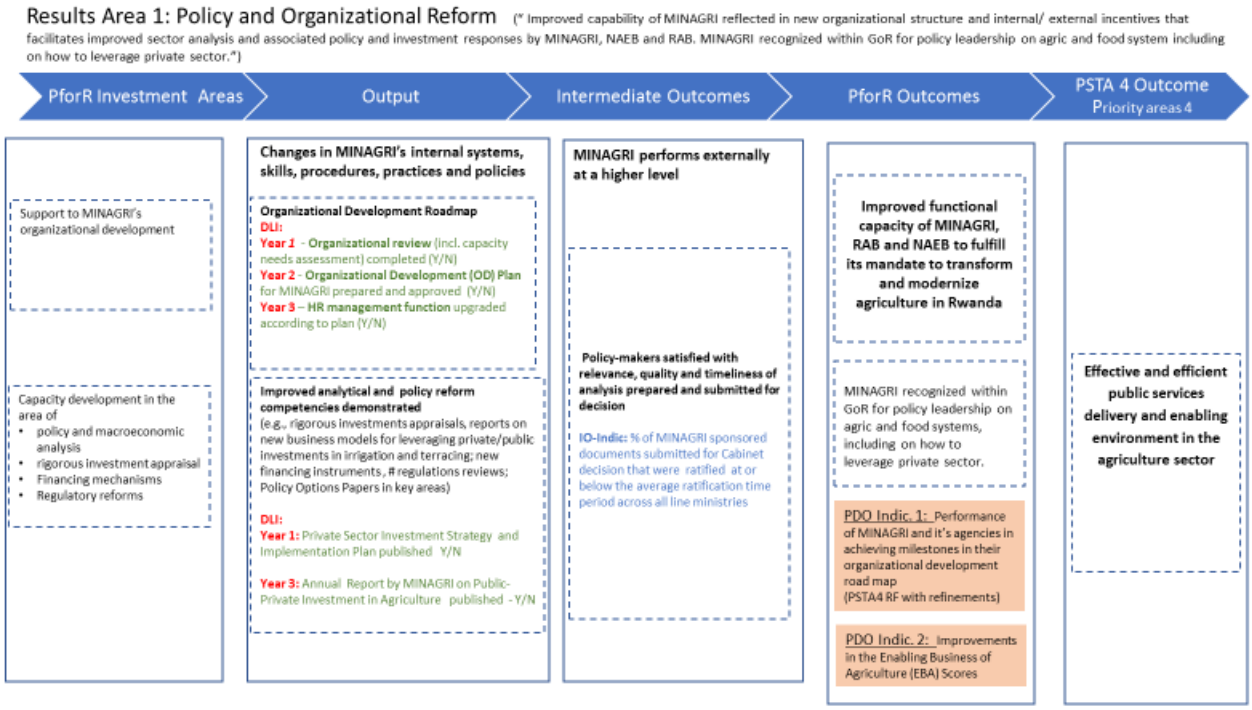
DLI 3. Digital information platforms are designed and operational. Limited information and timely data for evidence-based decision making is recognized by stakeholders as a major constraint.[21] Information needs are driven by central-level reporting requirements and the establishment of policy targets. Existing sector-wide information is not used for investment decisions nor can non-government actors utilize such information for their decision-making. There is little market-based

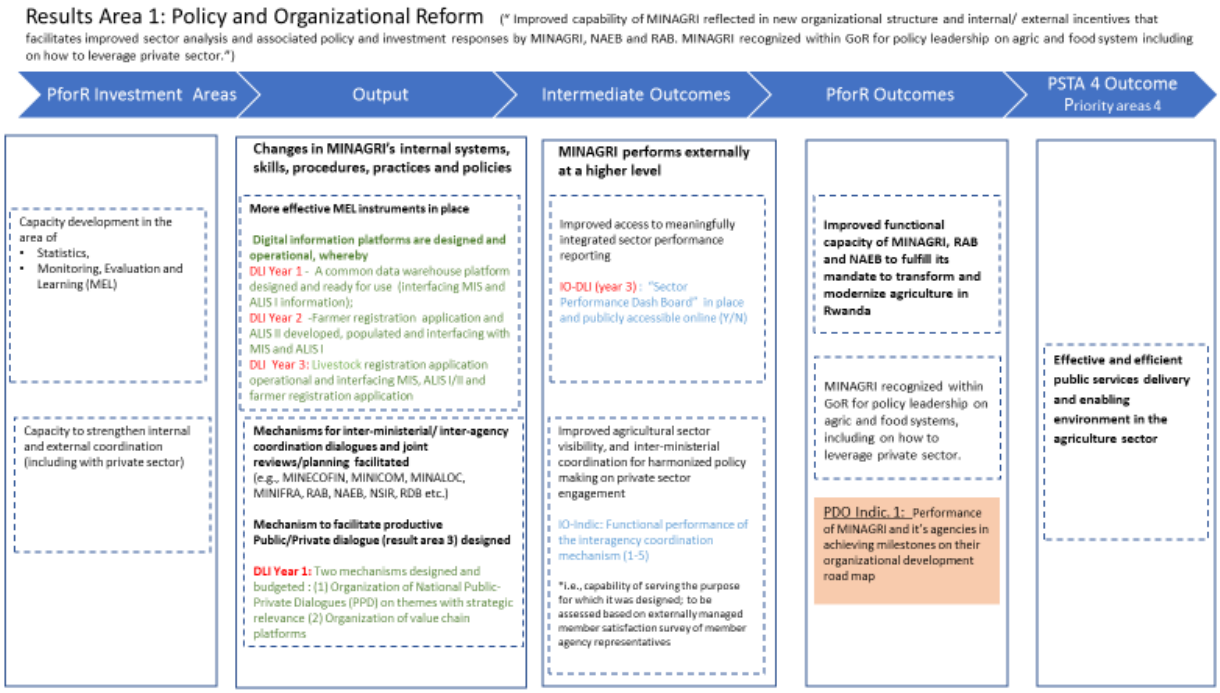
[19] Risner (2017).
[20] Risner (2017)
[21] Risner (2017:19)

data informing strategy or policy making. This DLI creates incentives to build a foundation for new systems for collecting managing information.

DLI 4: Mechanisms for inter-ministerial/inter-agency coordination dialogues and joint working. Engaging with Private Sector requires new ways of coordinating and working. This DLI seeks to incentivize the creation of new structures and will track their performance. The goal is to create positive engagement between key actors and to establish stronger linkages with key players who can support a rapid transition towards a strong enabling environment. Recommendations on how to improve the regulatory environment would be an important outcome from these dialogues.

Figure 8: Results Chains for Results Area 1





Results Area 2: Enabling Commercial Agriculture

The second PforR Results Area focuses on specific interventions to improve the quality of public investments in essential value chain services to leverage commercial agriculture. This includes key areas such as infrastructure and research, by introducing new business models that will link public investments to commercial markets and leverage increased levels of private sector investments. PSTA4 advocates for maximizing the effectiveness and efficiency of public investment by leveraging increased private sector investment in service provision and delivery/management of agricultural infrastructure.

The PPP models will be developed in line with the PPP law of 2016 and in close consultation with the PPP Committee. The 2016 PPP Law marks potential zones for investments and lists potential investors (both foreign and domestic) based on agreed criteria. The overall framework for PPPs in Rwanda is considered to be strong, notwithstanding some concerns around contingent liabilities. All agriculture-related PPPs will be pursued in accordance with the Principles of Responsible Investment in Agriculture and Food Systems.

The PforR Program will support targeted interventions that correspond directly with Priority Area 3 of the PSTA4 on Inclusive Markets and Value Addition. In particular, the PforR Program will support the following activities:

- An expansion for coverage of innovative arrangements for financing new and/or maintaining new irrigation and terracing schemes involving private sector commercial operators. Examples of these arrangements – for instance, where

agribusinesses are collaborating with small-holder farmers in the command areas under contracting farming arrangements to off-take their produce – have evolved sporadically but are not yet a regular and systematic feature of MINAGRI's development plans for all such projects. Analytical tools developed under Results Area 1 will be applied to proposals for expanding productive areas through investments in irrigation or an expansion of the identified potential capital investment schemes with the greatest potential to apply the best practices of commercialization; and

- The PforR Program will allow private/public priorities to drive the types of activities to be supported under this component. However, considering the priorities outlined in PSTA4 and the resources allocated to the budget lines within the MTEF, it is strongly anticipated that the following infrastructure will be built: greenhouses, drying areas, cold storage facilities, and small-scale packaging facilities

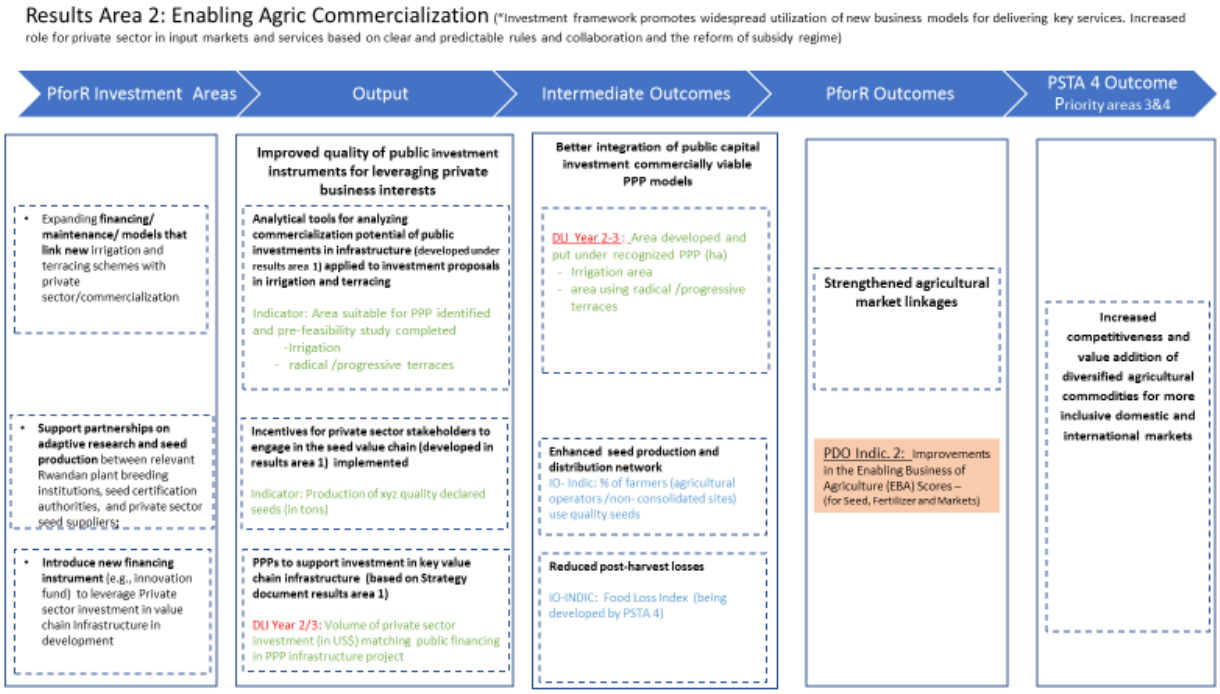
The PforR Program's support to the expansion land under terracing/irrigation and the investment instruments targeted towards climate related infrastructure (e.g. greenhouses, drying areas, etc.) will ensure the PforR Program makes a positive contribution toward MINAGRI goal of mainstreaming of climate smart agriculture into future investments.

DLI Justification

DLI 5 and 6: New irrigation and terracing area identified, developed and/or managed where commercial viability has been a determining appraisal criterion. Achievement of better integration of public capital investment into commercially viable PPP models will leverage greater commercialization on land subject to investments in irrigation or terracing. Economic analysis shows that these costly investments are rarely justified if used to produce low-value food staples. Marshland irrigation and radical terracing, in particular, only generate a positive economic return if they precipitate diversification into higher-value crop production. Moreover, accessing markets and securing value often requires better integration between small-holder producers having benefited from typically publicly-provided irrigation or terracing services and agribusiness who procure their output. Therefore, the PforR Program will incentivize a concerted effort by MINAGRI to be more systematic in connecting beneficiary smallholders in irrigation or terracing projects with agribusinesses to foster diversification into higher-value production and greater value addition.

DLI 7 Improved quality of public investment instruments for leveraging private business interests. The PforR Program seeks to leverage greater investment in key infrastructure services by the private sector to alleviate pressure on scarce public resources. This is consistent with the MDF principles, which seeks private sector investment where viable. Rwanda has a broad framework for PPPs which is broadly supportive. Yet this is designed for large scale concession-based PPPs, for instance toll roads and the like. It was not conceived to address the specific challenges of PPPs in the agricultural space where transactions tend to be smaller, where there are different risks and uncertainties to be apportioned across the contracting parties. Moreover, value chain infrastructure includes essentially private infrastructure but which is utilized in inclusive value chains for the benefit of small-holders which is what justifies the public interest. Examples are warehouses for aggregation businesses which reduce post-harvest losses for small-holders and retain product quality and hence value along the value chain. The PSTA4 proposes the development of PPPs and alternative models.

Figure 9: Results Chain for Results Area 2



Results Area 3: Delivery of Improved Agriculture Value Chain services

Fostering competitive agricultural value chains requires the public sector to provide critical services to support production, processing, logistics, marketing and the like. Consistent with MFD principles, the public function supported by the program is to introduce and accelerate the expansion of services that de-risk agricultural investments by improving dialogue between private and public actions, increasing the use of private sector service delivery (e.g. out-grower schemes and productive partnerships), and expanding access to information and financial services. These measures will help achieve a key anticipated outcome, from PSTA4 it will be improved productivity and inclusiveness of agricultural market systems and increased value addition and competitiveness of diversified agricultural commodities, for domestic, regional, and international markets.

Supported interventions will strengthen market-oriented production, productivity, and processing of diversified agricultural commodities, through increased engagement of the private sector. This will promote the competitiveness and inclusiveness of value chains; reinforce linkages between markets and agri-businesses, farmers and other value chains actors through strengthened aggregation, out-grower schemes and market information systems; promote high-value addition of agricultural commodities; develop market-oriented infrastructure (including feeder roads, collection centers and storage systems); strengthened inclusive financial services and transparent, market-oriented pricing mechanisms; and improved quality assurance regulation and certification, with strengthened compliance and enforcement capacities.

The PforR Program will be focused on the following areas:

- *Promoting the development and scaling up of productive alliances*, focusing on small-holder farmer market integration, not only of intermediary and end markets, but also input and service markets necessary for increased productivity and profitability. Specifically, to facilitate the scaling up of out-grower schemes, together with contract enforcement and loyalty incentives. Strengthened contract farming will promote structured trading systems, where producers find secured markets, at pre-agreed fair and transparent prices, together with embedded services, including finances, to ensure they fulfill market requirements.

The PforR Program recognizes the potential for using private sector service providers to complement the efforts of RAB and NAEB and thereby expanding the overall availability of extension advice to Rwandan farmers. Indeed, there are already examples of private provision, which tends to occur organically in more commercially-oriented sectors where marketing requirements demand specific qualities, etc., that state extension workers are less likely to deliver. Often these occur within vertically integrated value chains and are essentially private arrangements between small-holder farmers and off-takers who procure their output. These can be supported as part of out-grower schemes and contract farming arrangements.

Specifically, the PforR Program provides incentives for MINAGRI along with RAB and NAEB to undertake two critical preparatory steps: The first is to identify those areas (spatially and/or by sub-sector) which offer the most attractive potential to pilot private extension provision. This will involve an assessment, commissioned from independent experts with the active involvement of NAEB and RAB. The second is the establishment of necessary performance standards necessary to underpin service delivery contracts with private providers. These performance standards must reflect existing best practices (at the very least they must meet existing standards of NAEB and RAB) and must include both technical agronomic elements and the methodology for service delivery (e.g. adoption of farmer field school methodologies, number of farmers to be reached, etc.). The draft proposal should be subject to a 'market test' to ensure there is sufficient interest among potential private providers prior to this pilot being launched.

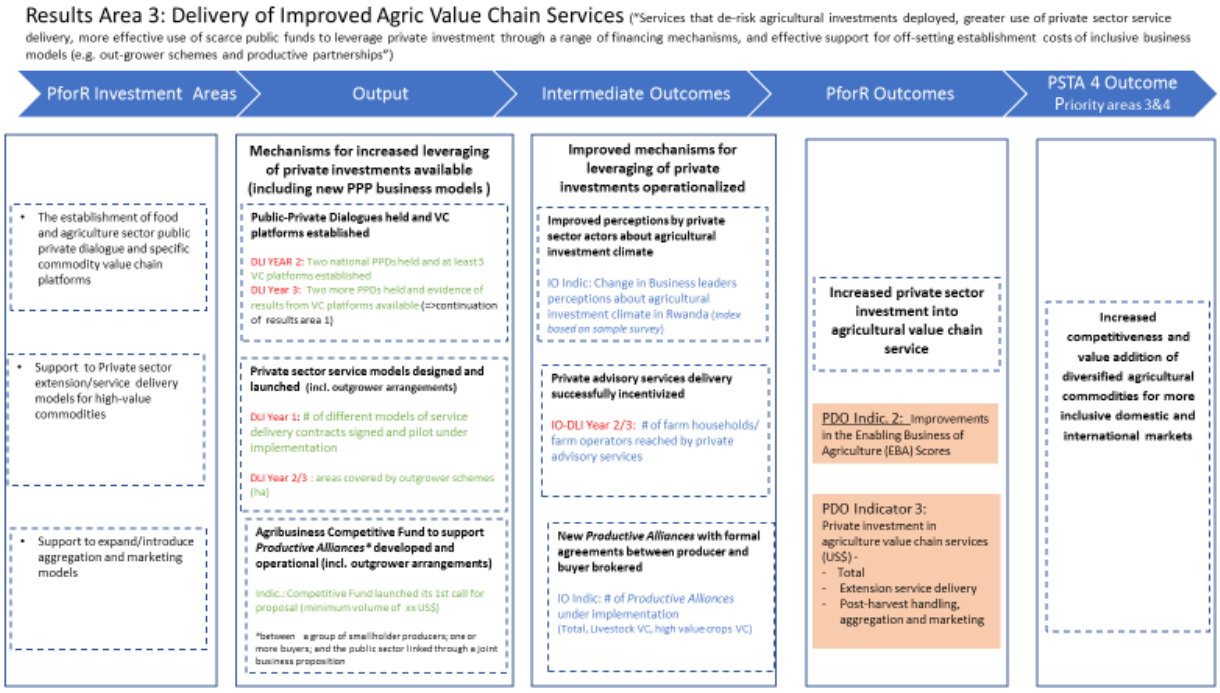
DLI Justification

DLI 8 Improved mechanisms for leveraging private investments operationalized. The PforR Program recognizes that to fully leverage private sector investment in agriculture, there remains a critical role for the state in the delivery of agricultural value chain services. These encompass policy interventions necessary for a broadly conducive enabling environment; the provision of essential public infrastructure such as roads, ports, wet and dry markets, etc; and critical services such as research, extension, credible codes and standards etc. Yet demands for these services out-strip the available resources – financial and technical. Assessments of PSTA3 have highlighted the limited scope for public extension services which have focused on a small number of crops and have not provided the level of support required to result in technology adoption. Similarly, there remains a shortage of infrastructure essential for competitive value chains in food staples and especially in higher value products, including dairy, livestock and horticulture. The Government program seeks to attract a greater private sector role either as financiers and/or service providers.

There is potential for using private sector service providers to complement the efforts of RAB and NAEB and thereby expanding the overall availability of extension advice to Rwandan farmers. Indeed, there are already examples of private provision, which tends to occur organically in more

commercially-oriented sectors where marketing requirements demand specific qualities etc. that state extension workers are less likely to deliver. Often these occur within vertically integrated value chains and are essentially private arrangements between small-holder farmers and off-takers who procure their output. These can be supported as part of out-grower schemes and contract farming arrangements. The types of services to be supported include advisory services, artificial insemination, disease control and post-harvest quality control.

Figure 10: Results Chain for Results Area 3



Results Area 4: Improving Efficiency of Public Expenditures

PSTA4 envisages a substantial scale-up in expenditures and this needs to be accompanied by ongoing efforts to improve value for money in existing spending. Therefore, the fourth Result Area aims to increase the efficiency and effectiveness of public spending in agriculture by focusing on three key areas of transformation, these are supporting the ongoing process of decentralization, further improving budget preparation and execution procedures of key service providers and reviewing and revising the subsidies provided to fertilizers. A key problem to effective implementation of the PSTA4 is the perceived weakness in the execution of publicly-funded activities and the resulting reduction in efficiency of agriculture-related public expenditures. This is not unique to agricultural spending. The recent AgPER sponsored by the World Bank provided a comprehensive assessment of the overall spending in support of the agricultural sector. There are a number of critical reforms required to improve value for money in spending, to better integrate allocations across programs with policy priorities, and to improve the ability of MINAGRI to compile the aggregate quantum of resources being spent on the sector.

The PforR Program seeks to incentivize the dual approach of supporting: (i) a very specific action that demonstrates improved efficiency in public expenditure of the core delivery agency RAB; and (ii) a more general effort to improve the overall expenditure among the three main agencies that account for the largest share of sector expenditure. Since RAB is the agency with responsibility for key services, improvements in the budget execution system will be undertaken with the goal of improving their delivery function. Standards for budget execution help to maximize the impact of government spending and the ability to meet such standards signals weaknesses that undermines value for money. It also undermines the argument for additional public resources since there are associated concerns over malfeasance in execution that render MINECOFIN reluctant to allocate

additional resources. Previous audits of RAB have not been approved because of non-compliance in several important areas. Prior qualified audits have highlighted in detail where weaknesses lie and both agencies are aware of where improvements are needed.

The second result requires broader improvements in the management and delivery of plans to support decentralization. The PforR Program results will incentivize 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 will assess the comparative advantages and complementarities of private sector service delivery in terms of service diversity, up scaling potential, sustainability, and cost effectiveness. This review also takes into consideration implementation responsibilities at 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.

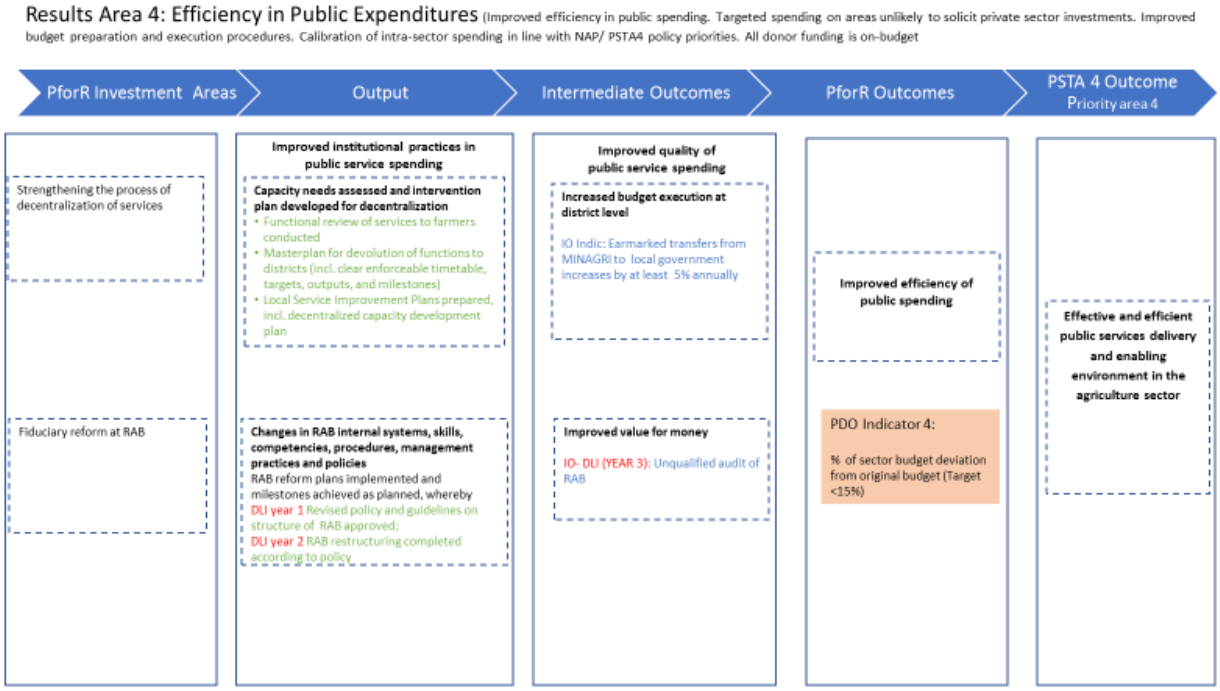
Local services improvement plans will be mandated as an outcome of the functional review, and these will seek to strengthen the complementarity of public and private sector service provision, suited to farmers' needs. These local improvement plans will include capacity building, monitoring and management responsibility and will be incorporated into local joint-planning, in close coordination with district level authorities responsible for those services. The plans will integrate the need for mainstreaming cross-cutting issues to be dealt with at district level (nutrition and 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. The Goal is to have Earmarked transfers increased by at least 5 percent compared to the baseline measure as reported in the subsequent PER-Lite (see below).

In order to track anticipated improvements in budgeting and expenditure execution, MINAGRI will commission repeat AgPER-Lite studies. This AgPER-Lite will track decentralized expenditures and will provide the evidence confirming significant improvements in the efficiency of sector expenditures by MINAGRI, RAB and NAEB. Expenditure efficiency is defined in the PFM literature.

DLI justification

DLI 9Reform of RAB. A significant roadblock to the effective implementation of the PSTA4 is the perceived weakness in the execution of publicly-funded activities and the resulting reduction in efficiency of agriculture-related public expenditures. This is not unique to agricultural spending. As mentioned above, the recent AgPER provided a comprehensive assessment of the overall spending in support of the agricultural sector. There are a number of critical reforms required to improve value for money in spending, to better integrate allocations across programs with policy priorities, and to improve the ability of MINAGRI to compile the aggregate quantum of resources being spent on the sector.

Figure 11: Results Chain for Results Area 4



5. Climate Change Statement of Intent and Summary of PforR Results Areas links to Climate Change

Statement of Intent: Climate Change

Climate Change research indicates that rainfall patterns are becoming more irregular and unpredictable with shorter rainy seasons negatively affecting Rwandan agriculture. Crop- and livestock-suitable areas, the length of the growing seasons, and potential yields are all expected to decrease. Moreover, estimates from the Fourth International Panel on Climate Change Assessment Report indicate that the average surface temperature in Africa has increased by 0.2 to 2.0 C in the last four decades (1970–2004), suggesting an overall increase in annual temperatures (by 1.0 C–2.0 C) over the next century (2010–2100) in Rwanda. Medium-term climate projections for Rwanda indicate a general increase in annual mean temperature (by up to 1.5 C) and in total annual precipitation rates by 2030.

Much of Rwanda's farming practices are ill-suited to the challenges of climate change, agriculture is mostly rain-fed, and therefore more exposed to weather-related risks, especially to severe, frequent, and prolonged dry spells occurring during the cropping seasons. Changes in climate conditions have impacted the prevalence of pests and diseases (e.g. major Army Worm outbreak was linked to the 2017 El Niño). Outbreaks like these have greatly affected agricultural production throughout the country, triggering losses in yields and income. However, farmers in general, lack access to climate related products, services and information. The sector's infrastructure (e.g. cold storage, crop drying facilities, etc.) that support the key value chains is insufficient, as a result, commodities are exposed to additional risks during extreme weather conditions.

Rwanda has, in some areas, undertaken an unplanned and unsustainable approach to the expansion of agricultural activities into more fragile environments such as steeper hill slopes and wetlands, as a response to increased food demand. These actions have triggered a range of farm practices that have exposed production systems to climate change related risks. Examples include; limited investment in soil protection mechanism, water management practices which are unsustainable, and efficient use of fertilizers and other key inputs.

Adapting to climate change, stopping land degradation, and maximizing the productive use of groundwater waste remains a public priority. Climate Smart Agriculture (CSA) entails triple wins in terms of productivity, adaptation and mitigation. This is essential in the context of Rwanda where the challenges of the food insecurity situation; population pressure, small land size per capita lead to the need for sustainable intensification. The GoR has recognized the need to foster and incentivize the adoption of CSA measures, for instance the need to increase the efficiency of water use, improve the sustainability of landscape management actions and improve the capacity of key agencies to understand and respond to key trends. These actions have mainstreamed into PSTA4 and to be directly supported by the PforR Program. The PforR Program and its results areas aim to tackle identified climate risks and vulnerabilities as follows:

Policy and Organizational Reform. Currently MINAGRI has limited capacity to fulfil its mandate in policy development, inter-sector and intra- sector coordination, resource mobilization and M&E. The PforR Program will support improving the capability of MINAGRI to properly address policy challenges and direct public investments across all GoR. This new capacity will be expressed in Climate Smart Investment Plan (a PAP action), that will seek to mainstream climate change into all aspects of the sector planning, budgeting and implementation and to strengthen regulatory institutions and policies (including rules and regulations) which reduce the emissions of Greenhouse Gases (GHG) in the agriculture, fishing, livestock, and/or forestry sectors improvements in data management 9(including weather monitoring systems)

A stronger dialogue between the Public and Private Sector (including farmer associations and other stakeholders) will allow for knowledge exchange and greater awareness of climate risks. For example, there could be a consensus on: a) effective ways to address cassava brown streak disease (CBSD), b) reform regulations to enable farmers in drought prone regions to have increased access to water efficient irrigation systems or c) options for improving energy efficiency in cold storage systems.

Private Public investments in key areas such as:

- Irrigation systems to reduce the risks of drought and promote sustainable water management practices and improve water use efficiency.
- Sustainably managed terracing that will enable farmers to increase soil fertility, reduce soil degradation, and invest in agro forestry.
- Key infrastructure such as energy efficient greenhouses to reduce the impact of weather risks and costs, energy efficient cold storage systems will reduce the impact of heat and reduce costs.
- Private sector services to increase access to knowledge and services including those

related to climate change, for example, increased awareness of pest outbreaks, management of livestock diseases, improved use of fertilizer, etc.

A summary of how individual DLIs contribute to Climate Change can be found below in Table 9.

Table 9: Disbursement Linked Indicators and Climate Change Intent

Disbursement-Linked Indicator	**Climate Change intent**
DLI 1: Organizational Development Roadmap successfully prepared and implementation on track	The process of organizational change will enable MINAGRI to build increased capacity to introduce institutional reforms that will enable private sector investment. In addition, the reforms will include a climate smart investment plan for MINAGRI This will include building the capacity to model, forecast and adapt as changes occur and greater evidence becomes available to hone down climate change forecasts and the relevant response. There is a specific PAP to support this activity.
DLI 2: Improved analytical and policy reform competencies demonstrated	The development of new policies and strategies will demonstrate MINAGRI's capacity to respond to new/emerging challenges and opportunities of climate change. Specific examples of how this increased capacity may be demonstrated include the following: The promotion of more energy efficient greenhouses. Increasing access to water efficient irrigation systems. Reforming fertilizer subsidies to increase the efficiency of use.
DLI 3: Digital information platforms designed and operational	Improved local climate information services and medium/short-term forecasting (extreme weather events, rising temperatures, dry spells, etc.) This action will support adaptation planning and strengthening ability of producers and markets to cope with climate change and climate variability impacts. Improvements to the collection and management of data related to land use and livestock will improve MINAGRI's capacity to track climate-related risks and hazards such as trends in crop and livestock pests and diseases.

DLI 4: Mechanism to strengthen public private dialogue (PPD) and specific commodity value chain platforms designed and implemented	A stronger dialogue between the Public and Private Sector (including farmer associations and other stakeholders) will allow for knowledge exchange and greater awareness of climate risks. For example, there could be consensus on a) effectives ways to address CBSD, b) reform regulations to enable farmers in drought prone regions to have increased access to water efficient irrigation systems or c) options for improving energy efficiency in cold storage systems.
DLI 5: New irrigation area identified, developed and/or managed where commercial viability has been a determining appraisal criterion	The investments in irrigation will, reduce the risks of drought by promoting sustainable water management practices and improving water use efficiency.
DLI 6: New terracing area identified, developed and/or managed where commercial viability has been a determining appraisal criterion	The establishment of sustainable terracing will enable farmers to increase soil fertility (introduction of organic matter), reduce degradation (protect run off), and invest in agro forestry.
DLI 7: Volume of private sector investment (in US$) matching public financing in PPP infrastructure projects	Investments will support both improved adaptation and mitigation actions; for example: introduction of energy efficient greenhouses will reduce the impact of weather risks and costs, and energy efficient cold storage systems will reduce the impact of heat and reduce costs. Overall these investments will reduce risks and ensure

	business continuity during and after extreme weather events.
DLI 8: Private sector service models designed, launched and achieving positive response	The introduction of market driven services should increase access to knowledge and services including those related to climate change, for example, increased awareness of pest outbreaks, management of livestock diseases, improved use of fertilizer, etc. The reduced reliance on public sector as the primary service provider will enable Public Resources to be refocused towards supporting farmers who are at the greatest risk from climate-related hazards.
DLI 9: Reform of RAB	The aim is to ensure the key public-sector service provider increases its efficiency and effectiveness in order to implement the relevant actions Climate Smart Investment Plan (see DLI2).

Summary of PforR Results Areas and Associated DLIs

A summary of the Results Areas and associated DLIs is provided in the table below

Table 10: Summary of DLIs

Disbursement-Linked Indicator	**Definition**	**Target**	**Total Amount** (*US$ millions*)	**Responsible**
	Results Area 1: Policy and Organizational Reform			
DLI 1: Organizational Development (OD) Roadmap successfully prepared and implementation on track	• Organizational review, including capacity needs assessment of MINAGRI completed and new functional structures in place (year 1) • OD Plan for MINAGRI prepared and approved (year 2) • Upgrade of HR management function completed (year 3)	Yes Yes Yes	**Total 10** 4 4 2	MINAGRI
DLI 2: Improved analytical and policy reform		Yes	**Total 10** 4	MINAGRI

competencies demonstrated	• Private Sector Leveraging Strategy with Implementation Plan published (year 1) • Annual Report by MINAGRI on Public-Private Investment in Agriculture published (year 2) • Agricultural input subsidy schemes reviewed, alternative models for increasing efficiency assessed, reforms agreed and implemented (year 3)	 Yes Yes	 2 4	
DLI 3: Digital information platforms designed and operational	• A common data warehouse platform is designed and ready for use, whereby existing data in MIS and Agriculture Land Information System I (ALIS) are fully interfaced (at least down to the level of all districts) – (year 1) • The Farmer registration application and ALIS II are fully interfaced with MIS and ALIS I in the common data warehouse platform. Both, Farmer registration and ALIS II, will hold data covering all districts - (year 2) • The Livestock registration application (holding cow data with national coverage) will be interfaced with MIS, ALIS I and II, Farmer registration application in the common data warehouse platform (Year 3); • Sector Performance Dash Board is in place and publicly accessible online, whereby it provides reports on national agricultural macro indicators, national Indicator of Food Security and PSTA 4 results indicators (year 3)	 Yes Yes Yes	**Total 8** 2 2 2 2	MINAGRI
DLI 4: Mechanism to strengthen Agriculture Public-Private	• Two mechanisms designed, piloted, and budgeted: (1) National Ag. PPD on themes with strategic relevance and	100%	**Total 8** 2	MINAGRI

Dialogues (Ag. PPD) and Agriculture Value Chain Platforms designed and implemented	(2) Commodity value chain platforms (year 1) • Two national Ag. PPDs held and at least 3 Agriculture VC platforms established with operating plans (year 2) • Additional 2 Ag. PPDs held (year 3) • Agriculture VC platforms are fully functional and yielded evidence of satisfactory results (as per M&E of operating plan) (year 3)	 100% 100% Yes	 2 2 2	
	Results Area 2: Enabling Agricultural Commercialization			
DLI 5: New irrigation area identified, developed and/or managed where commercial viability has been a determining appraisal criterion	• **# of ha** identified, developed and put under recognized PPP (year 2) • **# of ha** identified, developed and put under recognized PPP (year 3)	1260 1680	**Total 10** 5 5	RAB
DLI 6: New terracing area identified, developed and/or managed where commercial viability has been a determining appraisal criterion	• **# of ha** identified, developed and put under recognized PPP (year 2) • **# of ha** identified, developed and put under recognized PPP (year 3)	745 2310	**Total 10** **5** **5**	RAB
DLI 7: Volume of private sector investment (in US$) matching public financing in PPP infrastructure project	Volume of private sector investment (in US$) matching public financing in PPP infrastructure projects • # of US$ Mil (year 2) • # of US$ Mil (year 3)	 4.00 7.15	**Total 20** 10 10	RAB and/or NAEB
	Results Area 3: Delivery of Improved Agric Value Chain Services			
DLI 8: Private sector extension service models		6,000	**Total 15** 5	RAB

designed, launched and achieving positive response	• farm households reached by private advisory services (non-outgrower scheme) (year 2) • additional farm households reached by private advisory services (non-outgrower-schemes (year 3) • new farm household participating in outgrower schemes (Year 3)	8,000 10,000	5 5	
	Results Area 4: Efficiency in Public Expenditures			
DLI 9: Reform of RAB	• Implementation Plan for RAB Restructuring Order prepared and approved by its Board (year 1); • Deviation (+/-3%) between budget and outturn expenditure 2019/20 (year 2); and • Unqualified audit of RAB (year 3)	Yes (+/-3%) Yes	**Total 9** 3 3 3	RAB

6. Program Economic Evaluation

Economic Assessment

The economic assessment of the Transformation of Agriculture Sector (PforR) support operation for the GoR's Fourth Strategic Plan for PSTA4 includes: (i) the rational for public sector financing, (ii) the World Bank value added and (iii) a quantitative assessment of the PSTA4's economic impact**.**

The economic impact assessment suggests that the Program is economically viable. The economic impact assessment covers three main PforR interventions that account for more than half of the total PforR Program cost and support key subprograms of the PSTA4.[22] Focusing on agricultural production benefits the results of the analysis show an economic net present value (NPV) of US$213 million and a sound economic rate of return (ERR) of 26 percent. The analysis is based on an excel-based 3 cropping models developed to calculate the increases in productivity.[23] It assumes an exchange rate of 741 RWF for US$1, at 12 percent discount rate and a time horizon of 25 years.

In addition, PforR Program will also contribute to poverty reduction through farm-level income growth. Increases in farm income per person will range between US$152 and US$1,036 on

[22] The PforR's activities taken into account in the analysis are terracing (radical and progressive), irrigation developments and marshlands irrigation.

[23] The excel-based 3 cropping model integrates the 2014 cropping model's assumptions on both cropping patterns (with and without the Program) and 2014 crop prices.

a 0.6ha farm. Assuming an average farm household of 5 people per person, income increase constitutes about 0.8 to 5.4 times the poverty line for Rwanda or US$0.3-2.3 per person per day.

The PforR Program would also bring other environmental, institutional and private sector benefits which cannot be readily quantified.

Public sector rational

Public financing of this Program has three main justifications: **(a) the provision of public goods - infrastructures -** such as terraces, irrigation and post-harvest investments that are essential to increase production, foster diversification into higher-value production and leverage greater commercialization; (b) **the Program will support the Government in core public sector functions** such as strengthening the agriculture sector institutional framework in terms of organization, policy, regulatory framework, sector capacity building and private sector involvement and promotion; and (c) **the role for Governments in providing critical services such as research, knowledge generation and technology transfers of the agriculture and livestock sectors** while expanding the range of actors in promoting agricultural research, including the private sector

Public sector involvement in land terracing and marshland irrigation is justified by the targeting of poor and remote rural areas with few economic development alternatives while linking public investments to commercial markets and leveraging private sector investments. Through the Program, public sector investment would assist private farmers in developing land that is potentially suitable for agriculture but is currently left idle, or cultivated with very low intensity, due to the slope and/or lack of irrigation systems (marshlands). Development of hillside terraces and irrigation developments has high unit costs that cash-poor farmers are not able to cover. Investments in radical and progressive terracing do generate direct benefits to farmers. However, the investments also reduce long-term productivity losses from soil erosion while contributing to the preservation of the natural environment. Furthermore, irrigation development has spillover effects on the local population through employment generation and improved availability of water for household use as well as livestock production. Finally, the Government through the Program will promote financing/maintenance models that link the terracing and irrigation schemes with private sector/commercialization.

The PforR Program aims to increase the efficiency and effectiveness of public sector agriculture institutions for key agricultural services delivery, while putting in place processes to expand the role of the private sector in service provision. Yet the delivery of the key agriculture results depends on the public agriculture sector and its ability to plan, budget, execute and account for public resources in an efficient and effective manner. In particular, strengthening PFM in agriculture and supporting the ongoing process of decentralization are essential to increase the execution of publicly funded activities and improve efficiency of agricultural spending. Likewise, improving conducive and business oriented regulatory frameworks, increasing access to financial services and promoting public-private productive partnerships will unlock the growth potential of the private sector in the agriculture sector.

Research, knowledge-generation activities and technology transfers are an important public function in support of agriculture development. The impacts of investment in research, technology transfer

rely on effective institutions that can implement research programs and ensure farmer adoption of improved technologies and farming practices. In addition, investments are planned to adapt the legal and regulatory system to transform the agriculture sector towards higher value chains including exports. At the same time, PforR seeks to expand the range of actors in promoting agricultural research, including the private sector, for higher-value crops.

Value added of World Bank support

First, the World Bank financing in support of PSTA4 would add comparative value given the Bank's position to draw upon a wealth of global experience in the following areas: (i) sustainable land management; (ii) input provision; (iii) increased irrigation in marshland and hillside approaches in support of increasing agriculture production and productivity; (iv) fostering of a more conducive policy environment for stimulating the private sector's role and investments in the agriculture sector; (v) increased marketing and sales of agriculture production and creation of on- and off-farm small and micro businesses; and (vi) provision of advice to the GoR on adapting relevant good practices and innovations to the Rwandan context.

Over the past fifteen years, the World Bank has provided significant support to Rwanda's agricultural sector which provide a strong foundation for this operation. Both the Rural Sector Support Project (RSSP) and the Land Husbandry, Water Harvesting and Hillside Irrigation Project (LWH) achieved commendable results in helping to transform Rwanda's rural farming sector. Under RSSP 1, 2 and 3, farmers moved from low-value subsistence farming to a more productive irrigated system and impressive improvements were made in marshland rehabilitation and protection of hillsides against erosion. Similarly, LWH made significant contributions to raising rural incomes, increasing productivity of hillsides, increasing crop yields, and improving participatory approaches of farmers' organizations.

The proposed PforR Program builds on lessons learned from the implementation of the first PforR Transformation of Agriculture Sector Program. Factors related to capacity development and allocation of human and financial resources for increased M&E, improved institutional arrangements (decentralization) have been duly considered in the design of the project and thoroughly discussed with the Government's counterparts. The lessons learnt of PforR1 would support the GoR's effective implementation of PSTA4, thereby contributing to achievements of strategic impact, outcome, and output level targets.

The PforR Program also complements other government initiatives and Bank supported projects, both on-going and in preparation, such as the Rwanda Public Sector Governance Program For Results (on-going) and the PFM Reform Project (in preparation). Indeed, the Program presents an opportunity to enhance institutional arrangements [central-local governmental intergovernmental fiscal relations and the Agriculture Development Fund (AFD)] and to provide information to improve resource predictability, budget systems and alignment with government priorities in the agriculture sector. Overall, this intervention offers the opportunity for the Bank to strengthen and sustain a policy dialogue on critical public-sector management reform issues that could significantly improve the capability and performance of the Government.

Finally, the World Bank Group has the convening power that is critical to articulate funding issues which will be crucial to the PSTA4's success.

Quantitative Methodology

The assessment only quantifies direct benefits for a number of PforR Program activities, including terracing (radical and progressive), irrigation developments and marshlands irrigation, that account for more than 50 percent of the PforR Program cost and supports two key areas of the PSTA4 (SP 2.1 Sustainable land husbandry and SP 2.2 effective and efficient under Integrated water resources management (IWRM) frameworks) (see Table 11).

There is a sound return on public sector investment in lands terracing and water developments increasing production capability and generating upgraded farm incomes. The planned US$300 million, 3-year investment yields a sound overall economic NPV of US$213 million with an Economic Rate of Return (ERR) of 26 percent. As shown in table 12 below, the estimated 26 percent ERR lies within the range of rates of returns calculated on existing and closed investment projects in Rwanda and other Sub-Saharan countries as implemented through different organizations (ERRs ranging from 14 percent to 93 percent on projects with a varying combinations of soil conservation, irrigation, and post-harvest components).

Table 10: Net return on public sector by cropping model and benefit stream (in US$ million)

Cropping model	Financial values		Economic values	
	NPV (12%)	ERR	NPV (12%)	ERR
Radical and progressive terracing	87	27%	125	28%
Hillside land irrigation	52	23%	49	23%
Marshland irrigation	41	27%	40	27%
Net return to public sector investment	**179**	**25%**	**213**	**26%**

Source: PforR, PSTA III Agricultural Program for Results Support Operation – Economic and Financial Analysis Model

An Excel-based cash flow model was developed to assess the impact of the public investment on revenues and costs in three programs. For the purpose of modelling, the net financial benefit is calculated with respect to an assumed 25-year cash flow starting from the beginning of the PforR Program implementation. The excel-based 3 cropping model uses the assumptions on cropping patterns (with and without the Program) and 2014 crop prices from the Economic and Financial Analysis Model developed for PforR Program Transformation of Agriculture Sector Program Phase 3 in 2014. The analysis assumes a market exchange rate of 741 RWF for US$1 and a 12 percent discount rate (in line with the assumption in other World Bank projects in Rwanda). Benefits and cost attributable to the PforR Program are measured by comparing the situation with and without the Program. The ERR is based on the discount rate that equates the NPV of the benefit stream arising from additional investment with the NPV of the cost stream.

Benefits. The bulk of the benefit assessment is based on the projected farm level yields, calculating the annual gross margins per hectare for each crop. The identification and monetizing of other benefits have resented some difficulties due to the absence of data or challenges to measure in financial terms

(such as incremental benefits incurred by linkages between the SPs, increased carbon sequestration or employment opportunities).

Costs. The PforR Program costs are assumed to be made over the Program's three-year period. Recurrent investment costs (estimated at 1 percent of total public investment cost) are also included and are applied after the three years of the PforR Program's implementation period over the remaining 22 years of the cash flow. Costs related to labor, planting, manure as well as fertilizers, chemicals and irrigation maintenance are also considered as investments to increase the production's yield.

The economic analysis is based on three cropping models applied on irrigated hillside, radical and progressive terracing and irrigated hillside marshlands as described below:

a. **Cropping on irrigated hillside areas.** The incremental impact of Program comes to a total of 14,400ha developed for the cropping on irrigated hillside areas. The cropping model includes the following assumptions: (i) representative cropping pattern of shares and yields for avocado, banana, maize, mango, onion, tomatoes, and sorghum for the without- and with-program situations (see table 3 below), (ii) farm level yields, crop prices, and costs of labor, planting, manure, fertilizer, chemicals, and irrigation operating and management fee, as applicable on the different crops, (iii) delayed harvesting and replanting of certain crops have not been taken into account, (iv) 5 percent production loss and (v) adoption of the improved with-program cropping practices by all farmers with the project.

b. **Cropping on non-irrigated hillside areas**. The incremental impact of the Program comes to 114,000ha developed for non-irrigated farming of which 84,000ha for the construction of progressive terracing and 30,000ha for the construction of radical terracing. The non-irrigated hillside model includes the following assumptions: (i) representative cropping pattern of shares and yields for banana, beans, cassava, irish potato, maize, sorghum and soybeans for the without- and with-program situations (see table 13 below), (ii) farm yields, crop prices and operating costs as applicable to the different non-irrigated crops (iii) similar to the irrigated hillsides model, delayed harvesting and replanting of certain crops have not been taken into account, (iv) 5 percent production loss and (v) adoption of the improved with-program cropping practices by all farmers with the project.

c. **Cropping on irrigated marshlands**. The incremental impact of the Program comes to 18,000ha developed for marshland irrigation. The irrigated marshland model includes the following assumptions: (i) sweet potatoes grown in the without-program situation and paddy rice grown in the with program situation (see table 3), (ii) farm yields, crop prices and operating costs as applicable for sweet potatoes and paddy rice, (iii) similar to the other models, delayed harvesting and replanting of certain crops have not been taken into account, (iv) 5 percent production loss, and (v) adoption of the improved with-program cropping practices by all farmers with the project.

Table 11: Assumed representative farm cropping pattern and yields without and with program by area

	Irrigated Hillsides	Non-irrigated Hillsides	Irrigated Marshlands

	Crop	Share	Kg/ha	Crop	Share	Kg/ha	Crop	Share	Kg/ha
Without Program	Banana	33%	15,000	Banana	20%	15,000	Sweet potato	100 %	6,000
	Maize	33%	2,000	Beans	18%	600			
	Onion	2%	8,000	Cassava	9%	10,500			
	Sorghum	32%	1,600	Irish potato	7%	8,500			
				Maize	24%	1,600			
				Sorghum	22%	1,400			
With Program	Avocado	22%		Banana			Paddy rice	100 %	13,000
	Banana	10%		Beans					
	Mango	19%		Irish Potato					
	Onion	19%		Maize					
	Tomatoes	30%		Soybeans					

Source: PSTA III Agricultural Program for Results Support Operation – Economic and Financial Analysis Model
Note: Cropping patterns on farms were obtained from the specific situations in the RSSP and LWH projects. Given the nationwide implementation of the strategy, some crops could be included in both the without and with program such as cassava and coffee, however for the present assessment an update of the cropping patterns was not feasible.

Adjustment factors for economic analysis. The following adjustment factors were made for the economic analysis: (i) the annual calculation of the 3 cropping models over a 25-year period using financial prices measured at the farm gate in constant 2014 amounts, (ii) financial prices and costs are not converted to economic prices by using adjustment factors, (iii) the setting of the discount rate to 12 percent in line with the assumption in other World Bank projects in Rwanda, (iv) the setting of the shadow price of unpaid family labor at US$0.98 per day (RWF 634 per day), which is 14 percent below the market price of US$1.14 per day (RWF 740 per day) for unskilled hired labor used in agricultural production, (v) the inclusion of 50 percent fertilizer subsidy on maize and wheat in the financial analysis and exclusion of this subsidy from the economic analysis, and (vi) the conversion of the remaining financial prices and costs to economic prices using a standard factor of 0.9.

Poverty reduction through farm-level income growth. Public investments in terracing and irrigation improve farm-level income. Table 14 shows the increase per hectare gross margin in the different investment areas: 31 percent increase on non- irrigated and much larger increases on irrigated areas. The increase is calculated based on the cropping pattern described in table 13. Assuming an average farm household of 5 people per person income increase constitutes about 0.8 to 5.4 times the poverty line for Rwanda or US$0.3-2.3 per person per day. It is noteworthy that the income increase will motivate farmers to adopt and maintain the improved agriculture technologies.

Table 12: Poverty from increased annualized financials gross margins by cropping area

(April 2014 prices)	Unit	**Irrigated Hillside Areas**	**Non-irrigated Hillside Areas**	**Marshland Areas**
Without Program	US$/ha	3,296	4,100	678
With Program	US$/ha	11,927	5,368	3,038

Incremental increase:	**US$/ha**	8,631	1,268	2,360
% increase	%	262	31	348
Increase on 0.6ha farm (5 persons)	US$/farm/year	5,179	761	1,416
Increase per person	US$/person/year	1,036	152	283
Increase as share of poverty line[1]	Ratio	5.4	0.8	1.5
Increase as share of extreme poverty line[2]	Ratio	7.7	1.1	2.1
Increase per person per day	US$/person/year	2.3	0.3	0.6

Source: World Bank, PSTA III Agricultural Program for Results Support Operation, 2014
Note:
[1] The Rwanda poverty line in 2012 prices was RWF 118,000 per person per year; converted to 2014 prices, it is US$192.
[2] The Rwanda extreme poverty line in 2012 prices was RWF 83,000 per person per year; converted to 2014 prices, it is US$135.

7. Risks, Rating and Mitigating measures

The technical risks to the PforR Program are significant. As an ambitious, transformative agenda, the change management required to fully achieve the PSTA4 objectives is considerable. At the same time, the demonstrated ability of MINAGRI and associated agencies to adapt and change is limited – reflecting weak capacity and the internal incentives within the GoR system that discourage such change. Indeed, it is for this reason that the Bank is supporting the Government program with the PforR.

Specific technical risks are centered on the following:

- The external technical capacity to support MINAGRI deliver PSTA4 is fragmented and focused on the agendas of individual agencies.
- The assumed response of the private sector to the policy reforms and incentives being provided by the PforR Program on the scale to deliver the kind of impact anticipated. This may be further harmed by continued dominance of large-scale and well-connected incumbent businesses;
- The technical competence of service providers (public and private) to deliver the kind of services required for this transformation agenda (including extension services for diversified especially higher-value agriculture and business development services for emerging agribusiness, for instance);
- The ability of MINAGRI to leverage or depend upon supportive interventions from the wider GoR, including the necessary financial resources anticipated in the PSTA4 investment framework as well as the overall macro-economic policy framework, as well as the ability of district authorities to effectively absorb the new responsibilities being placed upon them as part of the decentralization agenda.
- It will be important to assess the impact of both private and public investment on vulnerability to shocks at the household level.

- Building Resilience to Climate Change: To respond to the challenges of climate change MINAGRI incorporate climate change cycles into planning and programming issues and ensure migration and adaptation measures are mainstreamed into the activities of PSTA4

These risks are being minimized with the following actions by GoR/MINAGRI:

- MINAGRI will take a more strategic approach to the alignment of relevant external Technical support with the institutional challenges of transforming sector.
- The role of private sector actors envisaged in the sector PSTA4 is consistent with observations of similar transformations in similar countries across Africa. Therefore, it is considered technically viable. It is likely to depend on early movers from the East Africa region, and further improvements in economic integration within the EAC and additional measures to ease doing business for regional companies will enhance the expected response. Similarly, stimulating private sector investment and entrepreneurship is a key recommendation from the Future Sources of Growth study and is likely to command significant high-level political support which would further improve the overall environment for private sector actors. MINAGRI is also benefitting from other DPs' programs that directly support the development of agricultural value chains and therefore assist the emergence/expansion of private sector in agriculture.
- Continue to analyze the sector's access to finance. Specifically, the sector's exposure to risk and trends that can impact its exposure. This will enable the key actors to not only strengthen the performance of key areas, e.g. guarantee portfolio in the sector, but also allow a stronger engagement between partners—both financial institutions, multilateral and bilateral projects. Improved knowledge would also allow alternatives to current models of financing to be develop RAB and NAEB recognize the additional demands from more sophisticated clientele and is seeking to address this through a combination of: (i) structural reform to improve effectiveness (especially RAB via their ongoing reform program)
- On the fiscal side, overall the Government is acutely aware of the limited fiscal space and emerging debt concerns and, with Bank (and International Monetary Fund) support, is seeking to manage the macroeconomy accordingly. Within the sector, MINAGRI will analyze the annual budgets and MTEF that cascade out the PSTA4 investment framework to accommodate any fiscal shortfall. It is recommended, the MTEF is reviewed in December 2018 to ensure that the budget reflects the transformational agenda characterized by the PforR operation and that MINECOFIN/MINAGRI jointly manage and complete a comprehensive Public Expenditure review of the Sector by December 2020. Demonstrating that improving the effectiveness of agriculture-related public expenditures will strengthen MINAGRI's claim to additional resources even within a fiscally constrained environment, relative to competing ministries and agencies.
- A transparent and accessible system for monitoring of food security and nutrition is an important area where improved MINAGRI capacity will be established.

Program Action Plan

A Program Action Plan (PAP) has been prepared with specific Program actions related to technical, systems, agency capacity, and performance, and includes risk mitigation measures that will be carried out to improve the Program based on the various assessments and key risk management measures

proposed in the risk assessment. The technical, fiduciary systems, and environmental and social systems assessments highlighted the main types of cross-cutting risks; the resulting key actions and risk mitigation measures form the basis of the PAP. While the overall PSTA4 is sound, these additional actions will facilitate effective implementation and meet and contribute to international good practice:

Access to Finance. The Rwanda Agriculture Finance Diagnostic Report, 2017 highlighted the need to strengthen BDF operations in general and enhance its agriculture sector domain knowledge and analytical capacity. The ongoing BDF reforms that aim to streamline its core services and strengthen its governance represent an opportunity to strengthen its role in providing key financial services to the agriculture sector. Of particular importance are efforts to improve the management of the BDF's portfolio guarantees (because most agricultural loans are small loans for which individual loan guarantees would not be appropriate) and efforts to reduce the Non-Performing Loans (NPL) levels of the guaranteed portfolio (because the bulk of the NPLs are in the agriculture sector). In this context, the Diagnostic report recommended a comprehensive review of agriculture guarantee schemes. This review will provide the importance of an analysis for the PforR Programs' support to Match Grants and PPP more broadly.

Improving the alignment and strategic focus of TA: While the Results Area focuses on the implementation of an OD Plan, there is a broader reform agenda within MINAGRI and associated agencies that is a pre-requisite for successful implementation of the whole PSTA4 program. This element of the PAP will also serve to underpin the strategic deployment of the externally-funded TA to support PSTA4 transformation agenda and, where appropriate, facilitate the delivery key results areas.

Food Security and Nutrition Monitoring. While the PforR Program focuses on efforts to leverage private activity in agriculture, the food security and nutrition agenda is a major priority for GoR and is a Bank focus area. The PSTA4 sets out a multidimensional approach to food security and nutrition under its Impact Area 3 based on improvements in availability, accessibility, price stability and food utilization.

Climate Change Mainstreaming. MINAGRI to develop internal capabilities to mainstream climate change. Specifically, to assign focal points. These focal points would have a dual role: ensuring training throughout the sector and across relevant implementation institutions on these key issues, and verifying the integration on these issues in the sector program and projects. In parallel, a new set of climate and environment mainstreaming indicators will be agreed with Rwanda Environmental Management Agency for MINAGRI, linked to NST (sustainable agriculture) and Vision 2050

PER The expenditure framework presents an adequate basis for the Program. To ensure effectiveness and sustainability of PSTA4's reform agenda some areas should be strengthened and closely monitored. Specifically, the commitment of the Government and translation of the Strategic Plan for Agriculture Transformation, 20018-2024 (PSTA4) into Medium-Term Expenditure Frameworks (MTEFs) and annual budgets.