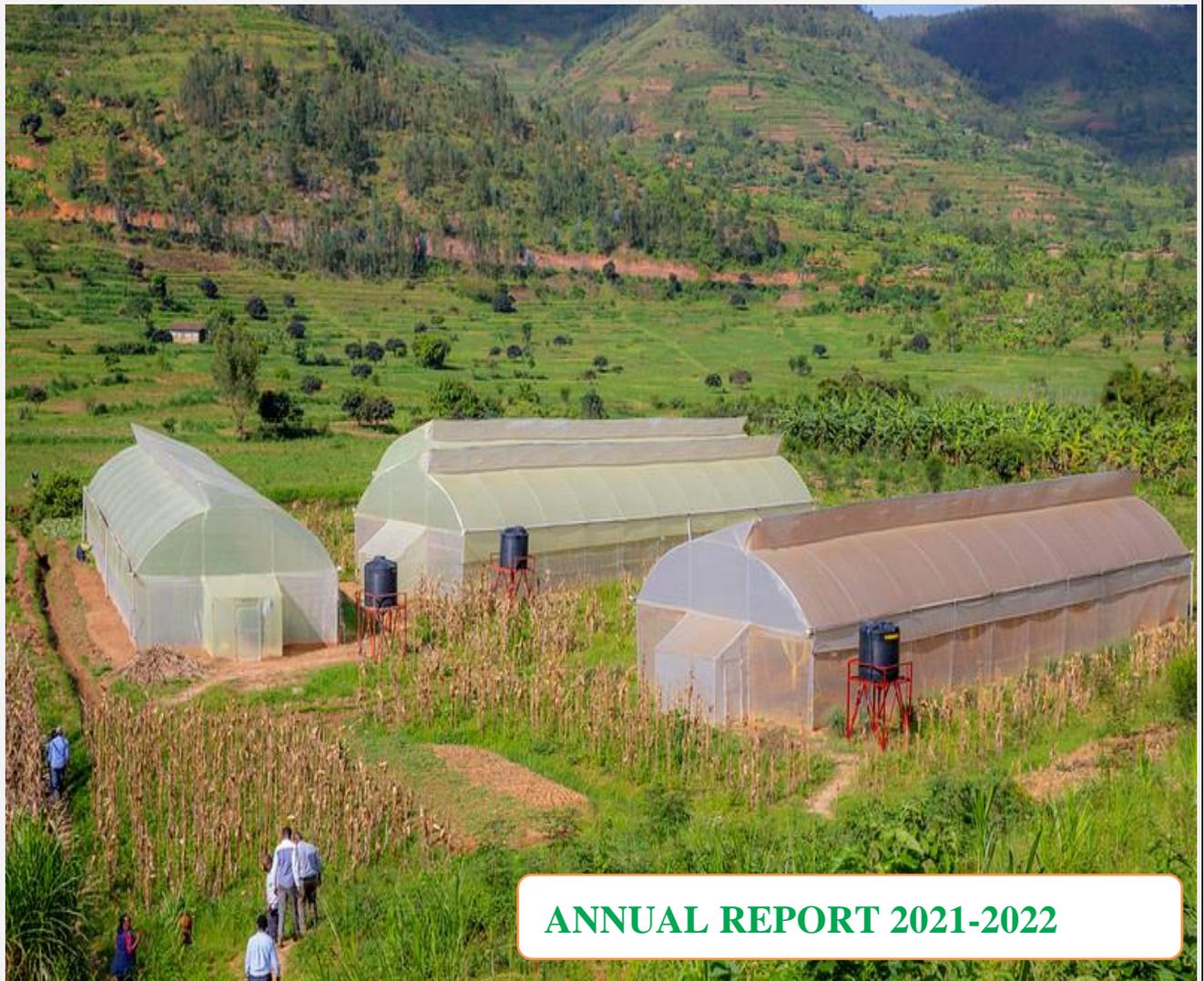


REPUBLIC OF RWANDA



**MINISTRY OF AGRICULTURE AND ANIMAL RESOURCES
P.O BOX: 621 KIGALI**



ANNUAL REPORT 2021-2022

Table of Contents

FOREWORD	6
MINAGRI 2021/22 HIGHLIGHTS.....	7
EXECUTIVE SUMMARY	9
PROGRESS TOWARDS NST 1	12
Chapter I. INNOVATION AND EXTENSION	13
1.1 Crop based research and extension	14
1.1.1 Cereals.....	14
1.1.2 Horticulture	17
1.1.3 Pulses and oil crops.....	22
1.1.4 Banana.....	24
1.1.5 Roots and tubers.....	25
1.1.6 Plant genetic resources.....	29
1.1.7 Integrated soil fertility management	31
1.2 Animal based research activities and extension.....	35
1.2.1 Mono gastric research activities.....	35
1.2.2 Ruminant research activities	40
1.2.3 Aquaculture research	42
CHAPTER 2: PRODUCTIVITY AND RESILIENCE	44
2.1 Sustainable land use management	44
2.1.1 Land use consolidation	44
2.1.2 Soil conservation.....	45
2.1.3 Analysis of the lime value chain and adoption of acid soil management technologies.....	45
2.1.4 Agriculture Mechanization	46
2.1.5 Irrigation infrastructures development.....	46
2.2 Crop production	50
2.2.1 Seeds production.....	50
2.2.2 Use of fertilizers and improved seeds	51

2.2.3 Crop productivity and production system.....	52
2.2.4 Advisory services delivery.....	53
2.3. ANIMAL RESOURCES PRODUCTION.....	54
2.3.1. Introduction.....	54
2.3.2. Animal genetic improvement.....	55
2.3.3. Animal feeding.....	58
2.3.4. Diseases control	58
2.3.5 Livestock population.....	59
2.3.6. Animal Products.....	61
2.3.7. Girinka program.....	62
2.3.8. Small stock distribution	62
2.3.9. Aquaculture and fisheries	63
CHAPTER 3. INCLUSIVE MARKETS AND VALUE ADDITION	68
3.1 Agriculture exports.....	68
3.1.1. Coffee performance	68
3.1.2 Tea performance	68
3.1.3 Horticulture performance.....	70
3.1.4 Diversification & products development performance.....	72
3.1.5. Market Linkages for Agricultural Exports.....	74
3.2. Dairy value chain	77
3.3. Meat value chain	78
3.4 Post harvest management.....	79
3.5 Strategic Food Reserve	80
CHAP 4: ENABLING ENVIRONMENT AND RESPONSIVE INSTITUTIONS.....	82
4.1. Agriculture de-risking interventions	82
4.2 Sector strategic documents development.....	83

4.3 Sector technical support	85
4.4. Agricultural sector digitalization	87
4.5. AGRICULTURE SECTOR VISIBILITY AND PUBLIC RELATIONS	90
4.5.1. National events.....	90
4.5.2. International events.....	92
4.5.3 Mass communication	92
4.5.4. MINAGRI’s Call Centre.....	94
4.5.5 Audio-visual Production and archiving	94
4.6 PLANNING PROCESS FOR 2021/2022 FY.....	95
Annex 1: Budget Execution per Programs and Subprograms	100
Annex 2: MINAGRI Central Projects Budget Execution 2021/22 FY.....	101
Annex 3: NAEB Projects Budget Execution 2021/22 FY	101
Annex 4: RAB Projects Budget Execution 2021/22 FY.....	102
Annex 5: Districts Budget Execution on Agriculture Programs.....	104
ANNEX 6: PROJECTS PERFORMANCE FOR 2021/2022 FY.....	107

List of Tables

Table 1: Number of F1 seeds obtained in seasons 2022 A and 2022 B by crossing selected female parents with the donors	16
Table 2 : Selection and the number of soybean line under evaluation.....	22
Table 3: National performance trial of 5 varieties profiled for varietal release process.....	25
Table 4 : Selected 8 new cassava lines under multi locational trials	26
Table 5 : Mean performance of selected sweet potato genotypes.....	27
Table 6: Yield Performance of selected potato genotypes.....	28
Table 7 : Plantlets and minitubers production	28
Table 8: Substitution Formula 2, fish meal replaced by BSF maggots: Starter feed for broiler chickens.....	36
Table 9 : Formula 1: Starter feed for broilers	37
Table 10: Final formula for broiler starter	38
Table 11: Effect of supplementing hydroponic barley on milk yield and milk composition	41
Table 12 : Land use consolidation for priority crops during 2021/22 FY at National level.....	45
Table 13: Quantity of improved seeds produced	51
Table 14: Quantity of crop production (MT) in 2022A	53
Table 15: Demo plots established in Season 2022A & B	54
Table 16 : Trend of Animal population by type (2011-2021)	60
Table 17: Trend of animal products 2011-2021 in MT	61
Table 18 : Consumption per person per year vis a vis need	61
Table 19 : Tea performance in FY 2021-2022.....	69
Table 20: Implementation status of PSTA4.....	83
Table 21: Agriculture Sector Priority Areas for 2022/2023 FY	95
Table 22: Budget Execution per Agencies 2021/2022	98
Table 23: Budget Execution per type (domestic, external & Districts agriculture programs)	99

FOREWORD



The Agriculture sector remains the backbone of the Rwandan economy and the largest source of employment countrywide. In Fiscal Year 2021/22, the share of agriculture in Rwanda's gross domestic product was 23% and its contribution to the national exports earnings was 37%.

Rwanda's agriculture transformation agenda is based on the implementation of the national flagship agriculture strategy known as Strategic Plan for Agriculture Transformation (PSTA 4). The fiscal year 2021/22 was the fourth year of implementation of PSTA 4 and it is in that period when the PSTA4 Mid-Term Review (MTR) was conducted. The findings showed that PSTA 4 was effective and contributed to the agriculture development. It was noted that the PSTA 4 put emphasis on climate change adaptation and mitigation as well as environmental protection through climate-resilient activities. Big investment projects were initiated to enable private sector to invest in agricultural and animal production and also to improve country food systems and cope with COVID-19 pandemic effects.

The MTR revealed increased agricultural production and productivity, and this undoubtedly contributed to the average GDP growth of 6% in the last five years while the stunting prevalence rate dropped from 38% in 2015 to 33 % in 2020. With the remaining 2 years ahead of the PSTA4 implementation, we call upon all stakeholders and partners in the agriculture sector to focus on activities that have not been fully implemented as highlighted in the MTR of PSTA4 to achieve all planned targets by 2024.

Agriculture has and will continue to play a prominent role in both economic growth and poverty reduction as it has important implications for food security, nutrition, exports, and has backward and forward linkages to both industry and services sectors.

Considering the Rwanda's Vision 2050, agriculture is expected to be totally transformed with professional farmers and commercialized value chains. Let us therefore, continue with strengthening the market-orientation of crop and animal resources production systems, promoting research and innovation at all value chains nodes, building post-harvest handling and storage facilities across the country in order to achieve the envisioned transformed agriculture that benefit not only value chains actors but also the Country's economy.

The experience from past years assures us that there is a solid resolve among partners to move fast forward to unlock our potential and tackle the existing challenges in our farming systems. Under the current global challenges, we are convinced that agriculture transformation needs joint efforts now than any other time before.

The Ministry's commitment and vision are still steadfast and I continue to count on all stakeholders' strong collaboration and support as we keep our momentum on this agriculture transformation journey.

Dr. Gerardine MUKESHIMANA
Minister of Agriculture and Animal Resources

MINAGRI 2021/22 HIGHLIGHTS

Climate resilience interventions

- Radical terraced construction: 135,343.5 ha
- Progressive terraces: 986,276 ha
- Area under irrigation: 68,126 ha
 - Marshland developed: 37,273 ha
 - Hillside developed: 8,780 ha
 - Small scale irrigation (SSIT): 22,073 ha

Social protection:

- 427,576 cows so far distributed to poor families including 20,800 distributed this fiscal year 2021/22.
- Small stock distributed to vulnerable families:
12,254 pigs, 17,631 goats, 7,153 sheep and 142,843 poultry distributed to youth cooperatives from poor families

Agriculture export Earnings:

- Earnings generated from export is USD 640.9 million
- Agriculture contributed 37% of the total National exports
- 15,184MT of coffee exported, 35,404 MT of tea exported and 42,559 MT of horticulture exported.

Agri-GDP growth:

- Agri GDP growth reached 3% in 2021/22
- 23% of agriculture contribution to GDP

Agriculture finance / insurance:

- Agriculture finance stands at 4.8 %
- 24,144 cows insured
- 23,956 ha of crops insured

Animal products:

- Milk production stands at 999,976 MT
- Meat production stands at 185,989 MT
- Fish production stands at 43,560 MT
- Eggs production stands at 8,665 MT
- Honey production stands at 6, 135 MT

Food security and nutrition:

- Percentage of food secure households increased from 80% to 81.3%, which means increase of 1.3 % from 2015 to 2018

Land use

Land mechanized increased from 62,207.5 ha in 2020/21 to 70,740 ha in 2021/22FY

Percentage of mechanized farm operations stands at 36%

Percentage of population employed in agriculture: 62.4%

Land consolidation: 766,750 ha in 2022A and 539,217 ha in 2022B

Animal health and Genetic improvement

- Cows inseminated: 110,495
- AI Calves born: 42,195

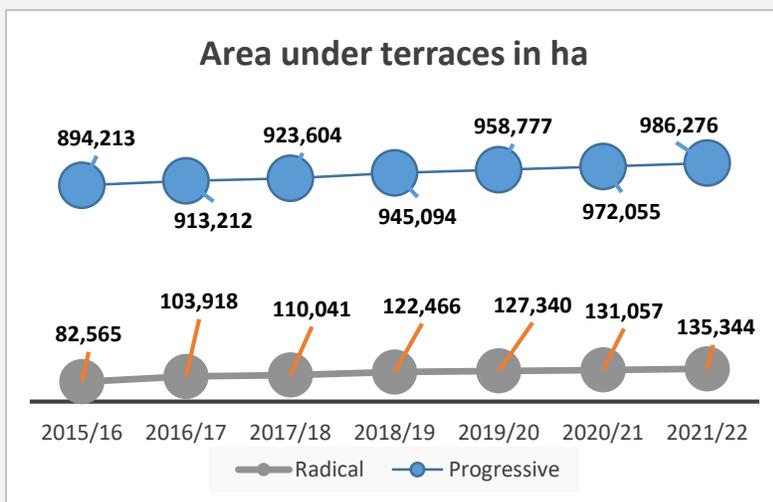
Agro processing:

- Milk supplied to agro processing plant: 77,508,138 liters
- 8,263.9 MT of Cassava supplied to Kinazi Plant
- 46,650 MT of maize supplied to Processing industries

EXECUTIVE SUMMARY

The 2021/2022 fiscal year was the fourth year of the implementation of Strategic plan for agriculture transformation (PSTA 4). PSTA 4 has four priority areas: (i) Innovation & Extension; (ii) Productivity & Resilience;

achieve the strategic objectives for the Agricultural Sector. This fiscal year has prioritized the development of Agriculture infrastructures to support productivity and commercialization of agriculture outputs.



Based on the country topography, more efforts were deployed in land management to improve land productivity and stability. The total area of land under conservation with radical and progressive terraces are respectively 986,276 ha and 135,344 ha of which 14,221 ha of progressive and 4,287 ha of radical

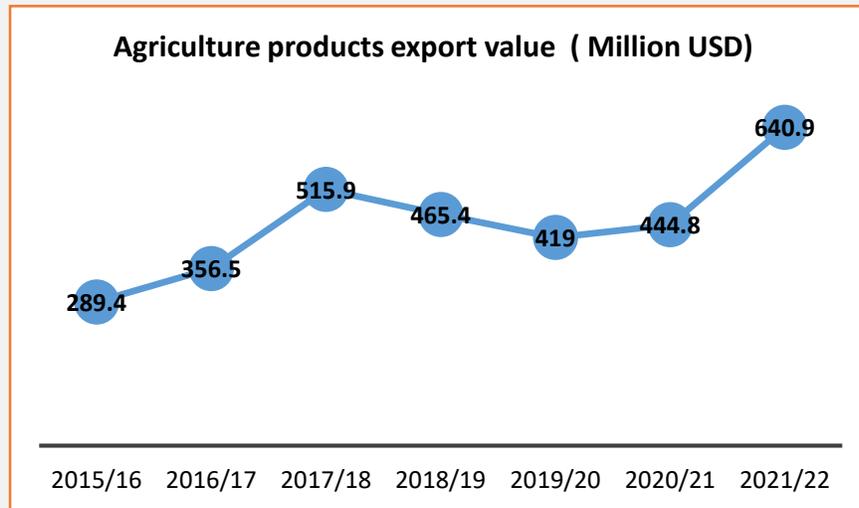
(iii) Inclusive markets & value addition; (iv) Enabling Environment & Responsive Institutions. In combination, these priority areas provide a strategic orientation towards achieving the transformation of the Rwandan agriculture from a subsistence to a value creating sector, which contributes to the national economy and ensures food and nutrition security in a sustainable way. The 2021/2022 agriculture IMIHIGO (performance contracts) were set in order to The Ministry continued efforts to contribute to social protection and nutrition through

terraces were developed in this financial year. Irrigation schemes have allowed farmers to move from rain-fed agriculture to diversified high value crops hence resulting in increased cropping intensity and land productivity. The country has registered 68,126.5 ha under irrigation - including 37,273 ha of marshlands, 8,780 ha of hillsides and 22,073.5 ha of small scale irrigation.

GIRINKA and small stock distribution. So far 427,576 cows have been distributed

through GIRINKA program since its initiation. During 2021/2022 fiscal year, the Ministry targeted the distribution of 23,469 cows to poor households and 20,800 was achieved due to the involvement of private sector in this program and pass on model. On the side of Agricultural products export, the

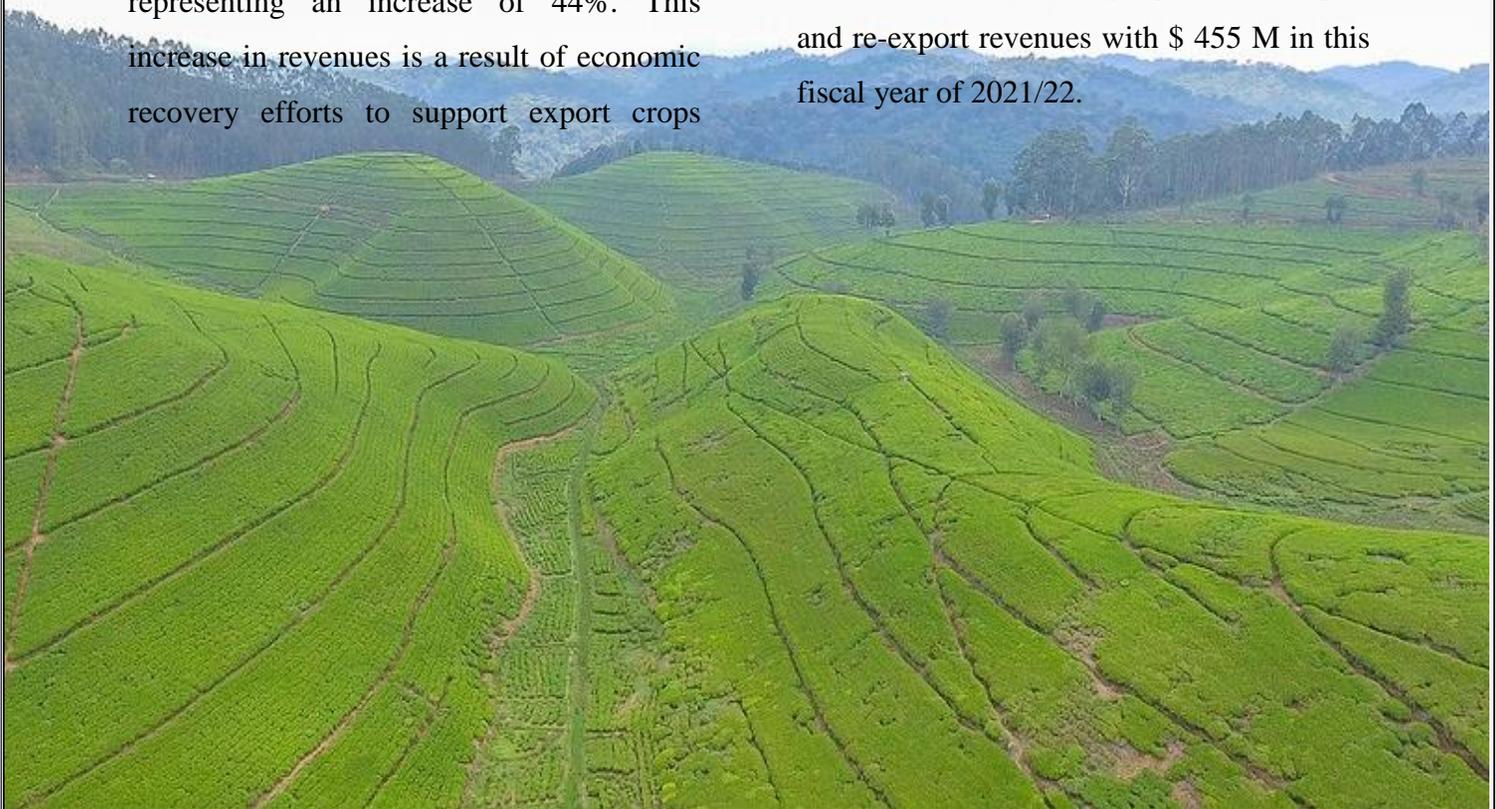
deployed by the Government of Rwanda. Traditional commodities comprised of tea, coffee and pyrethrum performed well as expected due to better prices at international markets and increase of local production especially for tea. The removal of COVID 19 restrictions, opening of businesses and



borders opening have also allowed the diversification of export destinations and improvement of regional trade with neighbouring countries. The traditional commodities generated \$ 185M in 2021/22 while it was \$157 M in 2020/21, this is an increase of 18%.

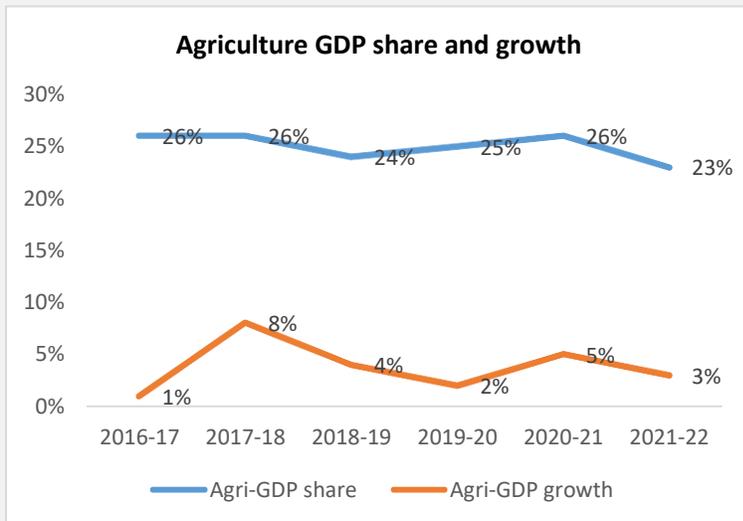
export revenues in 2021/22 was \$640.9 M against \$444.8 M earned in 2020/2021 representing an increase of 44%. This increase in revenues is a result of economic recovery efforts to support export crops

The non-traditional commodities contributed a lot to the total country agriculture export and re-export revenues with \$ 455 M in this fiscal year of 2021/22.



Regarding food security mechanism, the Government through its National Strategic Grain Reserves Project registered storage of

during COVID 19 restrictions. Around 3,490 MT of beans, 432 MT of maize, 3,878 MT of maize flour and 3,223 MT of rice have been distributed to the Kigali City and other districts.



Given that the Agriculture sector is the one of key area to be instrumental to realize the country’s objectives as specified in Vision 2050 and NST1 (National Strategy for Transformation, 1), more efforts have been deployed to put in place strategic actions and projects aimed

17,104.5 MT composed of 13,805 MT of Maize and 3,299.5 MT of beans. To ensure food security and mitigate the effect of shocks of food supply, 3,796.46 MT of maize, 1,475 MT of beans and 181.154 MT of rice have been distributed to the families affected by lockdown due to Covid-19 and disaster. Thus, the stock position at the end of June 2021 was 11,774 MT of maize and 4,075 MT of beans. In the FY 2021/2022, the National Strategic Grain Reserve (NSGR) availed food to respond to the needs of vulnerable and affected families

at enhancing agriculture contribution to the Rwanda’s economic growth and poverty reduction.



PROGRESS TOWARDS NST 1

The contribution of agriculture in Rwandan economy is very fundamental. The sector employs 62% of the working population and represents about a 23 % of the National GDP. Vision 2050 takes Rwanda to high living standards by the middle of the 21st century and high quality

Indicators	NST1 Targets (2024)	Currents status	Performance V/s NST1
Ha of land under irrigation	102,284	68,126	66%
Area of consolidated land (ha)	980,000	766,750	78%
Percentage of farm operations mechanized	50	36	72%
Radical Terraces (ha)	142,500	135,344	95%
Progressive (ha)	1,007,624	986,276	98%
% Of farmers using quality seeds on consolidated sites	75	LSF: 81.7	109%
Quantity of fertilizer applied (kg/ha)	75	62.5	83%

The midterm evaluation of NST1 indicates where the sector performed well vis a vis to the NST1 targets (2024) and also shows areas lagging behind that need special interventions.

The strategic reserve at district level, productivity of major crops (beans, maize, soybean), agriculture loans and animal products (eggs) are among the low performing indicators.

livelihoods. The implementation instrument for the remainder of Vision 2020 and for the first four years of Vision 2050 will be the National Strategy for Transformation (NST1). NST1 will provide the foundation and vehicle towards Vision 2050

Indicators	NST1 Targets (2024)	Currents status	Performance V/s NST1
Yield (t/ha) of major crops maize, beans, irish potato, wheat, and soya beans.	Maize: 2.94	Maize: 1.6	54%
	Beans: 2.22	Beans: 0.7	32%
	Irish potato: 14	Irish potato: 8.6	61%
	Wheat: 1.72	Wheat: 1.1	64%
	Soya beans: 1.28	Soybeans: 0.5	39%
Strategic reserves stored at district level (MT)	Maize: 140,980	13,805	10%
	Beans: 69,917	3,299.5	5%
Quantity in MT of meat and dairy products produced (Meat, Milk, Eggs)	Milk: 1,274,554	999,976	78.5%
	Meat: 215,058	43,560	86%
	Eggs: 19,403	8,665	45%
Credit to agriculture sector as percentage of total loans	10.4	4.8	46.1%

Chapter I. INNOVATION AND EXTENSION

The contribution of research in agriculture production is very important especially in resolving the issues related to agriculture productivity, climate change, pest and diseases control, soil depletion etc. In Rwanda Agricultural research is the engine driving agricultural growth which has resulted to food security, combating malnutrition and reducing extreme poverty in the country. This fiscal year research has focused on development and released high yielding, diseases and pest resistant crop varieties, animal breeds and various technology coping with climate risk agriculture sector. Therefore, this section highlights major interventions carried out micro biotechnology plus both crops and animal based research accompanied by extensive technology transfer.

Key research achievements:

Maize research continued breeding and hybrid production, 18 varieties were officially released.

Wheat: 5 barley varieties released

Soybean: 21 soybean lines are under evaluation composed of 5 on station, 7 on farm trails and 9 at National performance trails.

Beans: 9 varieties are under evaluation of their wide adaptability across the country

Cassava: 5 varieties are under evaluation for future release while 8 are under multi locational trails

Sweet potato: 8 sweet potatoes high yielding, nutritious and bio-fortified, and tolerant to Sweet Potato Virus Diseases have been selected for future release

Irish potato: variety profiling and documentation of 3 varieties were submitted to RICA for the official variety release.



1.1 Crop based research and extension

1.1.1 Cereals

1.1.1.1 Registration of cereal crop varieties on the national plant varieties list

Eighty-eight cereal crop varieties comprising 50 maizes, 20 rice, 16 wheat and two sorghum cultivars were registered on the National Plant Variety List (NPVL) published in the Official Gazette N° Special of 18th February 2022. The maize list included eleven RAB hybrid varieties with **six** for mid altitudes: RHM104, RHM1402, RHM1407, RHM1409, RHMM1709 and RHMM1710 and five for high altitudes: RHHM1520, RHHM1521, RHHM1601,

RHHM1611 and RHMM1707. The rice list comprised three new RAB varieties: TETA20-HM1, TETA20-HM2 and TETA20-HM2 while the wheat list included ten new RAB varieties: Gihundo, Mizero, Reberaho, Majyambere, Keza, Rengerabana, Cyumba, Nyaruka, Nyangufi and Kibatsi. The new RAB cereal crop varieties listed on the NPVL are currently widely grown by small scale farmers in Rwanda.

1.1.1.2 Cereal varieties development

a) Official release of 18 new RAB maize hybrids and five barley varieties

Eighteen new maize hybrid varieties comprising nine for high altitudes: RHHM1604, RHHM1628, RHHM1706, RHHM1708, RHHM1801, RHHM1806, RHHM1807, RHHM1808 and RHHM1816 and nine for mid altitudes: RHMM1701, RHMM1702, RHMM1704, RHMM1820, RHMM1823, RHMM1843, RHMM1848, RHMM1969 and RHMM1970 were

officially released in April 2022 through the letter No: 266/DGO/2022 of 8th April 2022 from Rwanda Inspectorate Competition and Consumer Protection Authority (RICA). Moreover, five barley varieties comprising: RBR02101, RBR02102, RBR02103, RBR02104 and RBR02105 were also officially released in April 2022

b) Development of new maize hybrid, barley and wheat varieties for future official release and utilization

Thirty new maize hybrid cultivars were developed for future official release and utilization. They comprised 14 RAB varieties tolerant to fall armyworm: RHMM2001, RHMM2002, RHMM2003, RHMM2004, RHMM2005, RHMM2006, RHMM2007, RHMM2008, RHMM2009, RHMM2010, RHMM2011, RHMM2012, RHMM2013 and RHMM2014, three maize hybrid varieties tolerant to fall armyworm from CIMMYT: FAWTH2001 FAWTH2002 and FAWTH2003 and 15 varieties with various traits including drought tolerance: RHMM2015, RHMM2016, RHMM2043 and RHMM2045, Maize Lethal Necrosis (MLN) tolerance:

RHMM2016, RHMM2043, RHMM2041 and RHMM2042, early maturity: RHMM2016, RHMM2024, RHMM2025, RHMM2026, RHMM2027, RHMM2029 and RHMM2030, and general adaptability: RHMM2034 and RHMM2035. Furthermore, seven new wheat cultivars: RW-WHT-022-104, RW-WHT-022-109, RW-WHT-022-111, RW-WHT-022-113, RW-WHT-022-116, RW-WHT-022-118 and RW-WHT-022-121 and eight new barley varieties were tested: AC15/529-5/34, FIREFOXX, ZHANA, GR13-04-20, GR13-04-30, GR13-04-62, GR13-12-83 and GR13-79-68A were developed for future official release and utilization.

c) Development of new rice breeding populations

Three hundred thirty-three rice F1 seeds were produced by using selected female parents and donors in the seasons 2022 A (August 2021-January 2022) and 2022 B (February-July 2022) (Table 1). In 2022 A season, the female parents were Basmati, Imbaturabukungu (high yielding), Keza (aromatic), Mugwiza (high yielding), while the donors were Buryohe (aromatic), WAB2699

(high yielding), Supa (aromatic), Nerica (grain quality), Komboka (aromatic). In 2022 season B, the female parents were: Keza (aromatic), Supa (aromatic), V046 (high yielding), KF20040 (aromatic) whereas the donors were Komboka (aromatic), Basmati (aromatic), WAB2699 (high yielding) and V046 (high yielding).

Table 1: Number of F1 seeds obtained in seasons 2022 A and 2022 B by crossing selected female parents with the donors

Season 2022 A			Season 2022 B		
Cross	Generation	Number of seeds	Cross	Generation	Number of seeds
BASMATI/BURYOHE	F1	43	KEZA/KOMBOKA	F1	34
Imbaturabukungu/WAB2699	F1	27	SUPA/BASMATI	F1	19
KEZA/SUPA	F1	38	V046/WAB2699	F1	21
MUGWIZA/NERICA	F1	32	KF20040/BASMATI	F1	41
Imbaturabukungu/ Komboka	F1	15	WAB2699/V046	F1	63
Total		155			178

1.1.1.3 Evaluation of agronomic practices for improved wheat production

a) Evaluation of different types of herbicides

Two selective herbicides, namely, Propanil 360 G/L EC and Terbutryn 500 G/L obtained from One Acre, were evaluated at three rates: recommended rate, the maximum and the minimum rates calculated based on the manufacturers' directives. The propanil minimum rate was 8.5 ml/100ml, the recommended rate was 12.8 ml/100ml and the

maximum rate was 17ml/100ml. The Terbutryn minimum rate was 1.4ml/100ml, the recommended rate was 1.7ml/100ml and the maximum rate 2ml/100ml. The experiments were conducted in Musanze and Rwerere station. The weed species were collected from wheat fields around the experiments. The species so far identified

included: Galinsoga parviflora (Kimari), Bidens pilosa (Inyabarasanya), Commelina benghalensis or Tradescantia zebrina (Inteja), Fallopia convolvulus (Climbing bindweed), Digitaria abyssinica (Bermuda grass, Urwiri), Oxalis latifolia Mugabudasunikwa or Mugabudatsimburwa, Isaga and Bejejentaraza). Preliminary results indicated that Propany has been more efficient that Terbutryn in controlling weeds in the wheat fields.



b) Evaluation of wheat planting dates

Experiments on planting dates were established in 2022A and B in three locations: Musanze, Rwerere and Nyamagabe. They were conducted in six staggered using two varieties: Nyaruka and Gihundo in such way that early, middle and late planting periods were covered. Based on the preliminary information provided by the study, it

was concluded that the experimentation should be repeated in several consecutive cropping seasons at different wheat growing locations with appropriate and precise weather measuring to be able to fix the right planting time for wheat crop in a given location.

c) Evaluation of wheat planting depths

The purpose of this activity was to determine the right sowing depth for wheat seed and update the recommendations. Seeds were sown at different sowing depths comprising: 1cm, 2cm, 3cm, 4cm, 5cm, 6 cm, 7 cm, 8 cm, 9 cm and 10 cm. The variety used in the experiment was Gihundo. The experiment was established in Musanze, Rwerere and Nyamagabe Stations. The results indicated that shallow planting depth yielded higher than deep planting depth in general. However, in some cases, shallow planting depth attracted the birds that damaged seeds the first two weeks after planting.

1.1.2 Horticulture

The Rwandan horticulture is the fastest growing subsector within agriculture and plays a key role in economic growth, poverty reduction, food security and employment (NAEB, 2014). It is a job-intensive and investment-attracting industry and this generates jobs to a large proportion of Rwandans and provide foreign currencies to the country. Rwanda's climate and soils are also highly suited to the production of horticultural crops. Therefore, development of horticulture means offering the population means to earn some money on regular basis as well as essential nutritional

requirements. Despite the economic importance of horticultural crops, their production is hampered by several constraints such as limited availability of improved varieties and quality seeds, poor agronomic management, pest and diseases infestation, among others (Dijkxhoorn et al., 2016). To tackle existing challenges facing horticulture subsector, different research and technology transfer interventions have been conducted in the fiscal year 2021-2022 and are summarized in the following paragraphs.

1.1.2.1 Evaluation of introduced okra (*Abelmoschus esculentus*) lines for growth and yield characteristics

Okra is a multipurpose crop due to its various uses: immature fruits are consumed as vegetables, their mucilage has medicinal applications; while okra seeds are source of oil and protein and can play a significant role in mitigating food insecurity and alleviating malnutrition. However, Okra has been considered a minor crop and no attention has been paid to its improvement in past. Therefore, a study was conducted to evaluate new okra germplasm for growth and yield characteristics in different locations. The study was conducted in two RAB Stations Rubona and Mulindi (Horticulture Centre of Excellence), for 2022A season. Experiments were laid out in Randomized Complete Block Design with three replications. Five okra lines evaluated were AVOK1502, AVOK1504, AVOK1505, Konni and Hounsoufé and one local check was included. Results showed that the

number of fruits per plant differed significantly ($p>0.001$) between lines at Rubona site, while there was no significant difference at Mulindi site. The highest number of fruits per plant was recorded at Rubona site with AVOK1505 line followed by AVOK1502 and AVOK1504 with 17.52; 13.18 and 9.57 respectively. Fruit length differed significantly ($p>0.001$) between lines at Rubona site, Avok1502, Avok1504 and Avok1505 recorded the longest fruits with 13.6cm, 10cm and 9.5cm respectively. Fruit yield per plant and per hectare was significantly ($p>0.001$) different between lines at Rubona and Mulindi sites. Avok1505 recorded the highest yield per plant and kg per hectare at Rubona (285.7g and 11, 904 kg). For all evaluation parameters considered, three lines showed the best performance; the lines are Avok1502, Avok1504 and Avok1505.

1.1.2.2 Evaluation of performance of introduced hot pepper lines in low, mid and high-altitude agro-ecological zones

Four hot pepper lines: PP9852-170, PP9950-5197, PBC462 and ICP18-7, obtained from World Vegetable center were evaluated for their performance in Musenyi (Low altitude), Rubona (Mid altitude) and Rwerere (High altitude) fields in RAB and compared to a commonly grown commercial variety (Red long cayenne) Data have

been collected for the season 2022A, while the second season trial 2022B is ongoing. Results from season 2022A showed significant difference between sites and varieties in terms of growth and yield parameters. Generally, long cayenne (used as a local check) produced more number of fruits per plant compared to the introduced lines in all sites.

However, in terms of weight of the produce, fruits harvested from the introduced lines were heavier than the ones from long cayenne. This is supported by the fact that the average yield per plant and per plot were between 2-2.5 times higher compared to control i.e. long cayenne. Among the five introduced lines, PP9852-170 and ICP18-7 performed better in regards to yields produced at all sites. Findings from 2022A season are promising as

1.1.2.3 Mapping of Passionfruit woodiness virus disease and other viral diseases of passion fruits through a diagnostic survey in major growing areas

Passionfruit crop has a huge potential as a cash crop for improvement of rural livelihood and national economy. However, its production is constrained by pests and diseases and key among them are viral diseases. A survey was conducted in 8 districts: Nyamagabe and Nyaruguru (South), Gakenke and Rulindo (North), Rusizi and Karongi (West), and Rwamagana and Kayonza (East Province), from July to September 2021, with the aim of collecting

they indicate that the introduced lines have more yields compared to the commonly grown commercial variety. These findings will be compared with the results from the ongoing season 2022B trial for further interpretation. Test for capsaicin level (scoville rating/scale) of the introduced lines is required in order to compare their hotness level in relation to the currently grown commercial varieties in the country.

diseased leaf samples for identification of viral diseases affecting passionfruit. During the survey, incidence and severity of passionfruit viral diseases was assessed at farm level. A total of 225 diseased leaf samples showing symptoms of viral diseases were collected from 72 passionfruit field across the districts. All collected samples (225) were tested for presence of General potyviruses, Cowpea aphid borne mosaic virus (CABMV) and Cucumber mosaic virus (CMV) using available commercial serological kits (Photo 3). Out of which, 101 samples tested positive for Potyviruses, 7 samples for CABMV and no positive sample for CMV. Further analysis is being carried out using Polymerase chain reaction, to test for presence of *Passionfruit woodiness virus* (PWV), *Ugandan Passiflora virus* (UPV) and any other potyviruses that are known to cause woodiness disease in passionfruit.



1.1.2.4 Production of clean seeds of tamarillo and passionfruit

Use of quality seed/planting material is a vital input in crop production because crop status largely depends on the seed materials used for sowing and the response of other inputs in crop production depends on seed material used. Seeds of horticultural crops such as tamarillo and passionfruit have a major impact on potential crop yield and subsequent income. Existing commercial seed companies in Rwanda do not supply tamarillo and passionfruit seeds; which forces farmers to save seeds from their own crops for the next planting season. It is in this regards that efforts were made to produce clean seeds of tamarillo and passionfruit that will be distributed to farmers.

Seed production blocks have established in RAB stations for passion fruit (Nyamagabe 1.0 ha,

Rubona 0.5 ha, Rwerere 0.28 ha) and tamarillo (Nyamagabe 1.0 ha, Rubona 0.5 ha, Rwerere 0.5 ha). In addition, major growing areas of passion fruit and tamarillo (Musanze and Nyabihu districts) have been identified. In total, four fields of passionfruit (Rwambogo cell, Musanze sector, Musanze district) and two of tamarillo (Rugarama cell, Kabatwa sector, Nyabihu district) have been selected for seed production and regular follow up of the selected fields was done. By the end of fiscal year 2021-2022, 6.65 kg of passion fruit and 5kg of tamarillo seed have been produced and made available for distribution in major production districts through cooperatives, NGOs, private companies, government organization as well as individual farmers. However, more seeds are expected from the same plantations.

1.1.2.5 Technology transfer and service provision

i) Follow up of nurseries activities for the production of quality seedlings of fruit trees

Through implementation of Kayonza Irrigation and Integrated Watershed management Project (KIIWP), a total



of 440,000 fruit trees have been produced in six nurseries of Kabarondo and Murama sectors in Kayonza district. These included: 100,000 avocados, 160,000 mangoes, 60,000 citruses, 60,000 tree tomato and 60,000 Jack fruit. The scions used during the grafting stage were provided by RAB orchards and selected private orchards that were inventoried by a joint technical team composed of representatives from SPIU-IFAD/KIIWP, RAB, NAEB and AGRWIN. Regular follow up of private sector's

orchards was done in order to ensure the production of good quality scions. Besides, 46,500 seedlings of different fruit trees have been produced in different RAB stations (Rubona, Nyamagabe, Muhanga, Rwerere, Nyagatare and Ngoma). These include 11,000 avocado, 3,500 citrus, 5,000 mango, 19,000 tree tomato, 7,000 passionfruit and 1,000 apple seedlings.

ii) Establishment of fruit orchards in KIIWP sites at Kayonza district

Planting of 440,000 fruit tree seedlings produced in nurseries at Kayonza started in mid-October 2021 and ended in January 2022. These fruit trees have been planted over an area of 1,150 ha; which include 261 ha of avocado, 157 ha of citrus, 418 ha of mango and 157 ha of jackfruit. Tree tomato plants (60,000) have been intercropped with avocado. Through FFS approach, beneficiary farmers were technical assisted to establish and maintain these fruits trees and were practically guides in all activities, namely blocks and sub-blocks demarcation, pegging, hole making, planting, mulching, watering, pruning, fertilizer application, pest and disease management, etc.

iii) Clean planting materials of fruits produced through horticulture innovations at HCoE

Fruit nurseries that have been established in HCoE were used to produce clean planting material of avocado, mango and citrus through grafting from the scions that were obtained from mother garden located in the HCoE fruit tree orchard. The scions were used during the multiplication of new fruit tree saplings as well as by fruit tree nursery operators who outsource from the HCoE clean and healthy scions. During the 2020/2021 fiscal year, 2050 scions of avocado and 2102 scions of citrus were harvested and distributed to different nursery operators for multiplication. Also, 6575 saplings of avocado and 1610 saplings of citrus were produced.

iv) Development of extension materials for transfer of horticulture technologies

Different extension materials have been developed to assist in transfer of horticulture technology to farmers. The developed materials covered different fruits and vegetables and are in form of Booklets, Leaflets, Factsheets, Green & Yellow Lists & IPM guides. All developed documents have been printed out and distributed to different beneficiaries with special emphasis to Kayonza site of 1150 hectares planted with different fruit trees, under KIIWP Project. In addition, these extension materials were also distributed to different categories of interested people in the agriculture show 2022 at Mulindi site.

1.1.3.1.2 Technology transfer and capacity building

Training and establishment of demonstration plots of bean and soybean

In a bid of improving farmers' capacity and awareness creation of the recently released bean and soybean varieties, a total of 1920 demo plots for soybean and 2720 demo plots for beans were established across the country in 2022B through Twigiremuhinzi extension model. Farmer promoters received seeds, DAP fertilizer and extension materials, and established demo plots in

their respective villages. Further, a total of around 14,000 farmer promoters, Social economic development officers (SEDOs), Sector agronomists and agro dealers across the sites were trained on good agricultural practices (GAP) including the use of Rhizobium, inorganic and organic fertilizers, line spacing, planting rates, weeding, pest and diseases management and post-harvest handling.

1.1.3.2 Bean

1.1.3.2.1 Variety development

Crossing blocks were established and populations advanced through successive generations for climbing beans where 112 lines were in F2, 342 lines in F3, 256 lines in F4 and 388 lines in F5. From F5, a total of 67 stable lines were advanced to the preliminary yield trial. Among these 67 stable lines, 53 lines will be advanced in



intermediate yield trial in 2023A. Further, a total of 317 genotypes have been evaluated; 66 nurseries were tested in preliminary yield trials, 186 in intermediate yield trial, 23 in advanced yield trial, 32 in multiplication yield trials, 7 in adaptability trials and 9 in national performance trials. Finally, 9 pre-release candidates (4 bush and 5 climbers) have been evaluated in different environment. Those lines are for climbers: RWV 2425, MAC71, RWV 6001, RWV 6008, RWV 5035 and for bush: RWR 5055, RWR 5062, RWR 5064, RWR 5070. The goal was to

evaluate their wide adaptability across the country (adaptability) and to involve farmers in their selection (acceptability).

1.1.3.2.2 Field days and assessment of farmer's perception on new bean varieties

Gender based Participatory Variety Selection on 5 pre-release climbing bean lines (RWV 2425; MAC71; RWV



6001; RWV 6008; RWV 5035) and 4 pre-release bush bean lines (RWR 5055; RWR 5062; RWR 5064 and RWR 5070) was conducted in 8 Districts to evaluate farmer and consumer preferences (including organoleptic tests) and identify farmer and market demanded climate smart varieties to guide future breeding. A total of 167 farmers participated in the PVS, among them, 24 were females aged between 18 and 35 years, while males under this category were 18. In the

category of above 35 years old, females were 57, and males were 68.

1.1.4 Banana

Key activities on banana carried out in this fiscal year 2021/22 focused on advisory services through *Banana Xanthomonas Wilt* (BXW) control, banana rehabilitation campaigns in collaboration with the districts, providing assistance for BXW control using digital tools, trainings and technical support:

- Banana rehabilitation campaigns were organized on 6,626.8 ha
- Trainings of farmer groups were organized in different districts in form of field training sessions, rehabilitation campaigns or BXW disease control campaigns and technical visits on calls from farmers for disease outbreaks. The total number of trained farmers was 1,261.
- Banana *Xanthomonas Wilt* (BXW) disease has widespread to all districts continued to show up with varying incidence. The control campaigns were organized in Muhanga, Nyanza, Rusizi and Gisagara. During the campaigns, methods of BXW control were demonstrated, namely, single diseased stem removal, use fire or of soap and omo for tool cleaning.
- BXW control using BXW application

Farmer promoters across 20 Districts of Rwanda are sharing information on how to identify, control and prevent BXW in farmer's banana fields and provide agronomic practices on banana by using BXW application. Currently, 150 farmer promoters were engaged and use BXW App to help farmers to report on BXW disease incidence, recommend control measures and provide feedback on the disease progress via

BXW App. More than 6000 farmers were registered into BXW application by farmer’s promoters, and 5,554 BXW diagnoses were sent via BXW App. The farmers reported to BXW App received advice on disease control.

1.1.5 Roots and tubers

1.1.5.1 Cassava

Cassava production is severely threatened by the current epidemic of cassava brown streak disease (CBSD) and cassava mosaic disease (CMD), both diseases affect the availability of clean planting materials and declining productivity. Research on cassava focused on developing new lines with dual resistance to CBSD and CMD with other market traits preferences.

1.1.5.1.1 Selected new cassava varieties for official release

The varietal profiling conducted indicated 5 cassava varieties resistant, and proposed for official varietal release. The selected varieties were introduced from IITA Tanzania and another variety is from local breeding program. Their documentation is ongoing for official variety release.

Table 3: National performance trial of 5 varieties profiled for varietal release process

No	Clones ID	Variety Name	Yield/ Ha	CBSDi	Adaptability
1	RWACASS2003	EYOPE	29.37	2	-
2	RWACASS2002	PWANI	30.83	0	Mid altitude
3	RWACASS2004	KBH2006/066	26.83	2	-
4	RWACASS2001	Mkumba	28.01	2	-
5	RWACASS2005	MH2005/0091OP/12	37.56	0	Wide adaptability

The table 4 indicate cassava varieties under multi locational trial.

Table 4 : Selected 8 new cassava lines under multi locational trials

No	Clones names	CMDi	CMDs	CBSDi	CBSDs	Root CBSDi	Root CBSDs	Yield (t/ha)	DMC (%)
1	RBN018/028	0	1	1	2	4.5	2.7	28.5	27.2
2	RBN018/020	0	1	2	2	1	2.5	24.1	30.7
3	RBN018/061	0	1	19.2	3.1	8.3	2.7	10.1	29.8
4	OKHUMELELA	0	1	14.8	2.2	3.7	3.2	13.6	28.5
5	RBN018/051	0	1	4	2	1.2	3	13.0	30.4
6	RBN018/056	0	1	9	3.3	4.8	2.6	16.4	26.9
7	F-10-30-12	1.9	3	14.5	2.4	7.9	2.8	10.7	29.8
8	RBN018/025	0	1	20.2	3	2.3	2.1	10.2	21.8

CMDi: Cassava mosaic diseases incidence, CMDs: Cassava mosaic diseases severity, CBSDi: cassava brown streak disease incidence, CBSDs: cassava brown streak disease severity, DMC: Dry matter content

1.1.5.1.2 Cassava demonstration trials and technologies dissemination

Four pre released varieties (RBN18/025; RBN18/051; RBN18/028; RBN18/020) were planted in 26 demonstration plots in Nyanza, Kamonyi, Ruhango, Bugesera, Rulindo and Gakenke Districts to evaluate them in farmer's field conditions and involve farmers in selecting preferred clones based on their performance.

Cassava climate smart agriculture technology and use of fertilizers disseminated to farmers using participatory demonstration plots. In addition, 600 farmers were trained on how to address the twin problems of low multiplication ratio and pests and diseases

1.1.5.2 Sweet potato

Sweet potato production is constrained by low yielding genotypes with less nutrition potential and viral diseases. Research and extension activities on sweet potato focused on varieties development through selection and advancement of new populations with aim to develop and disseminate high yielding, nutritious and bio-fortified sweet potato varieties and resistant to Sweet Potato Virus Diseases (SPVD).

1.1.5.2.1 Improved crop varieties developed for future release

Eight sweet potato high yielding, nutritious and bio-fortified, and tolerant to SPVD have been selected for future release. Five of the new sweet potato lines are Orange Fleshed Sweet potato (OFSP), two sweet potato lines are White Fleshed Sweet potato (WFSP) and one Purple Fleshed Sweet potato (PFSP). Demonstration plots were conducted for farmer's participatory selection and seed multiplication.

Table 5 : Mean performance of selected sweet potato genotypes

Genotypes	Alternaria (1-9)	SPVD (1-9)	Vines Yield (T/ha)	Root yield (T/ha)
Rwa17-001	2.67a	2.67b	32.92a	14.29a
Rwa17-103	3.00a	2.67b	26.29a	15.23a
Rwa17-130	3.00a	1.33c	20.50ab	14.805a
Rwa17-294	1.00b	2.00ab	19.71b	11.87ab
Rwa17-255	2.67a	3.67a	16.02b	12.36ab
Rwa17-51	1.33b	2.00a	15.63b	5.57b
Rwa17-146	1.00b	2.33b	14.29c	14.39a
Rwa17-10	2.33a	3.67a	11.53c	13.25a

SPVD: Sweet potato Virus Diseases

1.1.5.3 Irish potato

The Irish potato productivity is constrained by many factors including low yielding potato and poor quality seed among others. Research and extension activities on Irish potato focused on variety development and early generation seed multiplication (especially minitubers).

1.1.5.3.1 New potato varieties submitted for official variety release

National Performance Trial (NPT) selection indicated three new potato varieties (KIN 18.253, KIN18.190 and KIN18.150) and variety profiling and documentation were concluded and the dossier was submitted to RICA for the official variety release.

Table 6: Yield Performance of selected potato genotypes

Sites/ Clones	KIG 18.029	KIN18.150	KIN18.190	KIN 18.253	Kirundo (Check)	KIR18.058
Karenge	33.5	25.72	37.79	37.58	49.38	36.52
Kibebo	32.27	31.11	36.8	35.24	47.45	36.75
Kinigi	18.45	26.66	32.47	24.66	28.64	32.53
Mukura	36.38	37.41	34.84	35.2	26.58	21.4
Rurenge	23.07	20.9	47.94	30.52	25.37	29.04
Rusenge	29.29	25.82	41.5	50.82	45.14	34.66
Twumba	24.19	25.65	30.32	27.05	27.05	23.26
Uwinkingi	42.64	50.33	34.99	22.53	43.98	36.93
Mean	29.97 ^b	30.45 ^b	37.08 ^a	32.95 ^{ab}	36.70 ^a	31.39 ^b

1.1.5.3.2 Early Generation seed multiplication of newly released varieties

Early generation seeds of newly released varieties produced through tissue culture plantlets, airoponic and screen houses. 1,099,339 in-vitro plantlets and 3,201,949 minitubers were produced by RAB and private seed potato multipliers.

Table 7 : Plantlets and minitubers production

No	Varieties	Number of TC plantlets	Number of minitubers
1	Gikungu	199,315	580,528
2	Gisubizo	25,181	73,343
3	Jyambere	4,486	13,065
4	Kazeneza	28,787	83,845
5	Kigega	8,813	25,669
6	Kinigi	426,490	1,242,199
7	Kirundo	178,159	518,903
8	Ndamira	76,121	221,713
9	Ndeze	4,884	14,224
10	Nkunganire	15,824	46,089
11	Seka	2,057	5,990
12	Twigire	1,459	4,250
13	Twihaze	72,753	211,904
14	Cruza	16,286	47,436
15	Cyerekezo	38,725	112,791
Total		1,099,339	3,201,949

1.1.6 Plant genetic resources

1.1.6.1 Exploration and collection of plant genetic resources

Plant genetic resources explorations and collections performed in 2021-2022 fiscal year focused on fruits, vegetables, pepper, bean and forage plant genetic resources. A total of One hundred thirty-four (134) plant genetic resources comprising 69 accessions of papaya, 1 accession of passion fruit, 5 accessions of pepper, 8 accessions of pumpkin, 4 accessions of tree tomato, 22 accessions of sweet potato, one accession of bean and 12 forage genetic resources were explored and collected in different agro-ecological zone of Rwanda. These were conserved for further characterization trials, germination and moisture content tests. After collection, accessions were registered, processed and specific accession number was assigned. During collection, passport data sheets were filled for proper record, documentation and easy morphological characterization. Figure 1 exhibits some of the forage accessions collected during 2021-2022 fiscal year

1.1.6.2 Morphological characterization of plant genetic resources

In order to facilitate utilization of conserved accessions at national gene bank, a total of 76 plant genetic resources were characterized. These comprised 32 maize plant genetic resources, 22 bean accessions and 22 different sorghum plant varieties. Data were mainly recorded on plant and agronomic characters, reproductive and yield parameters and disease reaction.

Germplasm regeneration and seeds increase

For sustainable conservation of plant genetic resources conserved at National gene bank, three hundred seventy-four (374) plant genetic resources were regenerated. These comprised mainly vegetables, cereals, pulses, oil crops, roots and tubers. The following figure illustrates the field gene banks of arrow roots and yam under regeneration at Rubona station



Figure 3 : Genetic resources regeneration and field genenbank at Rubona station

Plant and forestry genetic resources conservation under active/base collection

Plant and forestry genetic resources conserved under cold room (active/base collection) for longer time must be checked for their viability. Different accessions conserved in active/base collections were evaluated in four replicates and at the end, the germination percentage was calculated. The following figures illustrate different accessions in germination room during monitoring of accessions conserved in base collection at Rwanda National gene bank at Rubona.



Figure 4. Conserved plant genetic resources under germination tests at Rubona station

1.1.6.3 Local animal genetic resources characterization and conservation.

Activities to care about 297 local animal genetic resources of Inyambo and Inkungu breeds at Rubona and



Nyagatare stations were carried out. Regular data on growth, production and reproduction were recorded. Figure 5 shows some of the Inkungu and Inyambo breeds on which different data were recorded. In order to document conserved (Inkungu and Inyambo) local animal genetic resources, large stock characterization was performed. This mainly focused on Inyambo local breeds. A total of sixty-seven Inyambo was characterized and different data related to morphological traits were recorded.

1.1.7 Integrated soil fertility management

Development of lime rates recommendations for acidic soils management

The experiments were established in the districts of Nyaruguru, Ngororero and Nyamagabe to assess the effect of low, medium and high rates of lime on correcting soil acidity and improving crop productivity. Results show the effect of lime in increasing beans and maize yields as reflected by significant difference between plots with no-lime and those which received lime. High yield increase (23.7% and 16.6% respectively for beans and maize) was observed between 1t/ha and 2.5t/ha as compared to 2.5t/h and 7t/ha.

Development of fertilizer recommendations for improved crop productivity

Research trials have been conducted in different agroecological zones (Bugesera, Central plateau, Eastern plateau, Eastern savannah, and Imbo) on different CIP priority crops (fig 6). The treatments consisted of a combination of different rates of N, P, and K. Results from season 2022A showing the crop response on each of these nutrients are illustrated by the figures below.

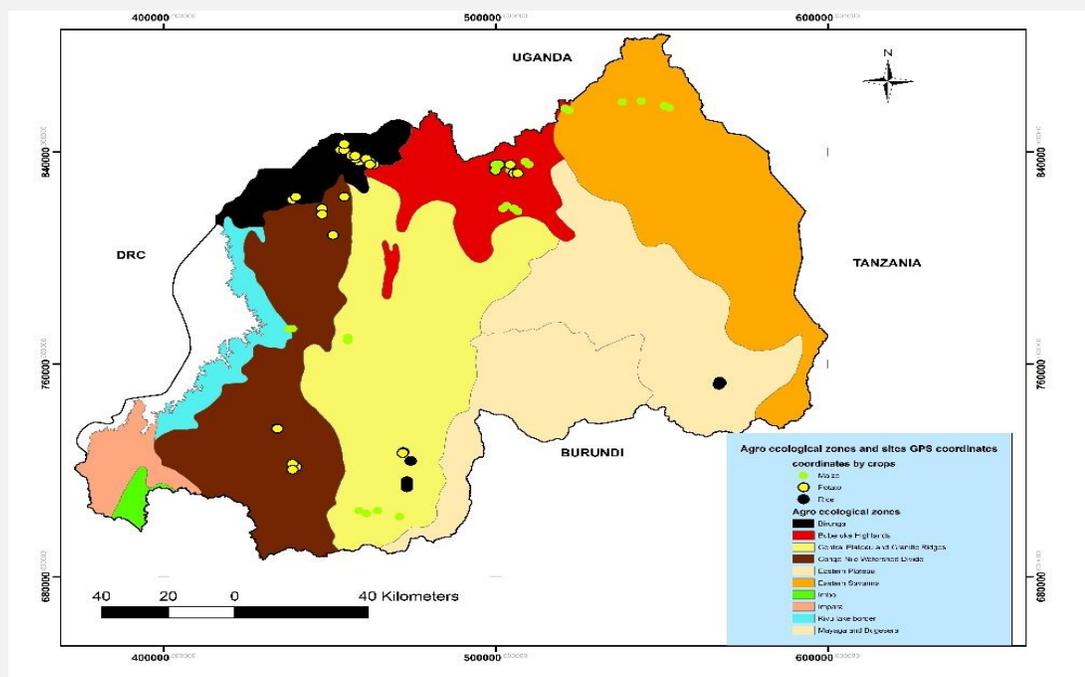


Fig 5: Agro ecological zones of Rwanda

- ***Effect of Nitrogen application on the yield of rice***

There is a significant difference between different rates of nitrogen (N) in all agro-ecological zones.

Application of 100 and 120 kg N/ha gives the highest and comparable yield with an increase of 1.2 and

2.0t/ha over the current recommendation (80kg N/ha) in all AEZ.

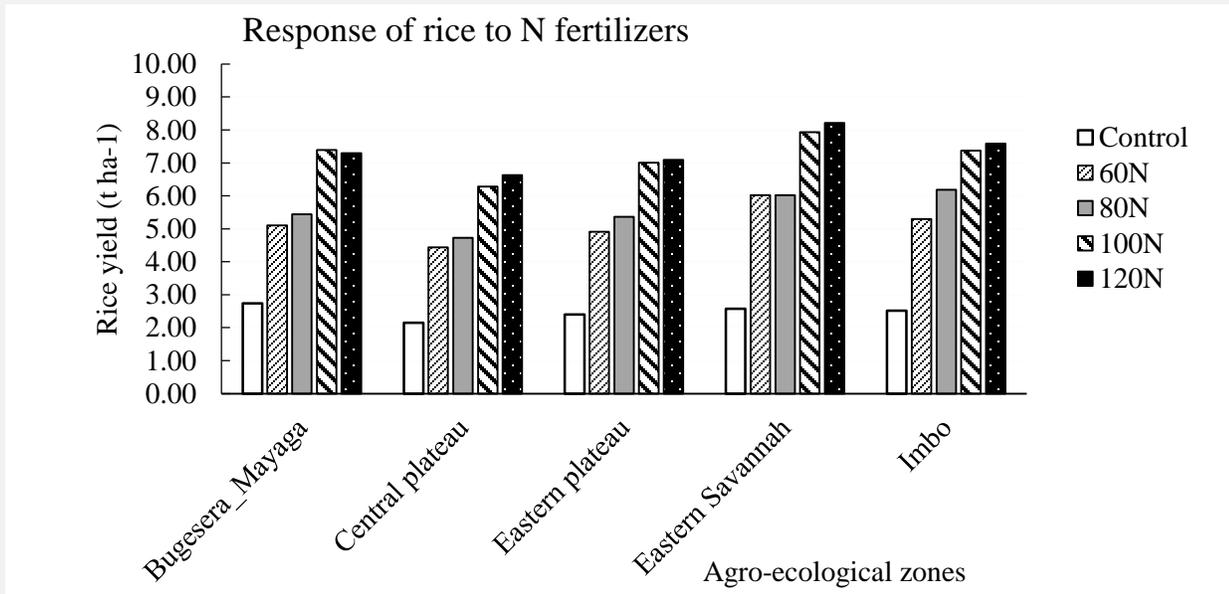


Fig 6: Effect of Nitrogen rates application on rice yield

- ***Effect of Phosphorus application on the yield of rice***

The optimum P rate was found to be 30 kg/ha in Bugesera, Mayaga and Imbo and 45 kg/ha in Central Plateau, Eastern Plateau and Eastern Savannah. No much increase of rice yield was observed with the increment of P at 60 kg/ha.

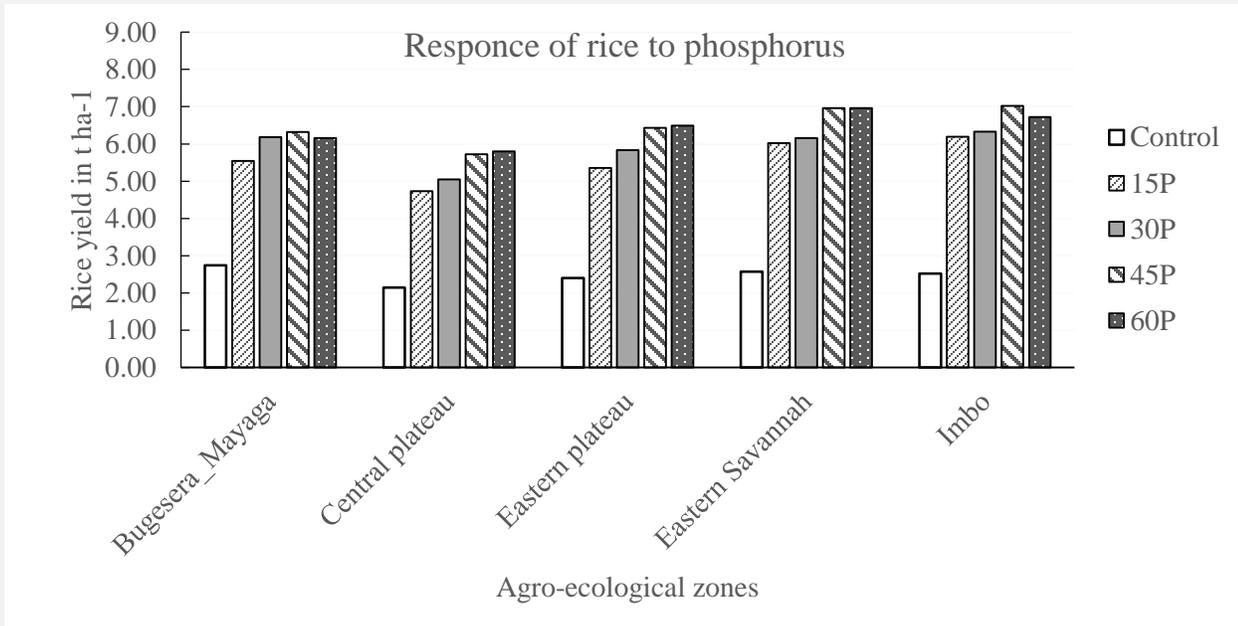


Fig 7: Effect of phosphorus rates application on rice yield

- **Effect of Potassium application on the yield of rice**

The response of rice on rates of K) revealed the optimum of 40 kg/ha in Bugesera, Mayaga, Central plateau, Eastern plateau, and eastern savannah, and 28 kg/ha in Imbo.

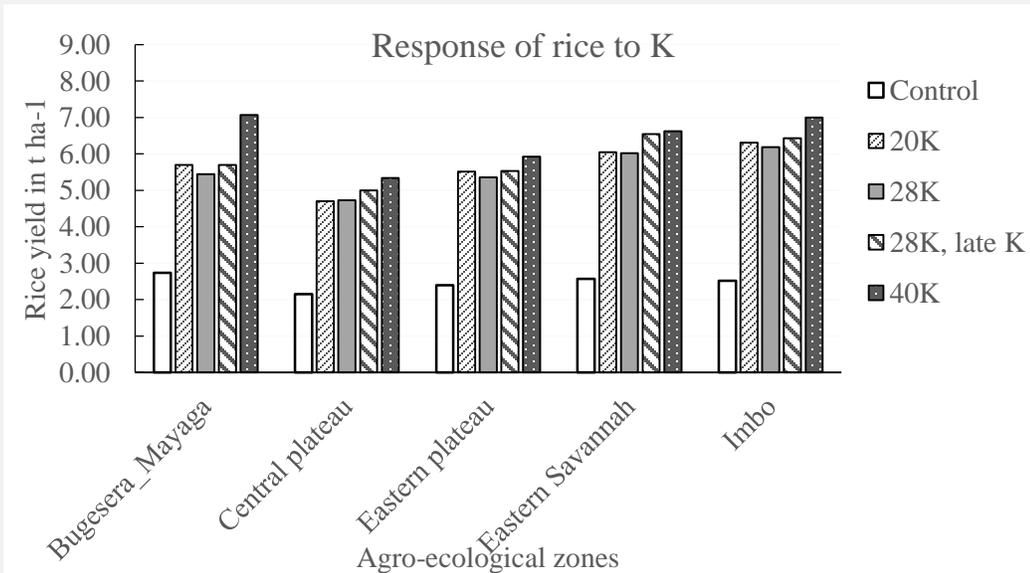


Fig 8: Effect of potassium rates application on rice yield

Effect of different types of micronutrients on yield of rice, maize and wheat

The objective of this research was to develop site specific fertilizer recommendation with NPK nutrients blended secondary and micronutrients for balanced crop nutrition. The effect of micronutrient rates and types were assessed on the performance of rice in Bugarama, Cyabayaga and Kanyonyomba. Maize and wheat performance was assessed in the Northern and Western Provinces. The treatments included:

- No Zn (14-23-14 +5S +0.2B +0.15Cu);
- Coated oxy sulphate (14-23-14 +5S +0.5Zn +0.2B +0.15Cu);
- Coated Zn sulphate (14-23-14 +5S +0.5Zn +0.2B +0.15Cu);
- Coated ZnO (14-23-14 +5S +0.5Zn +0.2B +0.15Cu);
- Granular Zn sulphate (14-23-14 +5S +1.0Zn +0.2B +0.15Cu);
- Coated micros reduced rates (14-23-14 +5S +0.25Zn +0.15B +0.12Cu).

Treatments with granular Zinc sulphate performed better than all other treatments across the three marshlands followed by the coated oxy sulphate treatment. The highest yield of wheat (4.7 t/ha) was obtained by the treatments ZnSO₄ (powder), ZnSO₄ (granular) and ZnO while the highest maize yield (6.1 t/ha) was obtained by ZnSO₄ (powder) followed by the Traditional Zn B and Firebrand ZB.

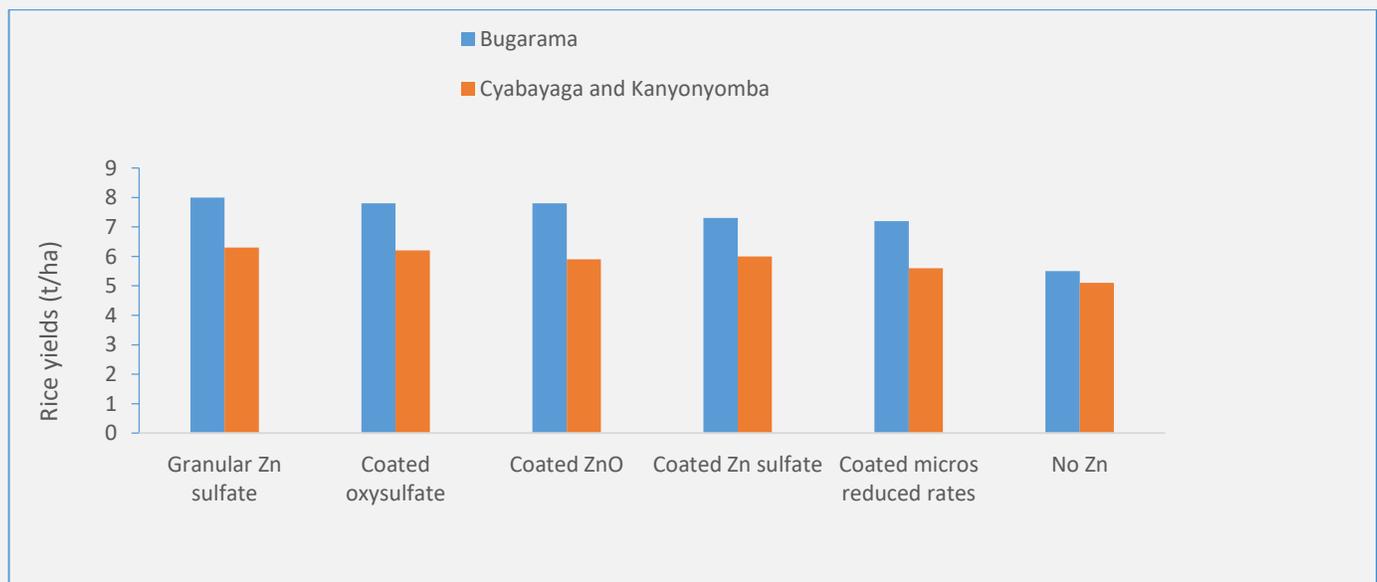


Fig 9: Effect of different types of micronutrients on rice grain yield

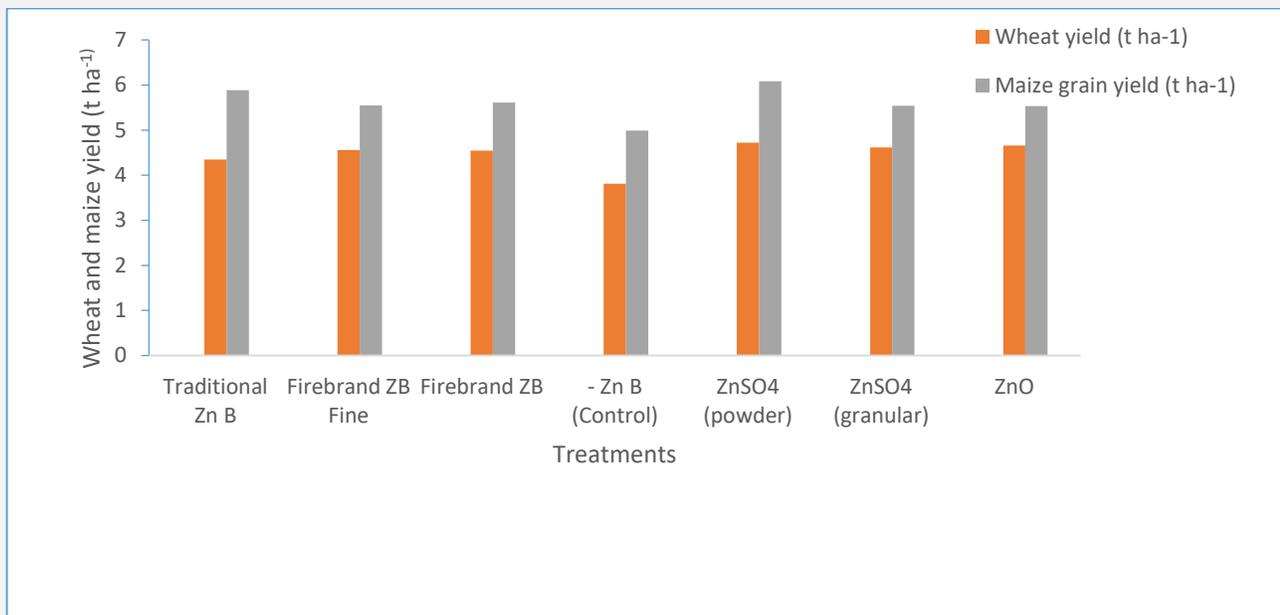


Fig 10.: Effect of different types of micronutrients on maize and wheat yields

1.2 Animal based research activities and extension

1.2.1 Mono gastric research activities

Effects of black soldier fly's maggot meal on growth performance of broilers

The objective was to detect a simple way of producing, harvesting and processing maggots, assess the performance of broiler chickens fed maggot meal as a protein substitute for fishmeal and evaluate cost of production. The Maggot meal was analysed to contain 40.12% CP, 10.97% CF, 6.88% EE, 15.88% ash.

The proximate analysis of nutritional qualities of BSF dried maggots showed that BSF Maggots can be locally available protein source as Raw materials for BSF Production.

The reduction of Soy bean meal and fish meal in a ratio by 25% to 50% give better results in Broiler production compared to Rations fed to Broiler concentrates alone. It was also found that the quality of Carcass was improved and affect positively meat taste. The Proportion of 25 to 50% Ratio based maggots is recommended as cost effective ratio in broiler production.

The reduction of protein sources such as Soybean meal and fish meal was achieved and affordable ration for Broiler production is formulated.

Comparison of feed formula for broiler chickens with and without maggot

Starter feeds for broiler chicken has been developed using ten types of ingredients locally available. The price per kg of the first formula (with soybean and fish) is 752.95 RwF, while in the second formula (with maggot); the price is 454.95 RwF/kg of concentrate. The first formula is well equilibrated in all nutrients except a small amount in energy which is very negligible. The substituted one is also equilibrated with a small deficit in crude protein (CP) of 11.88 g of CP/Kg of concentrate. This deficit is also tolerable and the formula is expected to give the same results as the formula 1 with a reduction cost of 298 RwF/Kg of concentrate.

Table 8: Substitution Formula 2, fish meal replaced by BSF maggots: Starter feed for broiler chickens

Ingredients	%	Quantity (Kg)	ME (Kcal)	P.B (g)	Lys (g)	M+C (g)	C (g)	P (g)	NaCl (g)	UP (RwF)	TP (RwF)	
Maize	44	0.44	1425.6	28.16	1.276	1.89	0.09	1.18	0	250	110	
Rice bran	11	0.11	190.52	8.91	0.66	0.88	0.143	0.77	0	200	22	
Cotton seed cake	15	0.15	420	50.25	2.625	1.83	0.3	1.5	0	600	90	
Soybean meal	20	0.2	740	64	4.94	2.4	0.5	1.2	0	1000	200	
BSF Maggots	5	0.05	203.95	26.8	3.445	1.06	0.3	0.06	0	0	0	
Molasses	1.7	0.017	46.75	0	0	0	0.027	0	0	250	4.25	
Bonemeal	2	0.02	0	0	0	0	7	3.1	0	350	7	
Limestone	0.5	0.005	0	0	0	0	2	0	0	100	0.5	
NaCl	0.3	0.003	0	0	0	0	0	0	3	400	1.2	
Premix	1	0.01	Vitamines + Oligo-elements								2000	20
Feed contribution	100	1	3027	178.12	12.946	8.06	10.36	7.81	3		454.95	
Animal requirements			3000	190	11.85	7.65	10	7	3			

Table 9 : Formula 1: Starter feed for broilers

Ingredients	%	Quantity (Kg)	ME (Kcal)	P.B (g)	Lys (g)	M+C (g)	C (g)	P (g)	NaCl (g)	UP (RwF)	TP (RwF)	
Maize	44	0.44	1425.6	28.16	1.276	1.89	0.09	1.18	0	250	110	
Rice bran	5	0.05	86.6	27	0.3	0.4	0.065	0.35	0	200	10	
Cotton seed cake	15	0.15	420	50.25	2.625	1.83	0.3	1.5	0	600	90	
Soybean meal	20	0.2	740	64	4.94	2.4	0.5	1.2	0	1000	200	
Fish meal	10	0.1	232	36	6.5	2.5	4.5	2	0	3000	300	
Molasses	1.7	0.017	46.75	0	0	0	0.027	0	0	250	4.25	
Bone meal	2	0.02	0	0	0	0	7	3.1	0	350	7	
Limestone	0.5	0.005	0	0	0	0	2	0	0	100	0.5	
NaCl	0.3	0.003	0	0	0	0	0	0	3	400	1.2	
Premix	1.5	0.015	Vitamines + Oligo-elements								2000	30
Feed contribution	100	1	2950.95	205.4	15.641	9.02	14.482	9.33	3		752.95	
Animal requirements			3000	190	11.85	7.65	10	7	3			

The substituted formula is accompanied with a reduction cost of 298 RwF/Kg of concentrate implying 60.4% reduction of feed cost per kg of concentrate when using BSF maggot to replace fish meal.

It is recommended to do deep BSF maggots safety studies in Laboratory such amino acids profile, Pathogens, heavy meals and Aflatoxins levels i maggots feed. It is recommended to engage Private sector in Market waste collection and processing as potential raw materials for BSF production; It is also recommended to engage Private sector in BSF maggots processing as protein source

Effects of Sweet Potato Vines Silage diets on Pig performance

The aim was to boost pig productivity and improve smallholder pig profitability in Rwanda by increasing the use of low-cost, locally accessible sweet potato vine silage (SPV)

Four dietary treatments with increasing levels of SPV-based silage were used in the experiment. Pigs were distributed to the treatments in groups of 10 pigs grouped randomly based on their initial body weight. Pigs in the control group A were fed on 100% concentrate, group B on 85% concentrate & 15% silage, group C on 70% concentrate & 30% silage and group D on 55% concentrate & 45% silage. The study found out that the SPVS had high crude protein and low level of ash compared to fresh sweet

potatovines. Group D of 55% concentrate & 45% silage was a good performer in all treatment in terms of low cost feeding and body weight gained.

Formulation of ration for broiler starter and lactating sow

Two formulas were developed and tested at on farm research trials. The details of the developed formulas are given below.

Table 10: Final formula for broiler starter

Ingredients	Qty (kg)	CP %	ME Kcal/kg	Av. P %	Ca %	Ly %	Me %	CF %
Broiler starter requirements	-	23	2800	0.5	1.2	1.2	0.5	6.0
Fish meal	10.00	4.20	240.00	0.243	0.373	0.320	0.110	0.10
Rice bran	08.00	1.08	176.00	0.120	0.006	0.048	0.020	1.12
Maize	42.22	3.78	1410.15	0.118	0.008	0.093	0.076	0.93
Soya	34.78	13.91	904.28	0.195	0.556	0.522	0.146	4.52
Total	--	22.97	2730.43	0.373	0.943	0.983	0.352	6.67
Shortage	--	00.03	69.57	0.127	0.257	0.217	0.148	--
Maize (balancing of ME)	02.00	00.18	68.80	--	--	--	--	--
DCP	0.690	--	--	0.128	0.145	--	--	--
Shortage of Ca	--	--	--	--	0.112	--	--	--
Limestone powder	0.315	--	--	--	0.113	--	--	--
Lysine	0.217	--	--	--	--	0.217	0.148	--
Methionine	0.148	--	--	--	--	--	--	--
TM+Vit+ other additives	1.630	--	--	--	--	--	--	--
Total	100.0	23.15	2799.23	0.501	1.201	1.200	0.500	6.67

2.Feed formula for swine

Lactating sow

Ingredients used = nine (9)

Ingredients	Quantity (kg)	DE (Kcal)	CP (g)	Lysine (g)	M+C (g)	Ca (g)	P (g)	NaCl (g)	UP (RwF)	TP (RwF)
Maize	0.29	1030	25	0.841	1.305	0.058	0.7	0	170	49.3
Maize bran	0.23	938.4	2.323	0.0621	0.0828	0.007	0.053	0	150	34.5
Sunflower cake	0.284	852	94.9	3.35	3.81	0.065	0.324	0	150	42.6
Wheat bran	0.142	346	22	0.5	0.5	0.44	1.43	0	240	34.08
Limestone	0.0043	0	0	0	0	1.5	0	0	100	0.43
Bone meal	0.0161	0	0.45	0	0	5.3	2.4	0	200	3.22
NaCl	0.003	0	0	0	0	0	0	3	400	1.2
Pig Premix	0.01	Supplemental vitamins and oligo-elements							2000	20
Contributions	0.9794	3166.4	144.7	4.7531	5.6978	7.37	4.907	3		185.33
Requirement	1	3000	140	6	3.3	8	5.5	3		

Based on ingredients prices in Rwanda nowadays, this formula is balanced and very cheap compared to the pig feed price in Gorilla feed company (305RwF/Kg). If a pig farmer uses this formula, he will gain **119.67 almost 120 RwF/Kg of concentrate (305 RwF-185.33 RwF)**.

Used book-(*Jean Claude Blum et al., 1984*). L'alimentation des animaux monogastriques : porc, lapin, volailles ; INRA, Paris, 1984.

Effect of hydroponic wheat fodder supplementation on growth performance of piglets

The study was conducted to evaluate effect of hydroponic wheat fodder as supplement, on the growth performance of weaned piglets.

Hydroponic wheat harvested from the hydroponic system had a higher the crude protein (CP) content of was 13.7% but the fiber was 9.56%, Ash, Ca and P were 1.7%, 0.23% and 0.33% respectively. WHP has high fiber which is indicated low digestibility of piglets. For the concentrate feed the crude protein (CP) content of was 15.46%, the fiber was 2.54%, Ash, Ca and P were 4.23%, 0.044% and 0.37% respectively. The Feeding trial of piglets using different levels of Hydroponic made of sprout wheat fodder in ration of levels of 0, 15, 30 and 45% was carried out with promising findings

The piglets supplemented with the ration with Level of 15% was cost effective with better results between 400 grs and 600 grs daily weight gain.

It is recommended that farmers can start adopting the technology of hydroponic green fodder to mitigate the cost of feeding which is high and unaffordable due to the high cost price of maize

The Proximate analysis of hydroponic green fodder showed that this new feed is potential one for replacing level of energy and protein source in pig diets.

1.2.2 Ruminant research activities

Effect of hydroponic barley fodder crop feed supplemented to Dairy Cattle in Nyanza District

The aim was to assess the effect of supplementing hydroponic barley fodder crop (HPB) on milk production. Results on milk yield and composition are presented in Table 11. There was a treatment effect on milk yield ($P = 0.01$) which increased linearly ($P = 0.01$) in cows supplemented with HPB. Cows fed a 50% HPB diet had greater milk yield (7.2L/day/cow) compared to cows fed 0% and 25% HPB. Considering the feeding conditions observed, the production of hydroponic barley could be a good strategy to supply a protein source to poor diets fed to dairy cows.

Table 11: Effect of supplementing hydroponic barley on milk yield and milk composition

	Treatments				P-values			Contrast	
	0% HPB	25% HPB	50% HPB	SEM	Period	Trt	P*Trt	L	Q
Milk yield (Liter)	4.81 ^b	5.77 ^b	7.2 ^a	1.02	0.57	0.01	0.56	0.01	0.63
Milk CP, %	3.19 ^a	3.28 ^a	3.1 ^a	0.25	0.99	0.19	0.99	0.22	0.06
Milk Fat, %	3.91 ^a	3.91 ^a	3.5 ^a	0.04	0.99	0.52	0.56	0.27	0.52
Milk lactose, %	4.67 ^a	4.67 ^a	4.5 ^a	0.34	0.99	0.22	0.99	0.23	0.07

Treatments: 0% HPB: Control diet without hydroponic barley fodder; 25% HPB: Diet containing 25% of hydroponic barley fodder in the diet; 50% HPB: Diet containing 50% of hydroponic barley fodder in the total diet; SEM: Standard error of the mean; Trt: Treatment; P×Trt: Period and Treatment interaction; L: Linear effect; Q: Quadratic effect; ^{a-b} Means within rows with different superscripts differ ($P < 0.05$).

Influence of endometritis, cow and herd-levels factors on milk yield and reproductive performance of zero-grazed dairy cows in smallholder farms

The aim was to assess the association of endometritis, cow and herd-levels variables, and the combination of all these variables with suboptimal milk yield and reproductive performance of postpartum zero-grazed dairy cows managed under smallholder farms.

The results reveal the important predictor variables of endometritis, reduced milk yield, and suboptimal fertility performance in postpartum dairy cows. The results suggest that there should be management interventions for improved milk production and reproductive performance towards smallholder dairy herd profitability and sustainability.

Evaluation of multiple ovulation and embryo transfer (MOET)

In the fiscal year 2021/2022, different sessions of embryo transfer and embryo production have been planned and implemented with objectives of (i) to improve skill capacity of MOET team in Rwanda and thus improve success rate of embryo transfer

and embryo production via multiple ovulation; (ii) to increase restocking of high genetic merit jersey cattle in Rwanda; (iii) to produce *Inyambo* cattle breed embryos as a contribution to indigenous

bovine breeds conservation; and (iv) to increase jersey breed genetics in Rwanda.

Success rate of embryo transfer has improved from 32% to 37.7% as the overall success rate registered in the three sessions of ET of this fiscal year 2021/2022. It has been established that among cows and heifers selected for synchronisation to be recipients, only 56.5% develop appropriate corpus

luteum and receive embryos. It is important to improve management and reproduction of RAB cows to ensure they can get into heat and reproduce. In addition, it is still recommended to continue building the skill capacity of technicians and researchers to have a significant accuracy that can effectively take the MOET technology to farm level with a good accuracy.

1.2.3 Aquaculture research

Effect of using different brood stock densities on the Reproductive performance of Nile tilapia (*Oreochromis niloticus*)

This experiment was undertaken to investigate the effects of stocking density on the reproductive performance of Nile tilapia (*Oreochromis niloticus*) bloodstock reared in haps. The haps measurements was $5 \times 15 \times 1\text{m}$ ($V=75\text{m}^3$) where the bloodstock aged 1- year old were stocked at a sex ratio of three females against one male (3:1).

The best reproduction performance was found in bloodstock stocked in intermediate group ($1\text{Kg}/\text{m}^2$) and therefore the present study suggests that bloodstock at stocking density of $1\text{Kg}/\text{m}^2$ in the sex ratio of 3 females by 1 male fish should be used in different hatcheries.

Growth performance of the acquired genetic fish for tilapia bloodstock production: Growth performance of Tilapia YY

The objective was to evaluate the growth performance, survival rate and feed conversion ratio on introduced YY tilapia sourced from Netherlands by Til-Aqua International Company and cultured in Tanks.

The specific growth rate of YY group A&B, YY Group C and YY Group D were ranged from 0.53 to 1.13, 1.19 to 4.72 and 1.12 to 6.63 percent per day respectively. The growth of fish during the first month of adaptation period was high in YY group D and group C and rates were being 6.63 and 4.72 percent per day respectively. The growth rate of YY

Group A&B did not maintain the same growth trend compared to the other groups. The initial stocking weight of fingerlings of group C was significantly (P0.5). The survival rates of YY group A&B, YY

group C and YY group D were 97.5%, 73.23% and 71.22% respectively and the survival of the bigger group (A&B) was significantly (P0.05) from each other.

Production and efficiency of Black soldier fly (*Hermetia illucens*) for Tilapia Fish, *Oreochromis niloticus*

The study was to make the production of maggot, feed formulation and feeding fish to study the effect of soybean meal replacement by Black soldier fly larvae meal in Nile Tilapia diet (*Oreochromis niloticus*).

The results produced showed that, Mean Weight Gain recorded for the fish fed with diet 3(50%BSFL) and diet 4(75%BSFL) were significantly higher (P0.05). Similarly, the results from specific growth rate and feed conversion ratio were significantly higher (P<0.05) for the fish fed the diet containing 50%BSFL meal than that of the control diet. The results from this study show that the replacement of soy bean meal with maggot meal

at various percentages of dietary treatments have significant effect on growth performance, survival rate, and FCR, nevertheless the optimal results were achieved on diet 3 where soybean meal was replaced by 50%BSFL meal.

It is concluded that BSFL meal is considered as one of the best alternatives for partial or complete replacement of soybean meal in Nile tilapia diets. Based on these results and the low cost of producing the Black soldier fly as they are consuming the unwanted waste, we are recommending the adoption of this animal protein source to fish farmers to sustainably produce cheap and nutritious fish feed capable to increasing yields and maximizing profits.

CHAPTER 2: PRODUCTIVITY AND RESILIENCE

2.1 Sustainable land use management

Under productivity and resilience pillar, the agriculture sector promotes sustainable production of irrigation schemes and terraced lands moving from traditional towards market oriented value chain production to subsequently generate higher incomes. This sustainability requires the enhancement of public private partnership (PPP) models involving the private sector service providers, private investors, farmers' organizations, cooperatives and Irrigation Water Users' Associations.

2.1.1 Land use consolidation

Various studies showed that fragmented land tends to produce a farm infrastructure that prevents the agricultural modernization. The GoR adopted the land consolidation policy that aims at overcoming the effects of land fragmentation by increasing the scale of Agricultural yields and stimulating a transformation to a competitive and market oriented Agricultural sector (MINAGRI, 2009).

Land Use Consolidation is one of the pillars of Crop Intensification Program (CIP) which currently undertakes a multi-prolonged approach for providing proximity extension services in terms of facilitating the availability and access of inputs (improved seeds and fertilizers) to farmer's /farmers' organizations, support of soil and water management, mechanization

and irrigation technologies, and improvement of postharvest handling and storage mechanisms. From the beginning of September 2007, the CIP program focused on eight priority crops namely maize, wheat, rice, Irish potato, beans, soybeans, banana and cassava and recently, Fruits and Vegetables have been added to the list. Table 12 summarizes the achievement of land-use-consolidation for priority crops during 2021-2022 FY compared to targets. With regards to PSTA 4 targets of achieving consolidated land at 980,000 ha by 2021/22FY, the area under land-use-consolidation was achieved at 79.3% when considering the achievements in season 2022 A

Table 12 : Land use consolidation for priority crops during 2021/22 FY at National level

Crops	Targets (2021-2022 FY) in Ha		Achievements (Ha)	
	Season A	Season B	Season A	Season B
Maize	252,467	56372	252,271	57,593
Beans	368,250	341,261	371,277	342,075
Irish potatoes	62,507	52426	60,203	50,607
Wheat	6,863	40,052	5,784	34,999
Cassava	60,474	31,163	51,968	29,567
Rice	14,075	14,773	14,448	15,102
Soybean	4,464	4,672	4,691	4,867
Vegetables	8,159	4,839	6,108	4,407
Total	777,258	545,558.4	766,750	539,216.9

2.1.2 Soil conservation

Soil erosion is one of the key factors hindering crop productivity in the most of the agricultural lands of the country especially the hillsides. Construction of radical terraces and establishment of



progressive terraces was conducted in 19 and 25 districts respectively to address issue of soil erosion. The total annual achievement was 4,329ha for radical terraces and 14,032ha for progressive terraces. The annual cumulative achievement was 135,385.9ha for radical terraces, and 986,087.1 for progressive terraces.

2.1.3 Analysis of the lime value chain and adoption of acid soil management technologies

Soil acidity is one the key factors hindering crop productivity in many parts of the

country. The proportion of acid soil coverage is estimated at 45% of the total agricultural

land. The acid soil management value chain entails mapping the lime value chain actors and function. Analysis of the lime value chain and adoption of acid soil management has come up on the followings:

The lime value is well structured and involves different actors from policy, advocacy and research organizations, extension agents, producers, processors, transporters/distributers, agro dealers, private organizations, and farmers. The lime is currently produced and processed from different private companies. The total is estimated to 80,500 tons per year against

114,000 tons of the potential. The quantity of lime applied in 2021/22Fy is equivalent to 15,857.6 MT.

The most critical challenges in the lime value chain are related to low awareness, insufficient infrastructures and equipment such as laboratory or tool kits for lime analysis, and lack of warehouses for lime storage. Other challenges, equally ranked include lack of farmers' knowledge on the use of lime, inadequate packaging, low capital and access to finance, and low capacity of manufacturer.

2.1.4 Agriculture Mechanization

Agriculture modernization requires using agriculture technologies to increase agriculture production in quality and quantity. PSTA-4 emphasizes the promotion and dissemination of adapted mechanized technologies to boost the yield and production by minimizing the harvest and post-harvest losses while saving human and capital investment in farm operations. In collaboration with different stakeholders, mechanized land increased from 62,207.5 ha in 2020/21 to 70,740 ha (2021/22) equivalent to 13.7% compared to the previous year. The achievement of mechanized farm operations reached 36% (2021/2022) while the target is 50% by 2023/2024.

2.1.5 Irrigation infrastructures development

Rwandan Government through MINAGRI developed strategies to increase agriculture production through reducing dependency on rain fed agriculture and initiated marshlands,

hillside and small-scale irrigation projects to achieve the target of 102,284 ha set by the NST1 by the year 2024. The total land under irrigation by June, 2022 is 68,126 Ha

composed of 37,273 ha of marshlands, 8,780ha of hillside and 22,073 ha of SSIT (Small Scale Irrigation Technology) developed.

Marshland and Hillside irrigation are 100% funded by the Government but for the SSIT, MINAGRI decentralizes the budget to the

districts for 50% subsidy provision to farmers.

Irrigation program activities in 2021/2022 Fiscal year mainly focused on the following: Irrigation studies development, Hillside irrigation development and Irrigation infrastructures rehabilitation

2.1.5.1. Irrigation Feasibility and detailed design studies development

Karangazi irrigation study development

The Feasibility and detailed design of Karangazi is ongoing. The objective of this assignment is to prepare the implementation of the Karangazi Valley Multipurpose Project through Feasibility Studies, Detailed (Tender) Design and Tender Documentation. According to the ToR, the project covers an area of 11,000ha gross (a net area of 9,000 is expected). stretching along the Karangazi stream (between Karangazi center and

Akagera River for a total distance of about 30km) and further expands up to Bwera Cell in Matimba Sector. At least 65,000 cattle will be also targeted for the supply of water. The main concept of the irrigation design is that water will be pumped from Akagera river to the reservoirs and will be then distributed to the Command area through supply canals. The study development stands at 68% Progress towards completion of Karangazi.

Mugesera Feasibility study and detailed design/Hydrological study

The Feasibility and detailed design of Mugesera is ongoing also, with the objective to analyse the hydrology and water resources issues related to the Feasibility study of Mugesera Multipurpose hillside irrigation Project.

2.1.5.2 Hillside irrigation development

Mpanga irrigation and watershed development

The overall progress for the project for irrigation and watershed development at Mpanga covering 659ha is at 95.6%. This project involves the watershed development now completed at 100%, the site establishment also completed at 100%, civil works for intake completed at 99.95% supply and installation of electromechanical equipment completed at 92.24%, and command area completed at 89%. The Contract was expected to be completed by May 2022; however, it was extended up to September 2022 due mainly to the disruption caused by COVID 19, delaying the manufacturing and inspection process of irrigation and electromechanical equipment`s.

Irrigation and watershed development for Mahama Lot 1 &lot 2

The development of Mahama irrigation schemes lot 1 and 2 started respectively in November and December 2021. Area under development is estimated to 1,220 Ha for Mahama 1 and 1,956 ha for Mahama 2. The progress stands at 20 % and main activities to be implemented are:

- Construction of site establishment
- Construction of intake and supply and installation of electromechanical equipment`s
- Supply and installation of irrigation infrastructure in the command area
- Watershed development

2.1.5.3. Irrigation infrastructures rehabilitation

Bugarama Marshland Rehabilitation

Bugarama marshland remains the largest irrigation scheme in Rwanda located in Southwest, Rusizi district under Rusizi catchment with the total area of 1,500 Ha but only 1,370 Ha are used to grow the rice. This marshland was developed in 1989.

Bugarama Marshland extends into four 4 different sectors known as Bugarama, Muganza, Nyakabuye and Gikundamvura. The marshland is used to grow mainly rice by the different cooperatives namely Ejo Heza Muhinzi w`Umuceri-Bugarama, Jyambere Muhinzi w`Umuceri-Muganza, Imbanzabigwi Muhinzi-Nyakabuye, and COPRORIKI-Gikundamvura. Bugarama marshlands rehabilitation stands at 97%.

Kamiranzovu Marshland Rehabilitation

Kamiranzovu is a marshland located in Butaro sector of Burera district. Kamiranzovu has 465 Ha used to grow different crops and Irish potatoes is the dominant crop. This marshland suffered from flooding which also affected the agriculture production and destroyed infrastructures. The root cause of those floodings comes from the runoff on the unprotected catchments. The rehabilitation works focused on site preparation,

topographic survey, construction and installation of water management structures including both irrigation and drainage networks, diversion weirs, both irrigation and drainage culverts, complex water management structures, drops and stream bank stabilization and bridges construction. The marshland is fully rehabilitated and operational.



Stream bank erosion during the disaster and after reshaping how it looks like.

Cyabayaga Marshland Rehabilitation

Cyabayaga dam is a water reservoir infrastructure for irrigation of a rice production scheme of 400 ha. Over time, Cyabayaga dam has been subject of accumulation of silts in reservoir dam due to the presence of fine solid particles into the water flowing from Karungeli river. The accumulation of silts reduces the volume of water in the reservoir and affects the capacity of the dam to serve the command area. The rehabilitation works focused on: Construction of silt trap structure for capturing sediments before water is getting into the reservoir; Construction of silt trap structure 1 km from the weir to remove sediments from Karungeli river; Construction of a new weir structure, consisting of 350 m³ of reinforced concrete, 90 m³ of cyclopean concrete, 250 m³ of

rubble stones masonry, which were used for the construction of a weir and two silt traps. Creation of a new irrigation canal of 4 km totalling 44,000 m³ of soil excavation. The rehabilitation works stands at 95% progress towards the Cyabayaga dam completion.

Rurambi dyke Rehabilitation

The natural disaster caused by the flood of Akagera river occurred in 2018 and hit again in 2020 where the river flow created breaches through the old dyke then the river flooded the entire marshland. These events affected the rice plantation and the rice production was completely lost. The disasters destroyed the old dyke, irrigation and drainage infrastructures, access road, sedimentation and cause the marshland to be unlevelled.

Dyke with 9.4km of length with 3.5m of height and 4m on top width constructed and irrigation infrastructures composed of irrigation canals, pumping stations and ramps were rehabilitated.

Rehabilitation mushishito marshland

Mushishito marshland located in Nyamagabe/Uwinkingi sector with 54ha was rehabilitated in collaboration with WFP. The rehabilitation works completed in March 2022 and it is now under maize plantation.

2.2 Crop production

2.2.1 Seeds production

In the context of strengthening seed production systems and exiting from the reliance on seed importation within the medium term (2018-2021) and sustain a steady supply of adequate in both quality and quantity seeds in the country, the government through the ministry of agriculture (MINAGRI) has created an enabling environment that mobilized the private sector actors to invest and engage in the activities of seed production and marketing.

During this fiscal year, the agriculture sector succeeded to supply required quality seeds to farmers for both agriculture seasons 2022A&B without any importation. Through joint planning and effective collaboration with seed multipliers the planed targets were achieved in term of basic and certified seeds production as summarized in table 13.

Table 13: Quantity of improved seeds produced

Crops	Basic Seeds (MT)		Certified Seeds (MT)	
	Targets	Achievements	Targets	Achievements
Maize	50	54.16	5,000	5,371.20
Soybean	50	56.2	400	527.8
Beans	85	86.3	650	679.9
Potato	1,600	2,129.8	30,000	34,649.7
Rice	37	51.2	640	753.2
Wheat	60	76.36	950	1,281.9

Note that 116,937,500 cuttings of cassava was produced against 110 million cuttings targeted.

Mobilization, Coordination and Capacity building of local seed producers

To improve and sustain production and marketing of locally produced seed, the government through the Ministry of Agriculture has encouraged and motivate the private sector actors in seed production, marketing and distribution activities so that it can gradually withdraw from this trend and focusing its efforts on coordination, regulation, quality control, and other key activities such as agriculture services delivery that cannot be carried out by the private sector.

In the framework of coordination and mobilization of the local seed production various activities conducted including field visit, consultative meeting and workshops to organize and provide marketing support, mobilize and provide technical support to seed multipliers on production and processing in order to ensure the production and delivery of adequate seed to farmers in the country.

2.2.2 Use of fertilizers and improved seeds

Increasing agriculture production requires adoption of sustainable land management, use of improved seed and fertilisers. This year farmers were mobilised to use agriculture inputs where the level of fertilisers uses achieved 62.5kg/ha.

5,800.9 MT of improved seeds composed of 4,113.5 MT of Maize, 305 MT of Soybean and 1,382.4 MT of wheat were used by farmers. On the side of inorganic fertilizers, a total of **71,499.5 MT** of fertilizers composed of 17,977.5 MT of UREA, 24,855.9 MT of DAP, 22,450.9 MT of NPK and 6,215.6 MT of Kcl+ Blends were used by farmers.

In addition, **15,990 MT** of fertilizers were applied in tea and coffee plantations. This was made up of 3,466 MT applied in coffee and 12,523.9 MT in tea plantation for in season A & B

The total quantity of fertilizers applied in this fiscal for both food crops and cash crops is equivalent to 87,489.9 MT and 15,857.6 MT of lime was applied.

2.2.3 Crop productivity and production system

A total of 1.06 million hectares were used for crops production in season 2022A. Farmers were mobilised through extension agents to adopt good agriculture practices to maximize the expected



production in 2022A. This imply the use of improved seeds, fertilisers, lime, soil conservation, pest and diseases control...et. The NISR report revealed that the production obtained were reduced for some crops compared to the previous year of 2021A: Maize decreased 7.9%, sweet potatoes decreased 1.7%, cassava decreased 7%, banana decreased 7.6%, beans decreased 8.9%. The increase in

production were obtained on rice with 4.3% and Irish potato with 8.1%.

Regarding to the use agricultural inputs, the results prove that 33.1 percent of farmers use improved seeds, 69.7 percent of farmers applied organic fertilizer and 38.6 percent of famers applied inorganic fertilizer. 19.8 percent of farmers applied pesticides, 8.2 percent of farmers practiced irrigation and 92.1 percent of farmers practiced anti-erosion activities. It has been realised that the level of adopting good agriculture practices for large scale farmers is very higher compared to the small scale farmers which contributed to the productivity increase for major crops.

The national average yield of Maize was 1.6 tons per hectare for SSF and 4.1 tons per hectare for large scale farmers, an average Irish potatoes yield of 8.6 per hectare for SSF and 10.3 tons per hectare for LSF, average rice yield of 2.8 for SSF and 4.3 tons per hectare for LSF. The yield of beans, wheat and soybean on LSF was respectively 1.3 t/ha, 2.2t/ha and 1.26 t/ha.

The Table 14 show the changes registered in term of area planted, crop production and average yield obtained in 2022 A compared to 2021A.

Table 14: Quantity of crop production (MT) in 2022A

Crop	Cultivated area (ha)		Production (MT)			Average Yield (t/ha)	
	2021 A	2022 A	2021 A	2022 A	Increment (%)	2021 A	2022 A
Maize	236,642	219,683	378,641	348,907	-7.8	1.6	1.6
Sorghum	33,636	37,469	44,039	45,016	2.2	1.3	1.2
Paddy rice	15,374	15,840	63,950	67,002	4.7	4.16	4.2
Wheat	4,418	3,495	4,500	4,019	-10.6	1.02	1.1
Cassava	200,313	186,204	601,291	637,856	6	14.2	14.0
Sweet potato	99,496	97,771	667,346	694,320	4	6.7	7.1
Irish potato	52,196	56,442	463,562	486,075	4.8	8.8	8.6
Taro & Yams	17,119	40,424	93,819	85,245	-9.1	6.0	6.4
Cooking banana	108,451	96,434	529,788	545,588	2.9	13.6	13.7
Dessert banana	41,394	36,598	124,546	126,838	1.8	8.12	8.0
Banana for beer	130,934	126,472	498,031	519,904	4.3	`	9.8
Beans	389,149	362,439	258,851	235,818	-8.8	0.67	0.7
Pea	11,116	10,872	8,617	8,247	-4.2	0.78	0.8
Groundnut	15,978	15,144	6,313	5,445	-13.7	0.4	0.4
Soybean	27,493	26,996	14,237	13,741	-3.4	0.52	0.5
Vegetables	20,181	18,721	159,669	142,604	-10.6	7.91	7.8
Fruits	11,206	10,914	25,275	21,261	-15.8	5.5	6.3

2.2.4 Advisory services delivery

Advisory services delivery is one of the seven pillars of Crop Intensification Program under which falls under mobilization of farmers for season implementation through meeting and mass campaigns, Radio talks and spots, training of frontline extension agents and formation of farmers in small groups for easy

access to delivery services. The considered frontline extension agents are Farmer Promoters (FPs) 13,682, Farmer Field Schools facilitators (FFS) 1,785, Social & Economic Development Officer (SEDO) 2,028, Agro-dealers (AG) 718 and Sector & District Agronomist 398 in season 2022A.

Through Twigire Muhinzi extension model, these front line extension agents were again trained on seasonally all Good Agricultural Practices (GAPs) and later on, farmers are grouped in small groups from where they are also trained by these frontline extension agents under the supervision of RAB and District technical staff. During this year of 2021/2022, the number of frontline extension agents trained were 37,076 for both seasons A =18,611 & B =18,465 while farmers grouped in Twigiremuhinzi groups were

13,254 and 18,454 for season 22 A & B respectively and the number of farmers reached by advisory services and registered in Smart Nkunganire System (SNS) were 1,174,996 and 824,504 for A & B respectively. After the training of frontline extension agents, FPs are supposed to establish a number of demonstration plots of each crop under CIP and 30,515 FPs demo plots were established in both Seasons 22A & B) as detailed indicated in table18

Table 15: Demo plots established in Season 2022A & B

Crop	# of Demo plots in season 2022A	# of Demo plots season 2022B
Maize	11,896	4,506
Beans	1,898	6,085
Soybean	244	1,509
Banana	121	177
Rice	289	185
Cassava	54	345
Irish potato	589	933
Wheat	32	356
Vegetables	295	1,002
Total	15,418	15,097

2.3. ANIMAL RESOURCES PRODUCTION

2.3.1. Introduction

Animal resources play an important role in the Rwandan agricultural sector. It contributes to agricultural GDP up 17%. This is because major policy development and investment have been put in place to increase animal resources production by increased adoption of strong disease control mechanisms, improved breeds, and better feed and feeding.

2.3.2. Animal genetic improvement

2.3.2.1. Bovine genetic improvement

The bovine genetics in Rwanda is in constant improvement to increase production, efficiency, and farmers' income from cattle farming. The bovine genetic improvement is implemented by different partners; mainly the Local Government, cattle farmers, livestock professional organizations, NGOs, and all are supervised by Rwanda Agriculture and Animal Resources Development Board (RAB). The focus of animal genetic improvement is the following:

- To ensure the availability of quality and genetically superior breeding germplasm;
- Bovine semen collection and processing;



Semen distribution through drone technology

- Liquid Nitrogen production and facilitating the availability of artificial insemination (AI) inputs;
- Capacity building of AI stakeholders on bovine artificial insemination, cattle reproductive management, and AI inputs handling (especially, Liquid Nitrogen);
- Supervision and facilitating of Cattle registration
- Facilitating and supervising

the cattle artificial insemination across the country;

- Strengthening the small stock genetic improvement;

Management of bulls

Rubona Bull Station hosts a team of 9 best bulls selected to produce semen in order to ensure fast dissemination of superior genetics and faster genetic improvement and conservation of local breeds. They are made of 3 Holstein Friesian, 3 Jersey, 2 Sahiwal and 1 Inyambo.



Friesian for Dairy



Inyambo for Conservation

Availability of Semen

In order to ensure the availability of bovine semen of good quality, every fiscal year RAB through National Animal Genetic Improvement (NAGIC) fixes the target of semen to be produced. In 2021-2022 Fiscal Year, a total of 251,649 doses of semen were availed including 197,049 dose of semen locally produced and 54,600 doses of Jersey breed imported. A total of 110,495 cows were inseminated and 42,195 borne calves were registered. For the proper storage of semen, 184,458 litres of liquid nitrogen were produced out of 261,274 liters planned in PSTA 4 representing 70.6%, and 180,231 litres were distributed countrywide



Jersey for Dairy



Sahiwal for Meat

Availability of Semen

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semen locally produced and 54,600 doses of Jersey breed imported. A total of 110,495 cows were inseminated and 42,195 borne calves were registered. For the proper storage of semen, 184,458 litres of liquid nitrogen were produced out of 261,274 litters planned in PSTA 4 representing 70.6%, and 180,231 litres were distributed countrywide

Capacity building

Bovine Artificial insemination (AI) is the best and safe mean of cattle reproduction. With AI the dissemination of superior genetics is faster; access of best bulls is ensured and reproductive diseases are prevented. Especially for Girinka beneficiaries and other smallholder cattle farmers, artificial insemination is the only option to breed their cows since they cannot afford to keep a good bull for breeding. To ensure that farmers benefits from this technology monitoring across the country is regularly conducted. Training on artificial insemination is organised for new AI technicians and refresher courses to improve the skills of existing inseminators. In this fiscal year, 256 animal sciences technicians have been trained on bovine artificial insemination techniques. In addition, 1,417,328 cattle have been identified using ear tags and registered into the database.

2.3.2.2 Pig Genetic improvement



The pig farming in Rwanda is undergoing development but the productivity is still constrained by insufficient of genetic material (poor quality genetics), inadequate supply of quality of feeds, high incidence of pig diseases and inadequate technical support services. In order to increase the good genetic of pigs in the country, 4 insemination canters were established: CPPA KISARO, Vision Agri-

business Ltd at Gicumbi; Pig farming on grands scale at Bugesera and Muyumbu pig breeding farm Ltd. The established centers tend to facilitate the distribution of improved genetic material, strengthen activities of semen collection and reinforce the dissemination of enough quantity and quality of pig

semen at a large scale. In this fiscal year 5,229 semen were produced and inseminated sows are 5,002 pigs. As results 47,417 improved piglets are available in the country.

2.3.3. Animal feeding

Forage production

The target for forage planting was to plant 4,000 ha of improved forage grasses and legumes across the country. In partnership different stakeholders, a big achievement was recorded, where land planted with improved forages was 4,558 ha.

Concerning the forage seed production; 50 tonnes of Napier grass cuttings, Brachiaria and Panicum splits have been produced and 696 kg of seeds of Chloris, Leucaena, Panicum, Desmodium, Mucuna and Barley fodder were also produced. The total seeds produced was estimated at 50.7 tonnes.

Training on forage conservation

3,183 farmers were trained on forage production, harvesting and conservation, as well as on general ruminant livestock husbandry.

2.3.4. Diseases control

2.3.4.1. Vaccination

Animal disease control was carried out through mass vaccination of animals against economically important and zoonotic animal diseases. Awareness campaigns have been conducted to ensure timely vaccination against Foot and Mouth Disease, Lumpy Skin Disease, Black Quarter/Anthrax, Brucellosis, Rift Valley Fever and Rabies. A total of 219,024 cows were vaccinated against FMD; 777,799 cows against LSD; 655,367 cows were vaccinated against BQ; 61,296 cows were vaccinated Brucellosis and 9,937 dogs were vaccinated against rabies.

2.3.4.2. Diseases surveillance

Rift Valley Fever (RVF) is a zoonotic disease transmitted from animals to human or animal to animal by mosquitoes bites particularly Aedes and Culex. But contaminated

materials like meat, aborted fetus and discharges from diseased animal plays a big role in the transmission of the virus to humans. The major clinical signs in animal

are bleeding from noses and abortions. In humans, signs are a malaria like syndrome complicated by bleeding in acute form of the disease. Even though RVF is not new in our country, the current outbreak which started on 21/3/2022 was unusually strong compared to the previous ones observed in 2018, 2020 etc. To tackle the epidemic, special measures were put in place especially the engagement of various institutions like MINAGRI, MoH, Local Government and Security forces.

Command posts were put in place from national to district levels and they are jointly working days and night. The preventive measures were put in place where vaccination and animal spraying have been prioritized. 1,203,749 cows were vaccinated, 1,422,992 goats were vaccinated and 293,629 sheep were vaccinated against RVF. On the spraying part, 1,272,460 cattle sprayed, 847,256 goats sprayed and 308,243 sheep were sprayed.

2.3.5 Livestock population

Livestock plays an important role in the agricultural sector of Rwanda. It contributes to agricultural GDP up 14%. This is because major policy development and investment that have been put in place to increase livestock productivity by increased adoption of improved breeds and better feed



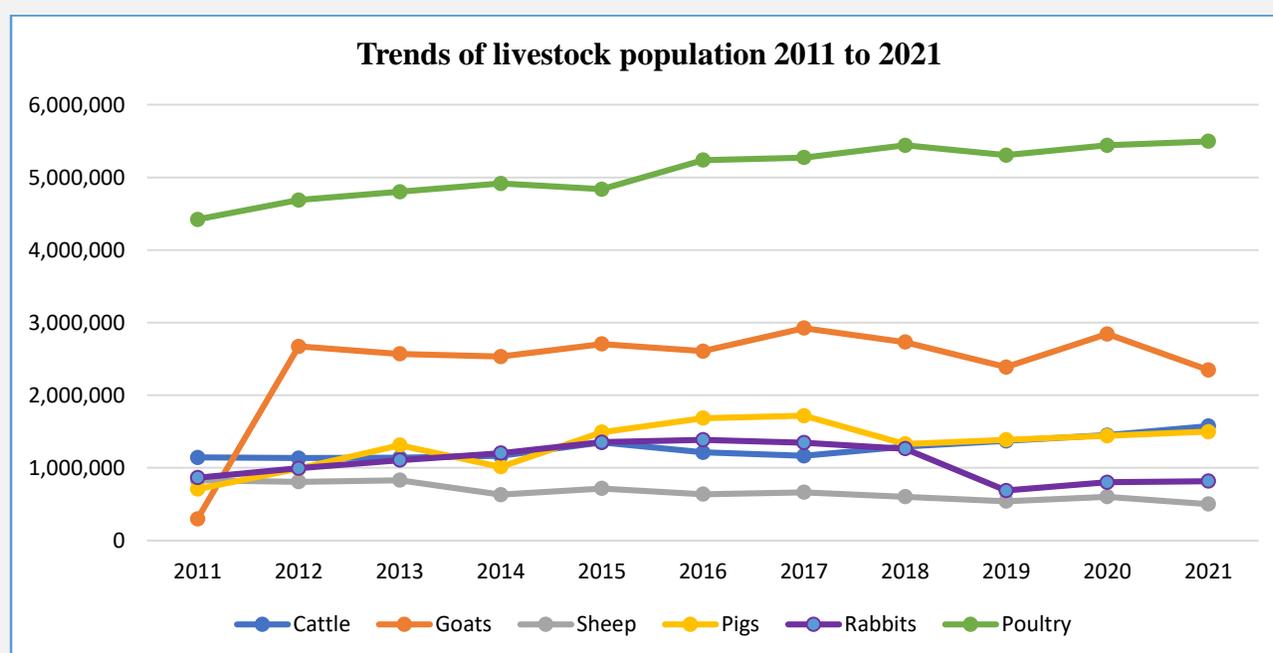
and feeding. The livestock sector has become increasingly productive over the past years and the aim is to sustain this growth under PSTA 4. Cows have been promoted for milk production, while small-stock, poultry, and aquaculture will be raised mostly for meat due to lower feed requirements. Small livestock also contributes to farm income, resilience, and enhanced

nutritional status of farming families. In this fiscal year 2021/22, the population of cattle has increased by 8,6% compared to the last fiscal year 2020/21. The small stock population decreased by 27,4% for goats and 29% for sheep. On the other hand, the population of pigs increased by 4%, and 1% for rabbits and poultry. The increase of cattle and pig numbers is due to efforts deployed by the GoR to support vulnerable families and other interventions initiated by NGOs, Civil

societies to assist poor families. In that context, 20,800 cows; 12254 pigs; 17,631 goats; 7,153 sheep; 4,663 rabbits and 142,843 poultry were distributed to poor families in 2021/22.

Table 16 : Trend of Animal population by type (2011-2021)

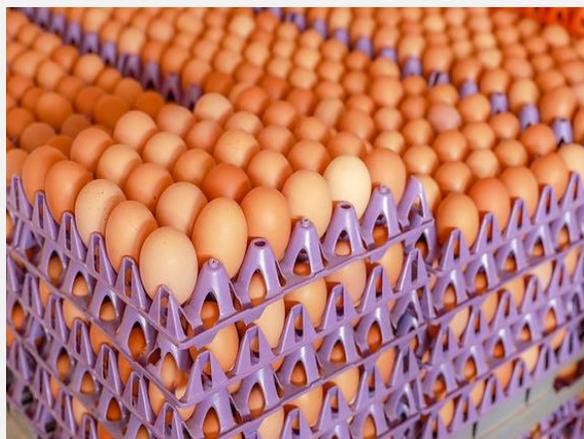
Category	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Cattle	1,143,231	1,135,141	1,138,799	1,165,835	1,349,792	1,214,244	1,166,187	1,293,768	1,371,828	1,449,888	1,575,703
Goats	297,078	2,672,751	2,570,275	2,532,277	2,706,382	2,605,780	2,923,706	2,731,795	2,387,898	2,844,001	2,348,895
Sheep	828,836	807,392	829,638	630,860	716,309	637,068	664,703	601,836	541,416	601,836	501,548
Pigs	706,472	989,316	1,311,250	1,014,629	1,492,506	1,684,709	1,716,438	1,330,461	1,385,769	1,441,077	1498721
Rabbits	864,696	993,685	1,105,750	1,203,485	1,354,703	1,387,669	1,347,860	1,264,734	688,788	801,490	817519
Poultry	4,420,764	4,687,984	4,802,764	4,916,837	4,837,794	5,238,497	5,272,725	5,442,152	5,306,254	5,442,152	5496574



Observations: The number of poultry, cattle and pigs is increasing while the decrease in number is being observed on goats, sheep, and rabbits.

2.3.6. Animal Products

Rwanda is currently recording unprecedented increased growth in livestock production due to



various policy interventions including One cow per family program, genetic improvements, to animal feeding, animal health and livestock infrastructure development. Cattles contributed significantly to meat production with 34 % of the share while poultry and pigs contributes 22 % and 14 %, respectively. The production of animal products has been increasing over the years. This

is attributed to different programs supporting the development of the livestock sector, mainly the livestock intensification program, Girinka program, small stock development, among others.

Table 17: Trend of animal products 2011-2021 in MT

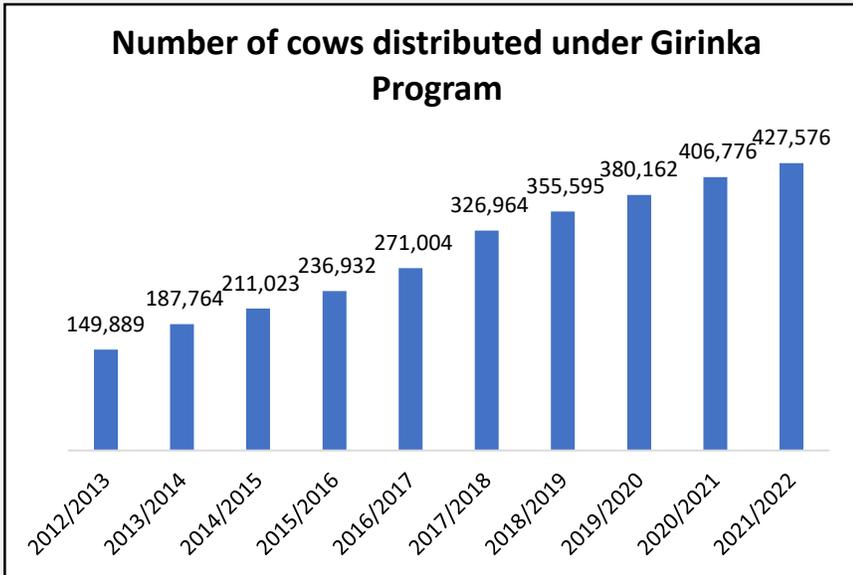
Product	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Milk	503,130	648,395	703,606	731,014	776,284	816,791	847,178	864,252	891,326	999,976
Meat	74,519	91,087	118,348	131,366	138,231	152,029	162,470	168,687	174,904	185,989
Fish	17,566	24,550	25,450	26,732	26,732	28,705	31,465	32,756	36,047	43,560
Eggs	6,324	6,757	6,973	7,347	7,347	7,475	7,936	7,972	8,272	8,665
Honey	3,785	4,286	4,585	4,738	4,738	5,105	5,200	5,500	5,800	6,135
Hides & skin	3,814	5,207	5,305	5,506	5,506	6,781	6,567	6,305	6,305	6,087

Table 18 : Consumption per person per year vis a vis need

Animal products	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Milk lt/pers/year	37,3	44,2	50,1	58,1	59,0	63,00	66,2	68	69,4	72,02	73,9	75,3
Meat Kg/pers/year	6,44	6,69	6,95	7,59	10,9	9,70	11,1	12,7	14,06	14,06	14,5	13,9
Eggs kg /pers/year	0,47	0,52	0,57	0,59	0,60	0,61	0,62	0,63	0,63	0,66	0,7	0,7
Fish Kg/pers/year	1,36	1,41	1,59	1,8	1,9	2,1	2,4	2,62	2,56	2,73	2,9	3,9
Honey Kg/pers/year	0,26	0,29	0,34	0,39	0,41	0,43	0,45	0,47	0,53	0,46	0,5	0,5

2.3.7. Girinka program

Girinka Program is a home grown solution that emerged from the 2006 as a pro-poor program to help poor families improve their welfare. Girinka program has been implemented in all 30 districts by the Government of Rwanda, Private sector, Civil Society Organizations, and Non-Government



Institutions through giving cows to poor families in order to improve their socio-economic welfare. Girinka Program reduces poverty through dairy cattle farming and improves livelihoods through increased milk consumption and income generation. Another intended benefit was improving agricultural productivity through

the use of manure as fertilizers. Since its inception in 2006 up to end June 2022, Girinka program has provided 427,576 cows to 427,576 Rwandan poor families

2.3.8. Small stock distribution

During the fiscal year 2021-2022, the distribution of small stocks was done as follow:



The total of 142,843 chicken were distributed (75971 from MINAGRI and projects; 66872 from other partners), 12254 pigs were distributed (3077 from MINAGRI and its projects; 9177 from other partners), 17631 goats, 7153 sheep's and 4663 rabbits were also distributed to vulnerable farmers.

2.3.9. Aquaculture and fisheries

Lake surveillance for illegal fishing control

Lake surveillance was increased in order to control illegal fishers and guide fishing cooperatives to boost Rwandan captured fish production. Various poachers and equipment were seized through regular surveillance and monitoring of fishing activities in collaboration with Police Marine, Army Marine, and Cooperative Union, which include 6,790 Kaningini, 759 poaching boats, 3,937 super-



nets, 462 Ibikuruzo seine-nets, and 196 poachers reported to Police and Army Marine stations.

Facilitation of new investors in cage fish farming

In collaboration with RDB, RWB, and MINAGRI/ RAB new investors in intensive fish farming and in tilapia Hatcheries were mobilized, registered, and licensed and have started the implementation of their projects. Those are the following:

- Radco Food Ltd in Bugesera for Pond Farming
- Kivu choice Ltd owning a tilapia hatchery in Gisaga (Kigembe) and cages in Nyamasheke for for tilapia grow-out (production of table fish);
- Akagera Management Company (AMC) Ltd in Kayonza for Tilapia hatchery
- Akagera Management Company (AMC) Ltd in Kayonza has set up a modern tilapia hatchery and started intensive tilapia production in Recirculating Aquaculture System;
- 2CN Ltd in Rutsiro for Cage Fish Farming
- EDGARD Enterprise in Rutsiro for Cage Fish Farming
- Great Lakes Africa in Karongi for Cage Fish Farming

To increase fish production from lakes, regular sensitization meetings were held in different fishing zones (Muhazi, Gisaka, Nasho, Kivu, Bugesera, Northern, and Akagera) in order to remind



fishers to use good fishing techniques with legal fishing nets catching mature fish; efforts were deployed to promote modern Fish Farming in Cages, Dams, Tanks and Ponds where 43,560 MT of fish and 43,747,270 fingerlings were produced in 2021/22FY.

In the development of aquaculture, different production systems are used

and their capacity is increasing every year. Fishing activities are carried out in 17 lakes and 4 rivers located in 15 Districts; aquaculture production is done in 3 production systems such as earthen ponds (324 ha), floating cages (59,390 cubic meters), and 41 dams with a total capacity of 31,360,000 cubic meters.

2.3.10. Capacity building

2.3.10.1. Livestock Farm Field School

Livestock-Farmer Field School (L-FFS) groups have become a central approach for better service delivery. The L-FFS is done through L-FFS facilitators. The latter are responsible for training farmer facilitators. Currently, the sector accounts 1,065 L-FFS across the country and 48 L-FFS Master trainers. The L-FFS facilitators contributed to the establishment of 2,169 L-FFS groups with 55,703 members.

2.3.10.2 Trainings

A total of 21 Poultry master trainers and 205 poultry facilitators (P_LFFS) were trained on advanced technologies related to poultry sector

95 pig facilitators were trained on pig feeding, breeding, diseases control and prevention, business plan development and 195 fish farmers were trained on Rice Fish integration, Cage Fish Farming, Tilapia Hatchery and Lake guardians.

On the side of beekeeping subsector, proximity coaching of 105 master keepers around Virunga and Nyungwe zone on modern beekeeping techniques. The coaching was done in collaboration with Rema, RDB and World Vision.

Training of technician for artificial insemination in pigs

To disseminate the technology of pig artificial insemination and their adoption, at least 315 technicians were trained on importance of pig rearing, pig farming management, semen collection and processing, and technique of artificial insemination, hormones physiology and biosecurity. Each inseminator predicted to reach at least 50 farmers/month, which means that one vet technician can reach 600 pig famers per year.

2.3.11. Livestock infrastructure development

Construction of the National Animal Genetic Improvement Centre

The National Animal Genetic Improvement Centre (NAGIC) also known as Bull Station located in Huye District/Songa /RAB is under construction and the construction progress was at 70.4% of its completion at the end of the fiscal year 2021-22, against 70% planned.

Construction of solar-powered boreholes.

The construction of boreholes is among the strategies to support farmers to cope with the lack of water for livestock in Eastern Province. Eight (8) solar-powered boreholes out of ten (10) planned to be constructed in the fiscal year 2021-22 were completed, and are located in Gatsibo District.



The location of the 8 solar-powered borehole sites is:

- Ndatemwa,
- Bihinga,
- Kidugudu,
- Munini,
- Nyamabuye,
- Kabeza,
- Mucucu and
- Gikobwa.

Construction of Milk Collection Points (MCPs)

Milk Collection Points (MCPs) are facilities that help increase the quantity and quality of milk



collected from producers that are very far from Milk Collection Centers (MCCs). The construction of twelve (12) new MCPs completed in April 2022 allowed reaching a total number of 150 MCPs countrywide. They are located in Burera, Gicumbi and Musanze as follow: **Burera (4)**: Kivuye, Butaro, Kinyababa, and Gahunga; **Gicumbi (4)**: Bwisige, Giti, Ruvune and Muko; **Musanze (4)**: Musanze, Muhabura, Cyuve and Gataraga.

Construction of proximity veterinary posts.

The construction of fifteen (15) proximity veterinary posts to support farmers accessing proximity extension service delivery started in the April 2022 and the overall physical progress of construction works stands at 60%. The proximity veterinary posts under construction are located in Burera, Gicumbi, Musanze, Gakenke, Ruhango, Huye, Gisagara, Nyamagabe, Nyabihu, Karongi, Rutsito, Ngororero, Nyamasheke.

Construction of Pig slaughter slabs

The construction of ten (10) pig slaughter slabs to respond to the crucial lack of pig slaughtering facilities in Rwanda, is seen as a response to the major impediment to the development of the value chain. The overall construction works progress was at 50% at the end of the fiscal year 2021-22, as initially planned.



Location of the 10 Pig Slaughter Slabs per Province (one per District):

Northern	Southern	Western
- Burera	- Huye	- Karongi
- Gicumbi	- Nyamagabe	- Nyamasheke
- Musanze	- Ruhango	- Rutsiro
- Rulindo		

Physical construction progress of Ruhango Pig Slaughter Slabs

Construction/Rehabilitation of District livestock markets

The construction of District Livestock Markets has been considered as one of the priorities in meat industry development and the 15 new District Livestock Markets planned started construction works with all required basic infrastructures for animal holding and meeting sanitary standards. The overall physical progress was at 50% at the end of the fiscal year 2021-22 as planned.



Location of the 15 District Livestock Markets per Province (one per District):

Northern	Southern	Western
- Burera	- Ruhango	- Nyabihu
- Gicumbi	- Huye	- Karongi
- Musanze	- Gisagara	- Rutsiro
- Gakenke	- Nyamagabe	- Ngororero
- Rulindo	- Nyaruguru	- Nyamasheke

Construction of 15 Spray races

Fifteen (15) spray races were constructed in the Eastern Province, to support farmers to fight and prevent tick-borne diseases and are distributed as follows: in Nyagatare (8), Kayonza (3) and Gatsibo (5) Districts.

CHAPTER 3. INCLUSIVE MARKETS AND VALUE ADDITION

3.1 Agriculture exports

Agricultural export is considered as an engine that contributes to the growth of the overall economy. It plays a strategic role in improving Rwanda's balance of trade and generate income for producers, processors and other actors in the agricultural sector. In Fiscal year 2021-22, the agriculture exports generated USD \$ 640.9 Million against US \$444.8 M recorded 2020/2021 that represents an increase of 45%.

Agricultural exports are categorized into two namely; Traditional and non-tradition/emerging commodities exports. Under traditional exports, there is Coffee, Tea, and Pyrethrum value chains while for emerging/non-traditional commodities exports there are fruits, vegetable, flowers, livestock products, cereals and grains, hides and skins among other diversified agricultural export products.

3.1.1. Coffee performance

Coffee production and exports

The total of 18,564 MT coffee was produced and 15,184 MT exported in fiscal year 2021-2022 Coffee contributed USD \$75,571,428 Million and accounted for 11.8 percent of total agriculture exports value. The increase in value was attributed to high unit price realized for the Rwandan coffee exports which average price (4.97 USD/kg) increased by 36.8 % percent. The area under coffee plantation is estimated to 39,844 ha. This year much focus was on gap filling and replacement. Thus, 11,677,761 coffee seedlings were prepared and planted on approximately 4,671 Ha mainly for gap filing and replacement. The sector account 313 coffee washing stations and 17 coffees dry mill.

3,466.5 MT of NPK of fertilizers were supplied to farmers to improve productivity and 15,887 litres of pesticides and insecticides were applied to control antestia bug, coffee leaf miner, and coffee stem borer.

3.1.2 Tea performance

Tea export quantities and revenues for the past 3 fiscal years, have been slightly increasing at the rate of 6%. However, during FY 2020/21, Made tea exports totaled 34,394 MT generating USD

90 million in revenues with a reduction of 3.8% compared to last fiscal year. This was mainly due to reduced average price of \$2.8 per/kg to \$2.6 per/kg.

3.1.2.1. Production, export and generated revenues

The tea development interventions especially tea expansion implemented over the last three years has continued yielding results as demonstrated by the increase in tea production from 33,649 MT in FY 2018/19 to 36,129 MT in FY 2021/22. This increment has been achieved through continuous sensitization for tea productivity improvement through application of fertilizers and building the capacity of private sector players and tea puckers.

Table 19 : Tea performance in FY 2021-2022

<i>Commodities</i>	FY2021-22 Target	FY2021-22 Achievements	Percentage achievement (%)
<i>Production (MT)</i>	35,943	36,129.6	100.5
<i>Exports (MT)</i>	34,394	35,404.7	102.9
<i>Value of exports (USD)</i>	99,750,000	103,499.9	103.76
<i>Average price (Kg/USD)</i>	2.9	2.92	100.6

To continue activities of tea expansion, during the fiscal year 2021/2022, 20.735 MT of tubing(s) and 17.858 MT of sheeting(s) were distributed to 6 tea cooperatives where by the end of fiscal year 3,455,800 tea seedlings had been prepared by RUTEGROC, COTHECYAKA, and SORWATHE. A total of 32,803 Ha is planted with Tea made up of newly planted area of 2293.45 in districts Nyaruguru, Nyamagabe, Nyamashake, Rusizi, Karongi, Rutsiro, Ngororero, Nyabihu, Rubavu, Rulindo, & Gicumbi. 12,498.9 MT of fertilizers was purchased and applied by 18 tea factories and tea cooperatives working around those factories

Over 35,404 MT of Made tea was exported to different tea markets including 31% direct sales, 68.5% through tea auction and 0.5% for local market.

3.1.2.2. Capacity Building in Tea Sector

To upgrade skills and knowledge in practice of good agricultural practices in Tea, each fiscal year a target of tea pluckers trained is set. During FY 2021/2022, NAEB through earmarked funds in



districts had a target of training 5000 tea pluckers, by the end of June 2022, a total of 5000 tea pluckers had been trained in plucking skills and post-plucking leaf management. The training covered practical sessions on tea plucking and the trainees visited the factories to monitor and evaluate on tea manufacture, quality control, tea tasting, and to discuss on Tea quality during plucking, handling, and

processing. The trained farmers belong the different factories and their cooperatives; these are: Mulindi, Sorwathe, Rubaya, Nyabihu, Gatara, Karongi, Kitabi, Mushubi, Mata, Muganza, Nshili, Uniliver, Cyato, Gisakura, Rutsiro, Pfunda, Rugabano, and Shagasha .

3.1.3 Horticulture performance

Horticulture has emerged as one of the potential agricultural subsectors that accelerate the growth of Rwandan agri-export economy. The data from NISR report (SAS 2022A) indicates that fruits and vegetable were planted on 29,635 Ha and production obtained was 163,865 MT. The horticulture exports generated 42,862 USD Million from 25,221 MT of vegetables that generated \$21.3 M; 16,207 MT MT of fruit that generated \$14.6 M, and 1,130 MT MT of Flowers which generated to \$6.8 M. Among horticulture exported commodities included; Flowers, Fresh beans, Chili/Pepper, Fresh Peas, Macadamia, Avocadoes, Passion fruits, Snow peas, Tomatoes, Cabbage, Carrots, Cucumber, Eggplants, Mushrooms, Broccoli, and Onions among others.

3.1.3.1. Horticulture Development

Major emphasis in FY2021-22 was to increase rose flower production under greenhouse and summer flowers, linking vegetable producers and exporters, and enhancing quality of exported fruits and vegetables through quality enhancement services.



The aim in floriculture development was first to increase summer flowers production. This was to be done by availing 52.35 MT of improved planting materials (seeds) to summer flower growers. This facilitated planting summer flower on 25 Ha and as result 100.5 Kg summer flowers planting materials were propagated. Furthermore, the intervention facilitated covering 7 Ha with shade nets at

Nyacyonga flower farms in production with improved irrigation system that targeting a production of 1,252,076 flower stems for exports mainly gentians whose prices were higher.

Additionally, much focus was on rose production at Gishali Flower Park. Commercial rose varieties were planted on 45 Ha in all phases of Gishali flower park development. A total of 58,649,076 stems of roses were produced of which 13,735,560 stems were locally sold while 32,397,025 stems were exported. Under vegetables development for export, NAEB facilitated growing vegetables on 1245.57 Ha among which 985.07 Ha were planted with chili pepper, 249 Ha with French beans, 7.5 Ha planted with bitter melon, and 4 Ha with eggplant.

3.1.3.2. Capacity Building and extension services in horticulture sector

In collaboration with partners such as Tear fund and Oxfam, 26,657 vegetable farmers were trained through approach of first training trainers who later alone trained farmers' groups' representatives that cascaded it to their fellow farmers.

During the fiscal year, pest and disease surveillance has been carried out for early detection of pests and diseases, determining extent of pest incursion, and improving pest management decisions

by providing information on pest population levels and interventions to cope up with their incidence and severity on the production farms.



Most of interventions were conducted on fruits (i.e. avocado, mango, citrus, and passion fruits) and vegetables (i.e. chili, and bitter melon). Main observed pests and diseases are: stink bug and anthracnose on avocado, mealybug on mango and citrus, alternaria and fusarium root rot in passion fruit, FCM on chilli and thrips on bitter melon. Different pest

control products (insecticides, fungicides and traps) have been distributed to farmers to assist them in management of pests and diseases.

3.1.4 Diversification & products development performance

Various activities were implemented to improve diversification and products development sector performance. This included, support in production and post-harvest infrastructures with an aim of ensuring consistency in supply of quality exported products. Facilitation of certification and promotional activities, supporting the preparation of pyrethrum nursery, exploring new markets, maintaining existing and new mulberry plantations and producing parental Cocoons among others

3.1.4.1 Sericulture Performance

During the fiscal year 2021-2022, NAEB supported farmers and CPCs to rear 1159.5 boxes of silkworms and the production of cocoons have been 15.452 MT. This was done through ensuring that CPC's rear up to the third instar and farmers started rearing from the fourth instar. In addition, technical support to farmers was carried out.

In the fiscal year 2021/2022, a decrease of 43.48% was observed in cocoons production compared with the last fiscal year 2020-2021 particularly due to farmers discouraged by the departure of the previous investor in the sector. Some sericulture farmers did not resume production after

termination of contract with HEworks Rwanda Silk Ltd. They were discouraged by reduction in farm gate cocoon price that followed the fluctuation of price for cocoon on international market caused by COVID 19 pandemic effect on different economies. However, farmers and CPCs were supported to rear 1159.5 boxes of silkworms and the production of 15.452 MT cocoons.

3.1.4.2 Pyrethrum production and export

During FY2021-2022, there was establishment of 105 Ha of pyrethrum nurseries prepared which produced seedlings transplanted during the expansion and regenerating old farms. Individual plots totalling 3,154 Ha were planted with prepared seedlings in four districts including newly established pyrethrum land on 665.7 Ha. 1,197.5 MT out of 1,299 MT of dry flowers targeted was supplied at the factory (SOPYRWA).

Revenue generated from refined pyrethrum exports during FY2021/22; increased by 11.8% compared to the previous fiscal year 2020/21 while the exported volume decreased by 24.9%

The decrease in volume was attributed from value addition implied of received refined pyrethrum in making pesticide that were used locally in fighting pests and diseases in coffee plantations, cows among others. Other reasons include; decreased pyrethrum land due to Birunga National Park expansion project, and insufficiency of seedlings leading to use of exhausted splits among others. 22,796 MT of pyrethrum exported and 6.3 USD Million were generated from exports.

Extension and capacity building in pyrethrum sector

The training was organized to build the capacity of pyrethrum farmers, to upgrade their knowledge in pyrethrum farming and to provide deeper understanding of the plants relating to production, harvesting and postharvest handling. The training covered the topics such as; Pyrethrum seedlings preparation, Land preparation, Crop management, Erosion control, Pests and diseases control, Seed preparation process from the farm level, harvesting and postharvest handling, and loss lowering. By the end June 2022, a total of 369 pyrethrum farmers in districts of Nyabihu, Musanze, and Burera were trained.

3.1.5. Market Linkages for Agricultural Exports

Qatar International Exhibition

The Qatar international exhibition, was organized in collaboration with Rwanda embassy in Qatar. During the exhibition eight companies were supported to participate in the 9th edition international



agricultural exhibition in Doha. Companies that participated were Bella flowers, coffee business company, Bahage foods, Crinnod, SOUK, Elmond green farms, and Garden fresh all aimed at promoting agricultural export commodities. Through the exhibition, B2B meetings were arranged whereby still following up on closing deals with new identified customers. As a result, relationships with existing buyers was strengthened through B2B meetings held,

new products of tamarillo, and yellow bananas were shown of interest from buyers in Qatar, Rwanda fresh brand was visibly promoted, and new businesses are being followed

Coffex Istanbul

The coffex Istanbul took place in Halic congress center with an aim of bringing coffee lovers and professionals together. It being the biggest international trade fair and promotion platform for coffee in middle east, different conferences, workshops, competitions, and seminars from giants of industry took place in coffee creative during the 3 days. Companies that were supported in participating was COOPAC, SHANGI, NOVA, NYAMURINDA, DUKUNDEKAWA cooperative, Tropic coffee, RFCC, and MICOF

Through the exhibition, two containers of coffee equivalent to 38 MT were shipped to attained markets in Turkey, and participants were able to connect with 67 coffee buyers whereby discussions for possible deals in starting shipping coffee to Turkey is ongoing.

Participation in salon international de l’agriculture” (SIA2022)

In showcasing and promoting the Rwandan agri-export products to create market linkages to EU markets, NAEB together with its stakeholders were supported in participating in the SIA2022. In total, 24 companies were assisted in attending and exhibiting their products which were tasted by different consumers from several countries. In total, 15 SMEs were trained for the 1st cohort, these were facilitated in attending and participating in exploratory mission to France and managed to leverage on EU market opportunities and being connected to their counterparts in Vitagora’s network and B2B meetings. The SMEs managed to showcase their innovative products in SIA2022 held in Paris from 26th February to 6th March where agriproducts from Rwanda have been appreciated



Out of 10 companies that participated, 8 of them managed to sell 332.25 Kgs at Rwandan booth equivalent to 79.3% of total shipped quantities for SIA exhibition that generated Euros 6,652. Through B2B meeting held in the exhibition, companies that participated were connected to almost 80 buyers that were interested in Rwanda products whereby discussions are still ongoing to start shipping to France, coffee products were selected as the best among other products exhibited in SIA 2022, Increased visibility of Rwanda brands through engagement sessions with SIA Media and story covering, and lastly acquired new ideas, market insights, and overall consumers preferences and expectations from European market

Dubai expo

In partnership with RDB and Rwanda Embassy of UAE, 10 companies that export value added products were supported in participating in Dubai Expo that was held from October 2021 to March 2022. Over the last 3 months, USD 50,000 was earned through placed orders at Rwanda Pavilion. As a result, Rwandas' exportable chili products, production, and prices were shared with West African Importers supplying to Indian market (i.e. Caraway Development Centre India Ltd) for further market sourcing and lastly were links of Rwanda Mountain Tea with trading companies from Middle East

Trade Mission in Egypt

After the visit of His Excellency the president of Rwanda to Egypt in March 2022 and after signing of several protocols including trade and investment, the Rwanda private sector federation in partnership with the embassy of Rwanda in Cairo, organized a three-day trade mission to Egypt. It was mainly intended to fast track on agreements signed concerning trade, investments, exports and tourism which is also in line with increasing intra trade between Rwanda and Africa in general.

It's in this context that PSF organized a delegation of more than eighty (80) business executives to travel to Egypt for the trade mission. Much focus was on what to import, a number of agriculture companies were engaged in exploring export markets including RFCC, Bella Flowers Ltd, Selly Faith Ltd, Muganza Kivu tea factory, Rwanda Mountain Tea, Kigali Macadamia nuts, Topical Coffee, and ESE Urwibutso.

Among the outcomes of the trade mission, was establishing trade contacts with tea buyers in Egypt and negotiating direct sales with tea blenders in reducing dependency on Mombasy tea auction. Secondly, is promoting Rwanda packaged tea and coffee to Egyptian market to reduce bulk sales with less prices where RFCC managed in getting distributors of their coffee. In promoting horticulture products to Egyptian market, Selly Faith Ltd managed to get a client for chili and avocado among others.

3.2. Dairy value chain

3.2.1. Support milk collection centers to acquire milk collection equipment

In the framework of enhancing the quality and safety of milk, a total of 93 milk collection centers were supported to acquire milk collection and quality testing equipment. The provided equipment includes milk collection cans of various capacities to enhance the hygienic collection of milk from dairy farms to the milk aggregation points, milk coolers for milk storage at the MCC level, and various milk quality & safety testing equipment. Among the distributed equipment include 40 milk cooling tanks, 50 milk reception tanks; 9,400 milk cans, 280 testing kits. .etc

3.2.2. Enhancing the utilization capacity of milk collection centres.

Enhancing the utilization capacity of MCCs was carried out through the enforcement of the Ministerial Order governing the collection, transportation and commercialization of milk in Rwanda. Specifically, a certificate indicating the origin of milk issued by MCCs was designed to help in identifying the milk which is not channelled through MCCs; and local government officials in occurrence districts were mobilized in the conduct of regular controls to fight the commercialization of milk through the informal market.

During the fiscal year 2021/22 a total of 85,223,665 litres of milk have been channelled through the existing MCCs (n=132). The quantity of milk collected through MCCs increased from 17,214,124 litres in the first quarter to reach 22,715,302 litres during the fourth quarter, representing an MCC utilisation rate of 52,3%. In comparison to the MCC's utilisation capacity recorded during the previous fiscal year (2020/21), the MCC utilisation rate has increased by 2.3%.

In addition to that milk supplied to processing plants increased from 70,385,689 liters in 2020/21 to 77,508,138 Litters in 2021/22FY

3.2.3. Milk processing plants

The increase in milk production along with its collection network across the country has been a business opportunity for the private sector to invest in setting up a new large milk processing factory in Eastern Province, Nyagatare District.

This new milk plant under construction at Nyagatare will have the capacity to process 500,000 liters of milk per day and the main product of the plant will be powdered milk.

The Nyagatare milk powder plant when completed will increase the country's milk processing capacity from 300,000 liters to 850,000 liters. The construction works are progressing well, the plant is planned to be commissioned in the next fiscal year 2022-23 and expects to operate at 40% capacity in the first year before increasing to 80% in five years.

3.3. Meat value chain

3.3.1. Gako beef project

The objective of the project is to increase beef production through providing basic infrastructure in Gako farm, improve Beef farm productivity and production, process live cattle into meat products, add value in Rwanda by developing quality meat products and attract investment into the Rwandan agriculture and meat sector. Started in 2015, the project envisages to enhance the



Hon Ministers of Agriculture in Rwanda and Botswana in their visit at Gako meat Company

country's foreign exchange receipts, and ensure the local livestock sector becomes more profitable. Currently infrastructures development is ongoing, 10.5ha are planted with improved forage and 5,300 cows are in the farm.

3.3.2. Meat Trade Competitiveness Project

Through the Rwanda Meat Value Chain Competitiveness Project implemented by Rwanda Agriculture & Animal Resources Development Board and MINICOM, various activities aimed at enhancing the competitiveness of the meat value chain were conducted. These include among others 1) Skills enhancement for meat value chain actors through the training of meat value chain professionals in appropriate meat handling practices as well as quality and safety inspection as

well as 2) Supporting animal slaughtering establishments to acquire appropriate equipment for meat inspection.

3.3.3. Meat quality and safety campaign.

In the framework of enhancing the public awareness on various issues related to the consumption of meat, a meat quality and safety campaign has been organised in partnership with RICA and ORORA WIHAZE. The mentioned campaign comprised various activities including press conferences, RADIO/TV shows, conferences and mobilisation sessions within different provinces. The campaign was conducted from May 17th to 15 June 2022 and contributed to the enhancement of public awareness on meat quality & safety.

3.4 Post harvest management

The post-harvest losses and quality of produces were highly variable depending on weather conditions at harvesting, drying techniques, cooling chain and facilities and quality of storage infrastructures for cereal, pulses and vegetables. The reduction of post-harvest losses and



Maize drying shelter

improvement of the quality of produces is a critical issue for ensuring country food security, increase rural income and contribute to the overall economic development of Rwanda. In the light of climate change and the double cropping systems promoted under Crop Intensification Program, post-harvest handling is now taking place at wetter times of

the year especially season A. The government of Rwanda through the Ministry of Agriculture and Animal Resources (MINAGRI) has supported in the establishment of post-harvest infrastructures, promotion of postharvest equipment like mechanical dryers and technical training on post-harvest best practices. However, continued support regarding the same and strict follow up of mentioned

above activities is required in order to ensure that post-harvest losses are minimized to an acceptable level.

The major achievements in 2021/22 FY are the following:

- 8 maize drying shelters and 3 storage facilities were constructed across the country
- Currently, the country counts:
 - 1,461 drying infrastructures composed of 894 maize drying shelters and 567 rice drying ground with a total capacity estimated at 44,665.MT
 - 523 storages having capacity of 316,420 MT
 - 40 drying machines have been purchased to contribute in grain losses reduction
 - 53 cold rooms to reduces losses in horticulture value chain

3.5 Strategic Food Reserve

The objective of National Strategic Grain Reserve project is to ensure national food security, mitigate the impacts of potential shocks to the food supply, and reduce malnutrition and hunger among the population, while avoiding market distortion. The underlying logic was the fact that the Government had to be prepared to protect the poor and vulnerable at time of scarcity of staple foods. As a result, the government of Rwanda through the Ministry of Agriculture and Animal resources decided to invest in the establishment of modern storage facilities on order to support in providing efficient and cost-effective storage solutions for food grains in the country thus reducing post-harvest losses.

Specifically, Strategic grain reserves in Rwanda are intended as a safeguard against food emergencies. Within the context of using a strategic grain reserve there are two main types of food emergencies: acute food emergencies resulting from when a certain proportion of the population is exposed to external event displacing or destroying their food supplies (such as an earthquake destroying household stocks, or flood washing out a bridge and preventing food to move to a market), or a significant shortfall in production causing rampant inflation in staple food prices. The Strategic Grain Reserve can then be used to release food to the markets to lower the market price, or to provide food to those who cannot afford to buy.

In the FY 2021/2022, the National Strategic Grain Reserves targeted to store 2,500 MT of maize, 2,000 MT of beans and 3,224 MT of rice. As a result, 6,000 MT of Maize, 2,718 MT of beans and 3,224 MT of rice have been purchased and stored as Strategic Grain Reserve.



To respond to the needs of vulnerable and affected families, 3,490.483 MT of beans, 432.335 MT of maize, 3,878.435 MT of maize flour & 3,223.975 MT of rice have been distributed to the City of Kigali and respective districts: Muhanga,

Ruhango, Huye, Kamonyi, Burera, Rubavu, Rutsiro, Musanze, Gicumbi, Nyagatare, Rwamagana, Bugesera, Kayonza, Kirehe, Rusizi & Gasabo to assist 737,498 Households affected by disaster and lockdown due to COVID 19. Thus, the stock position by end June 2022 was 13,805.013 MT of Maize and 3,299.548 MT of Beans.

To increase the capacity of storage facilities, Kicukiro warehouse has been extended with 1,500 MT capacity and privates sector contributed to the increased number of storage and drying infrastructures construction.

CHAP 4: ENABLING ENVIRONMENT AND RESPONSIVE INSTITUTIONS

4.1. Agriculture de-risking interventions

Agriculture finance is a national priority to achieve transformation of the agriculture sector and greater financial inclusion. PSTA4 puts in place mechanisms to increase access to finance for farmers. A comprehensive agricultural ecosystem financing programs including lease financing and insurance with a focus on priority value chains have been established to ensure increased financial serves flow across all agriculture value chains.

Currently, Agriculture finance stands at 4.8% against 10.4% planned in 2024 (NSTA1 target) and the GoR has already made efforts to de-risk the sector through various initiatives including;

- Project on weather-index based crop and livestock insurance.
- Establishment of the Business Development Fund (BDF) which provides guarantees for loans.
- Subsidy policy on agriculture inputs and irrigation equipment.
- Establishment of a commodity exchange market and warehouse receipt system to enable produce in storage to be used as collateral.
- Land consolidation policy where farmers can join their plots of land to create a sizable area for farming.
- Increase area under irrigation as mitigation measures for climate variability.
- Development of higher yielding varieties, resistant to diseases and climate change.

In light of the above initiatives taken to de-risk the sector, some major achievements have been achieved and among these include;

In climate resilience, the country invested in Small Scale Irrigation but also in large schemes development for commercial agribusiness (e.g., the Gabiro Agribusiness Hub) to reduces dependency on rain-fed agriculture during this era of frequent unreliable weather patterns. To this end, 68,126 Ha (in 2021/2022) are under irrigation which makes 66.6% of the targets at the end of PSTA4.

To adapt to climate change, the country has invested in land husbandry technologies through construction of terraces to protect land. The coverage of radical terraces is at 95% of NST1 target for 2023/24 and progressive terraces coverage stands at 98% of PSTA4 target for 2023/24.

In agriculture insurance, different livestock and crops were insured including 163,124 chicken insured, 3,477 pigs insured and 35,517 Cattle insured. On the side of crops, a total of 27,937.81 ha of crops insured composed of 4,703 ha of Maize, 22,047 ha of Rice, 1027.6ha of Irish potatoe, 151.8 ha of Chili and 9.01 ha of French beans. An amount equivalent to 652,630,160 Frw was compensated to farmers for the losses composed of 407,829,875 Frw paid for crops and 244,800,285 Frw paid for livestock. The amount of agriculture loans unlocked under agriculture insurance requirements is 2,024,970,345 Frw considered as a collateral since the start of the program.

4.2 Sector strategic documents development

This fiscal year the Ministry has put more efforts to develop strategic for easy implementation the mission the Ministry of transforming Rwandan agriculture from a subsistence sector to a knowledge-based, value creating sector that ensures food and nutrition security and contributes to the national economy.

Mid-term review of PSTA 4

The PSTA4 MTR aimed at identifying gaps and lessons learned in the first half of the PSTA 4 implementation, in order to propose any improvements/ adjustments for the remaining period of the strategy. The PASTA4 review completed and recommendations proposed are being implemented.

The table below summarize the implementation status of PSTA4

Table 20: Implementation status of PSTA4

Priority areas	No of indicators	>100% Over achieved	75-100% On track	50-74.9% On track	<50% Off track
Innovation and Extension	13	1	6	1	5
Productivity and Resilience	115	36	31	25	23
Inclusive Markets and Value Addition	54	17	9	18	9
Enabling Environment and Responsive Institutions	24	9	8	6	0
Total	206	63	54	50	37
Percentage	100%	30.6%	26.2%	24.3%	18%

Postharvest Management Strategy (2021-2025)

The post-harvest management strategy aims at guiding the economy in the effective and efficient management of post-harvest systems and processes throughout the agricultural value chains in Rwanda. The development of the strategy focused on:

- a. To enhance post-harvest and markets infrastructure and markets for strengthening private enterprise participation and value addition for all agricultural value chains with emphasis on technological advancements
- b. To enhance skills and research in post-harvest management for effective post-harvest management through the strengthening of research and development in pre and post-harvest management.
- c. To improve enabling environment for improved post-harvest management in all agricultural value chains
- d. To improve cross-cutting issues of significance to postharvest management systems including gender, youth, health and pandemics, climate change and environmental factors.

Studies development for NDC implementation

The Ministry of Agriculture in Collaboration with UNDP conducted studies on various interventions that shall facilitate the implementation process of National determined contribution (NDC) in Rwanda. The studies developed are the following:

- Climate Risk mapping and develop mitigation measures to orient private investment opportunities in climate-resilient agriculture
- Resource mobilization strategy for agricultural climate-resilient projects
- Analysis of climate investment and financial flows in agriculture sector
- Capacity need assessment of professionals in Public and Private Sector to identify and design bankable agricultural climate resilient project.
- Situational Analysis of Low Carbon, Climate Resilient Action and Implementation

4.3 Sector technical support

4.3.1.EU Technical support through TECAN

The EU- technical assistance (TECAN) to enhance the Government of Rwanda's capacities in the agriculture sector for the sustainable use of land and water resources, value creation and nutrition was put in place on 11th September 2017. During the Fiscal year 2021/22, TECAN continued to work with MINAGRI in the following areas:

Diagnostic of Public Funded Agriculture Infrastructure and proposal of a management model.

The purpose was to carry out a detailed diagnosis analysis to identify and document the current issues facing the use, maintenance, and sustainability of the public funded agro-infrastructures. Results from the analysis have revealed and confirmed several hypothesized issues affecting the performance of the public-funded agriculture infrastructures. These issues reflect some deficiencies in the delivery process of these infrastructures, the inability for optimal use and maintenance, as well as the unclear definition of roles and responsibilities of key players when it comes to maintenance and management during and after the establishment of these public-funded agriculture infrastructures.

It was further intended to assess prevailing models of management and propose pragmatic solutions, including proposals to adapt management models that would ensure future use, maintenance, and sustainability of agriculture-related infrastructure in Rwanda. Thus, the overall objective of the assignment was to develop evidence-based models to manage public shared infrastructures under farmers' cooperatives or PPP management in the agriculture sector.

Agriculture land use planning instruments are availed to improve agriculture spatial planning

TECAN is implementing a pilot land use, land categorization, fertility and crop suitability mapping in one district so that the approach and findings could be further extended to other District, assisting them in the completion of the agricultural part of their Land Use District Masterplan.

The mapping of current land cover and land use of Bugesera district which started in the previous reporting period was achieved, including a thorough community consultation at district, sector and

cell and village level. 1508 persons have been consulted and participated on the mapping exercise of their land, using high resolution maps provided by RLMUA. Inventory and full mapping of land with crops' suitability using existing soil data set confirmed by recent sampling and consistency analysis. Crop suitability maps was made available to all involved in extension at *Bugesera* District level. A full database relative to the digital map was made available.

A synthetic note on the regulatory framework enabling the protection of Agricultural Lands including the law and the 18 ministerial orders for its implementation and enforcement was availed as well in the form of booklet.

Customized agriculture extension system piloted in Rulindo District

TECAN carried out the mission to contribute to the successful piloting at district, sector and village level of the 6th component of CAES roadmap “Coordination, monitoring of extension services and reporting”, by framing a better coordinated extension service along a more efficient M&E and reporting system. Among other objectives, the pilot was meant to review, revive and expand the mandate of the agriculture committees at district, sector and village level, define role of technical staff in place and establish formal mechanisms to evaluate extension services performance and to understand their impact at district, sector and village level.

4.3.2 JICA Technical support

As a part of the Japanese Sector Policy Loan for Nutrition Improvement through Agriculture Transformation, the Rwandan Food Composition Table (RFCT) is being developed. The first round of food item sampling and analysis were done by MINAGRI and RSB officers, and this exercise will continue until FY 2024/25 to develop the complete RFCT.

Also, PSTA4 Mid-Term Review (MTR) has been conducted under the JICA support, and the MTR process was completed, providing some recommendations to improve the implementation of PSTA 4 in the remaining years.

MINAGRI has started to develop the Irrigation Strategic Plan with the support from JICA. The Inception Report was finalized and the Irrigation Strategic Plan is expected to be finalized by February 2023.

4.3.3 EU Technical support through IFPRI

As part of the EU’s technical support to Rwanda’s agriculture sector in 2022, the International Food Policy Research Institute (IFPRI) continued to manage the Rwanda Strategy Support Program (Rwanda SSP), a joint initiative with MINAGRI that is aligned with the Government of Rwanda's vision for accelerating agricultural transformation and rural development throughout the country. The program supports Rwanda’s forward-looking strategy for economic growth and transformation and, specifically, implementation of PSTA 4 through policy analysis, capacity development, and partnership. In 2022, the program received additional support from the Kingdom of Netherlands, the International Growth Centre, GIZ, and CGIAR.

During 2022, IFPRI, MINAGRI, and partners conducted multiple studies, seminars, and learning events related to (1) prioritizing public spending on agricultural transformation and assessing PSTA4’s contribution at its midterm; (2) navigating the global fertilizer price shock, reforming the fertilizer subsidy system, expanding agricultural insurance, and strengthening the seed sector to increase agricultural productivity growth; (3) improving diet quality, nutrition, and the wider food system; and (4) prioritizing agricultural value chains for inclusive growth; and (5) integrating gender and youth in the agricultural transformation process. IFPRI, MINAGRI, and partners also spotlighted the global food price crisis: its causes, its consequences for Rwanda, and policy actions to minimize its impact on food, nutrition, poverty, and growth.

4.4. Agricultural sector digitalization

To align with the smart Rwanda Master Plan, ICT4Rag strategy was developed with a mission to provide a conducive environment for the development, adoption, and increase of the use of ICT in agriculture. The strategy aimed at increasing agriculture productivity through the use of ICT, by promoting harmonization and system integration, public private partnerships, efficiencies and reduced transaction costs, as well as job creation along the agriculture value chain by leveraging ICT. Several systems in the agriculture sector have been put in place and can be grouped into the following categories:

i) Monitor sector performance and support decision-making processes

▪ Agriculture Management Information System (MIS)

Management Information system (MIS) was initiated in 2016. It is web based system which has capacity for data entry, data analysis and data dissemination_ It can draw graphs, maps

Gasabo Nutrition Monthly Report											
	July 2017	August 2017	September 2017	October 2017	November 2017	December 2017	January 2018	February 2018	March 2018	Ap 2018	
Girinka Earmarked Cows Distributed Progress							66	37			
Girinka Partner Cows Distributed Progress	25		26	6	20		15		15		
Girinka Pass On (Kwitura) Cows Distributed Progress	19	33	20	45	23	24	13	13	21		
Children benefited from one cup of Milk (Progress)											
Quantity of Milk Distributed (Progress)											
Number of Households with Kitchen garden (Progress)					107			8 958	5 476		
Number of Pigs Distributed Progress											
Number of Poultry Distributed Progress											
Number of goats Distributed Progress				50						546	

Gasabo Fertilizers Distributed Monthly Report		
	July 2017	August 2017
Subsidized Fertilizers UREA Distributed (Progress)		

Gasabo Cows Inseminated Progress		
Period / Data	Cows Inseminated Target	Number of Cows Inseminated Progress
Jul 2017 to Jun 2018	2 387	3 097

and ranking. The MIS plays a crucial role in the monitoring and evaluation framework between MINAGRI, its agencies, and other stakeholders.

Since February 2018 all data are entered monthly at sector level. *Android application was developed*

to enter data using tablets or smart phones. SOP (Standards Operational Procedures) and detailed user manuals developed for data entry and reporting

- **Satellite Crop Monitoring:** Provides a Monthly assessment of crop growth status (and early warning) in the country through satellite images and monthly crop monitoring Bulletin are produced and published.

ii) Provide services to farmers

- **SMART Nkunganire System (SNS):** Developed in 2017. SNS is an application that enables farmers to register and access subsidized agriculture inputs. It is accessible both offline and online. Farmers self-registration is done through USSD app *774#. More than 1.168,795 million farmers and 1,502 Agro-dealers are registered and use the platform.

System web platform: www.smartnkunganire.rw

- **National Agricultural Insurance Scheme (NAIS):** Launched in 2019. A system that enables farmers to access financial services and ensure flow of credit to the agriculture

sector by de-risking agriculture activities through insurance. It helps mitigate risks and losses incurred by farmers due to unpredictable natural disasters, pests and diseases that affect their livestock and crops. Farmers pay 60% of the insurance premium and GoR covers the rest (40%). It is accessible through android app and Web platform <http://nais.minagri.gov.rw>

- **Call center:** Operate at MINAGRI and provides information related to agriculture and livestock. Call center streamlines interaction between farmers and agricultural officials, provides access to agricultural information and advisory services and link farmers to relevant services. 24,000 calls received since June 2021 and various cases handled: livestock clearance request, irrigation, exports, horticulture, season calendar and other agriculture related issues.

- **SMART Kungahara System (SKS):**

Developed in 2021, SKS is a joint effort to digitalize the cash crop sector in Rwanda. So far, more than 340,000 farmers and 313 coffee washing stations registered.

Features: Value chain stakeholders registration, Coffee washing station registration, inputs warehouse management and distribution, mobile/online payment services and business intelligence reports

The system is accessible through USSD app*774#, android app for CWS/dry mill and web platform www.smartkungahara.rw .

- **Agricultural Land Information System (ALIS):** A web platform that allow us to visually map public land available for investment and private plots with at least 1 hectare, and provides details on plot size, general soil type, proximity to infrastructure and agro-climatic conditions. It also allows MINAGRI to monitor agriculture land use, as well as do planning and management. ALIS1 with 24,000 public plots on 57,000ha whereas ALIS2 with 638, 821 are on private plots 120, 228 ha.

- **E-Soko:** Launched in 2009, E-soko is an agricultural market price information system providing citizens with the latest commodity prices at major markets in Rwanda.

Price are collected at 62 markets in the country on 78 commodities. Android application set for enumerators and accessed through web platform www.esoko.gov.rw

The system helps farmers and others agriculture players to get access market information using mobile phones.

4.5. AGRICULTURE SECTOR VISIBILITY AND PUBLIC RELATIONS

The ministry organised and hosted a series of events that enabled Rwanda’s agriculture stakeholders to connect with their colleagues at national and international levels while increasing the country’s agriculture profile. These events offered opportunities for advanced learning from different agriculture stakeholders and experts while also expanding mutual professional networks.

4.5.1. National events

4.5.1.1. National Celebrations to mark World Food Day 2021

On Friday 29th October 2021, Rwanda marked World Food Day 2021, with Government officials and key stakeholders in the development of the country’s food and agriculture sector recommitting to nurturing sustainable food systems. The celebrations to mark the day were held in Rulindo District, where fruit trees were planted for better nutrition, children given milk, and fertilizers and



pesticides applied on maize crops. Food varieties grown locally were also exhibited to send a clear message for the presence of healthy and nutritious food in the area. This year’s World Food Day was celebrated under the theme: “Our actions are our future- better production, better nutrition, a better

environment and a better life”. While officiating the event, Dr. Jean-Chrysostome Ngabitsinze, former Minister of State in the Ministry of Agriculture and Animal Resources, emphasized that working together and closely among all stakeholders in agriculture and food processing will help

the country achieve more. He also urged for sustainably increasing agricultural productivity by protecting the environment during food production processes.

4.5.1.2. Media Field Trip

From March 28th to April 1st, 2022, MINAGRI through its Agricultural Information and Communication Program (AICP) organized a five days' media field trip for agriculture journalists with a focus on pig and poultry value chains. The goal of this media field trip was to raise awareness about pig and poultry value chains and strengthen the coverage of agricultural development in Rwanda.



Journalists were trained about communicating information about Pig and Poultry Value chains

4.5.1.3. Commemorating the 1994 Genocide against the Tutsi

On April 22, 2022: The Ministry of Agriculture and Animal Resources commemorated for the 28th time its former employees, staff of affiliated agencies and projects who were killed during the Genocide perpetrated against the Tutsi in 1994 in Rwanda.

4.5.1.4. Awarding journalists for agricultural reporting

On 13th May 2022: The Ministry of Agriculture and Animal Resources (MINAGRI) through the AICP, attended an event to award journalists during the Development Journalism Awards (DJA 2022) ceremony held in Kigali. During the event, four winners of the Development Journalism

Awards 2022 in the category of Agriculture and Livestock Reporting were also awarded with brand new computers and trophies by MINAGRI.

4.5.2. International events

Launch event for the Africa Green Revolution Forum (AGRF) 2022



A group photo after the launch of AGRF 2022 Forum in Kigali

On 3rd March 2022, a launch ceremony was held in Kigali to announce the theme and format, as well as build the momentum towards AGRF 2022 summit which was held in Rwanda from 5 to 9 September 2022. The summit was held under the theme 'Grow, Nourish, Reward – Bold Actions for Resilient Food Systems'. The launch event was officiated by the Rt. Hon. Prime Minister Dr. Edouard Ngirente.

4.5.3 Mass communication

The ministry used different channels of communication to raise the profile of Rwanda's agriculture sector and keep the general public and farmers in particular informed of new trends in the country's agriculture sector. In this regard, mass media such as radio, television, newspapers, online and social media were used to reach out to target audiences.

Radio and Television

Community-based radio stations played a great role in reaching out to community farmers and disseminating agricultural messages in different parts of the country. Live and pre-recorded radio talk shows were aired on Radio Rwanda as well as RBA's community radio stations across the country known as RCs (Radios Communautaires); RC Musanze, RC Rubavu, RC Rusizi, RC Huye, and RC Nyagatare. During the financial year, 480 radio talk-shows were aired on Rwanda Broadcasting Agency (RBA)'s Radio Rwanda and its affiliated locally-based community radio stations known in French as Radios Communautaires (RCs).



PS Musabyimana Jean Claude on Rwanda Television

Some 50 TV talk-shows were also aired on RTV (RBA's Rwanda Television) while 12 TV and radio spots to support media campaigns for healthy diets and awareness for agriculture insurance in line with promoting healthy diets were also aired on RTV and Radio Rwanda.

Social Media

Social media platforms were used to timely spread information on various sector activities. The main social media outlets used include Twitter, Facebook, Flickr, YouTube, and Instagram.

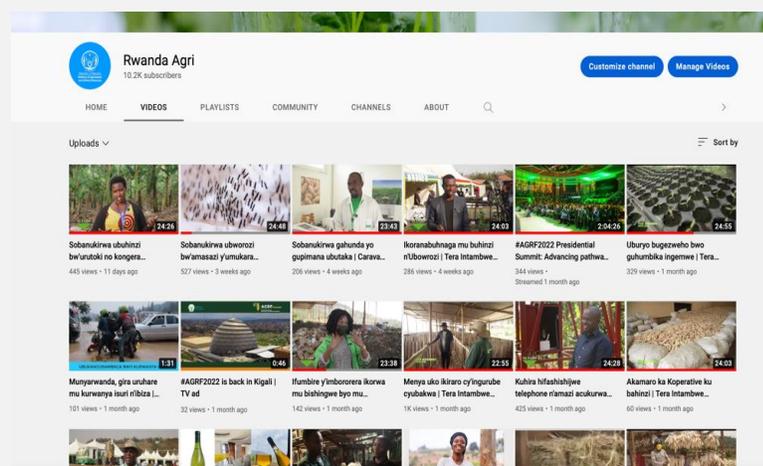
Media Relations

Media management was on top of the daily work of the communication team at MINAGRI. This included proper handling of media inquiries, arranging media interviews with the ministry's

officials, daily media monitoring, and strengthening relationships between the ministry and media fraternity. Good relationship with media enabled the ministry to drive the narrative around its mission, policies, enhanced agricultural practices and Rwanda’s success stories in agriculture sector in a consistent way.

Printed Extension Materials

The development of agricultural extension materials aims at improving knowledge and skills of



the frontline extension workers. Different types of printed extension materials were produced, including 3364 copies of booklets on best production practices for pig and poultry, which were printed and distributed to pig and poultry farmer promoters.

4.5.4. MINAGRI’s Call Centre

The Call Centre (accessible by dialling 4127) was used to receive and respond to queries from farmers across the country. This has enabled not only the farmers to get information from relevant directorates but also the ministry to get feedback from farmers. The Call Centre has been upgraded with a well-functioning Customer Relationship Management (CRM) system and it was used as a toll-free line by all farmers and other agriculture stakeholders in the country to address issues that range from crop and livestock insurance to crop pest management and access to seeds and fertilisers among other needs.

4.5.5 Audio-visual Production and archiving

During the Financial Year 2021/2022, 43 videos on Agriculture and Livestock were produced. All produced videos were disseminated through different channels including Media and social media (Twitter, Instagram, YouTube and Facebook). The YouTube Channel of the Ministry of

Agriculture and Animal Resources grew from 6,000 subscribers in June 2021 to 10,000 subscribers as of June 2022; an increase of 4000 subscribers in one year.

4.6 PLANNING PROCESS FOR 2021/2022 FY

The 2021/2022 fiscal year Planning process started with organizing the Backward Looking (BL) Joint Sector Review (JSR) meeting held virtually on October 28, 2021. The JSR meeting was chaired by Mr. Jean Claude MUSABYIMANA the Permanent Secretary of MINAGRI and co-chaired by Ms. Asa GIERTZ, Senior Agriculture Economist and Task Team Leader /World Bank on behalf of the Development Partners.

4.6.1 Joint Sector Review backward looking

The Agriculture Joint Sector Review forum brings together all Sector Working Group (SWG) stakeholders to engage in policy dialogue and to ensure ownership and accountability in the implementation of the National Strategy for Transformation (NST1), and the Strategic plan of Agriculture transformation (PSTA 4).

One of the key objectives of the BL-JSR meeting was to approve the key priority areas for the 2022/23 fiscal year that informed the planning and budgeting process of the sector. The table below indicates the sector priorities area for FY2022/23.

Table 21: Agriculture Sector Priority Areas for 2022/2023 FY

Priorities	Justifications	Proposed key actions
1. Scaled up the use of modern inputs, research and technology transfer to maximize productivity	<ul style="list-style-type: none"> ▪ Only 36% of small-scale farmers used improved seeds in season 2021A (SSF:36%; LSF:88.8%) ▪ Only 39,8% of small-scale farmers applied inorganic fertilizer in season 2021A 2021 (SSF:39,8%; LSF:87.2%) ▪ Percentage of farmers who applied organic fertilizer: SSF: 66.8; LSF: 74.8. (SAS: Season A 2021) ▪ Only 20.9% of small-scale farmers applied pesticides (SSF:20.9%; LSF: 87.2%) 	<ul style="list-style-type: none"> ▪ Impact assessment of the CIP (seed and fertilizers, extension models) and LIP (small stock). ▪ Increase the use of inorganic and organic fertilizers. ▪ Improve livestock nutrition: forage and feeds ▪ Genetic improvement and disease control ▪ Rwanda Food Composition Table

Priorities	Justifications	Proposed key actions
	<ul style="list-style-type: none"> ▪ Only 29.6% of farmers benefit of extension services (AHS 2017) ▪ Only 17% of Households involved in animal rearing has Chicken ▪ Only 13% of Household involved in animal rearing has Pigs ▪ Only 7% of Household involved in animal rearing has Sheep (CFSVA,2018) ▪ Productivity of coffee to increase from 3.1Kg/tree to 3.7Kg/tree and Made Tea from 7.2 MT/ha to 7.8 MT/ha 	<ul style="list-style-type: none"> ▪ Coffee Census and rejuvenation of coffee trees for higher productivity. ▪ Implementation of Customized Agriculture Extension System (CAES). ▪ Dissemination of findings from soil testing activities through campaigns and open day sessions at the research station level
<p>2.Increase adaptation and resilience to climate change and other disasters for smart agriculture</p>	<ul style="list-style-type: none"> ▪ Only 9.2% of farmers practiced irrigation, where 8.1%of small-scale farmers and 57.3% of large-scale farmers (SAS,2021) 	<ul style="list-style-type: none"> ▪ Development of the irrigation strategy ▪ Evaluation of the effectiveness of existing erosion control in terms of reducing soil losses and fostering rainwater infiltration. ▪ Strengthening the use of climate information in agricultural decisions. ▪ Construction of Radical and Progressive terraces ▪ Plantation of Agro-forestry and fruits trees ▪ Develop Small Scale Mechanization Strategy. ▪ Training of extension services (farmer’s promoters) on climate-smart agricultural practices ▪ Upgrading of extension services in climate-smart agricultural practices. ▪ Capacity building on data analysis and monitoring for ensuring policy impact and sustainability
<p>3. Strengthen post-harvest handling methods of crop and animal products</p>	<ul style="list-style-type: none"> ▪ Postharvest losses: Maize:18.6%; Wheat:20.8%; Rice: 15.4%; Irish Potato:25%; Beans:11% (MINAGRI Report, 2020/21) 	<ul style="list-style-type: none"> ▪ Set up a Post-Harvest Loss Monitoring and Evaluation system: <ul style="list-style-type: none"> ➤ <i>Conduct a survey to update data on CIP Crops post-harvest losses;</i> ➤ <i>Mapping of new and existing post-harvest handling infrastructures and equipment's.</i> ▪ Capacity building on post-harvest handling and management.

Priorities	Justifications	Proposed key actions
<p>4. Increase commercialization of agriculture products to increase revenues earned from domestic and international markets</p>	<ul style="list-style-type: none"> ▪ Limited access to market information ▪ Difficulties in complying with market requirements (quality and food safety standards). 	<ul style="list-style-type: none"> ▪ Conduct market survey (new and existing) on selected agricultural commodities. ▪ Mapping of new and existing stakeholders in selected value chain and areas of intervention. ▪ Launch and operationalization of the E-Agro Export for both domestic and international markets (E-soko+). ▪ Strengthen Agriculture Public-Private Dialogues and Value Chain Platforms ▪ Ensure quality and food safety standards of agricultural produce. ▪ Promotion of agri- processing
<p>5. Increase access to agriculture finance and risk-sharing facilities</p>	<ul style="list-style-type: none"> ▪ Only 4.7% of agricultural households had at least one member who requested agricultural loan (AHS, 2017) ▪ Only 5.7% of agricultural households received funds for agricultural purpose (AHS, 2017) 	<ul style="list-style-type: none"> ▪ Reinforce the insurance to de-risk the sector and scale up the existing national agriculture insurance program. ▪ Support the private sector to access agriculture matching grants. ▪ Capacity building of farming households/SMEs on Business plans and Management. ▪ Establish an Agriculture finance working group to provide platforms for players to discuss issues in Agri finance and propose appropriate interventions to de-risk the sector. ▪ Conduct a holistic agriculture financing situation analysis and needs assessment for both supply and demand sides of informal and formal lending in Agriculture.

4.6.2 Budget performance

The source of the budget executed by MINAGRI central and its implementing agencies (RAB and NAEB) came from Government (domestic budget) and Development Partners (loan and/or grant). The revised budget allocated to MINAGRI and its affiliated agencies in 2021/22 FY was 122,101,976,225 Frw executed at 103%.

The over-expenditure was due to the fact that the Government provided an additional budget to the National Strategic Grain Reserve Project equivalent to 2,581,522,739 Frw to purchase food commodities to assist families affected by lockdown due to COVID-19 and disasters. In addition, 7,411,651,846 Frw was added to the Livestock Intensification Program for mass vaccination to deal with of Rift Valley fever epidemic among cows, sheep, and goats.

Table 22: Budget Execution per Agencies 2021/2022

Institutions	Budget types	Revised budget 2021/22	Executed budget	%
MINAGRI Central	Recurrent	1,440,889,889	1,312,973,916	91
	Development	6,400,254,103	8,847,316,574	138
	S/total	7,841,143,992	10,160,290,490	130
RAB	Recurrent	4,937,737,923	4,380,252,574	89
	Development	101,023,499,987	103,096,976,341	102
	S/total	105,961,237,910	107,477,228,915	101
NAEB	Recurrent	929,594,323	929,594,323	100
	Development	7,370,000,000	7,351,970,135	100
	S/total	8,299,594,323	8,281,564,458	100
Total		122,101,976,225	125,919,083,863	103

Source: MINECOFIN

From table 24, we find that the revised budget allocated to MINAGRI Central was executed at 130%, RAB at 101% and NAEB at 100%.

Regarding budget execution per type of budget (domestic, external & districts on agriculture programs) we realized that the revised total budget allocated to MINAGRI Central, RAB, NAEB and, Districts agriculture programs was 165,767,530,236 executed at 103%.

Table 23: Budget Execution per type (domestic, external & Districts agriculture programs)

Budget types	Revised Budget 2021/22	Executed Budget	%
Recurrent	7,308,222,135	6,622,820,813	91
Development (Internal)	55,371,249,661	67,105,834,063	121
Development (External)	59,422,504,429	52,190,428,987	88
Districts Budget Execution on Agriculture Programs (including Earmarked Transfers)	43,665,554,011	44,867,268,736	103
Total	165,767,530,236	170,786,352,599	103

Source: MINECOFIN

Considering table 3, we find that, the recurrent budget was executed at 91%, the domestic development budget at 121%, external development (loan & grant) at 88% while the budget allocated to agriculture programs in districts was executed at 103%.

In general, the external funds registered low rate of budget execution (88%) due to low performance of some externally funded project such as RAB Competitive Research (54%) and the Development of efficient and inclusive market-systems for value chains of poultry and pig industries under ENABEL funds (56%).

Annex 1: Budget Execution per Programs and Subprograms

No.	Program	Sub-program	Revised Budget 2021/22	Executed Budget	%
1	AGRICULTURE RESEARCH AND EXTENSION		4,551,010,225	2,784,706,424	61
		1. Research and Innovation	4,263,976,865	2,578,191,076	60
		2. Extension Services and Technology Adaptation and Skills Development	287,033,360	206,515,348	72
2	SUSTAINABLE CROPS AND ANIMAL RESOURCES PRODUCTION AND PRODUCTIVITY		96,472,489,762	97,566,555,394	101
		1. Sustainable, Diversified and Climate Smart Crop Production and Productivity	60,385,902,512	59,417,627,587	98
		2. Sustainable Animal Resources Production and Productivity	23,260,607,012	26,064,146,757	112
		3. Nutrition-sensitive agriculture and Resilience Mechanisms	12,825,980,238	12,084,781,050	94
3	VALUE ADDITION AND COMPETITIVENESS OF CROPS AND ANIMAL RESOURCES		12,137,542,630	14,701,035,504	121
		1. Food Systems for domestic market supply	4,767,542,630	7,349,065,369	154
		2. Traditional Export Crop Development	3,763,500,000	3,761,108,794	100
		3. Export Diversification	3,606,500,000	3,590,861,341	100
4	ENABLING ENVIRONMENT AND RESPONSIVE INSTITUTIONS		1,685,711,473	1,258,796,864	75
		1. Agriculture Sector Planning, Coordination, Financing and Information Systems	45,000,000	44,196,570	98
		2. Animal Resources Policy, Strategies Development	394,904,664	388,673,851	98
		3. Crop Policy and Strategies Development	1,245,806,809	825,926,443	66
5	ADMINISTRATIVE AND SUPPORT SERVICES		7,255,222,135	7,087,935,322	98
		Administrative And Support Services	7,255,222,135	7,087,935,322	98
TOTAL			122,101,976,225	123,399,029,508	101

Annex 2: MINAGRI Central Projects Budget Execution 2021/22 FY

Projects	Revised Domestic Budget	Revised External Grant	Total	Executed Budget	%
Smart Agriculture Information System (SAIS)	32,000,000	223,282,824	255,282,824	248,340,401	97
Agricultural Insurance Project (AIP)	434,277,530	-	434,277,530	434,185,710	100
National Strategic Grain Reserve Project	4,767,542,630	-	4,767,542,630	7,349,065,369	154
Buffet Project (Nasho Irrigation)	73,604,112	-	73,604,112	73,604,111	100
Deeping Efforts to accelerate Nationally Determined Contribution (NDC) implementation project	-	452,522,314	452,522,314	325,096,290	72
Climate mainstreaming pilot for the coffee and tea sectors	417,024,693		417,024,693	417,024,693	100
TOTAL	5,724,448,965	675,805,138	6,400,254,103	8,847,316,574	138

Annex 3: NAEB Projects Budget Execution 2021/22 FY

Projects	Revised Domestic Budget	Executed Budget	%
Improving Coffee Production, Productivity and Quality	2,190,200,000	2,188,400,787	100
Tea Expansion Project	1,573,300,000	1,572,708,007	100
Sericulture Project	412,635,000	410,197,439	99
Export Logistics Development	65,000,000	63,722,049	98
Flower Park Construction	3,000,000,000	3,000,000,000	100
Commodity Chain Development (Horticulture Intensification and Quality Management)	128,365,000	116,461,853	91
Kigali Wholesale Market	500,000	480,000	96
TOTAL	7,370,000,000	7,351,970,135	100

Annex 4: RAB Projects Budget Execution 2021/22 FY

Projects	Revised Domestic Budget	Revised External Loan	Revised External Grant	Total	Executed Budget	%
One Cow Per Family	5,000,000	-	-	5,000,000	5,000,000	100
Valorization of Rurambi Irrigation Scheme In Bugesera District	1,070,232,086	-	-	1,070,232,086	1,283,916,632	120
RAB Competitive Research		-	3,065,967,701	3,065,967,701	1,660,620,941	54
Rural Community Support Project (RCSP)	200,000,000	-	-	200,000,000	200,000,000	100
Rwanda Dairy Development Project (RDDP)	150,000,000	9,866,244,000	-	10,016,244,000	9,898,514,623	99
Export Targeted Modern Irrigation (ETI)	150,000,000	14,556,380,696	-	14,706,380,696	14,587,330,616	99
Development of Market Responsive plant varieties and seed systems to reduce Rwanda's dependency on seed importation	1,298,000,000	-	-	1,298,000,000	1,018,002,561	78
Government Funded Modern Irrigation (GFI)	5,924,211,236	-	-	5,924,211,236	5,535,063,874	93
Small Scale Irrigation Technology (SSIT)	156,330,360	-	-	156,330,360	151,049,281	97
Horticulture Center of Excellence (HCoE)	188,050,360	-	-	188,050,360	162,577,562	86
Aquaculture and fisheries development	799,551,045	-	-	799,551,045	536,489,756	67
Agriculture Mechanization	200,000,000	-	-	200,000,000	185,632,255	93
Sustainable Agriculture Intensification and Food Security Project (SAIP)	531,863,736	-	9,653,667,165	10,185,530,901	9,346,681,448	92
Livestock Intensification Program(LIP)	3,004,680,212	-	-	3,004,680,212	10,416,332,058	347
Crop Intensification Project(Including fertilizer import)	2,848,881,661	-	-	2,848,881,661	2,493,566,835	88

Projects	Revised Domestic Budget	Revised External Loan	Revised External Grant	Total	Executed Budget	%
Development of efficient and inclusive market-systems for value chains of poultry and pig industries under ENABEL funds	-	-	2,692,490,185	2,692,490,185	1,503,817,093	56
Technology development for enhancement of food safety and Value addition in Agriculture	200,000,000	-	-	200,000,000	200,000,000	100
Kayonza Irrigation and Integrated Watershed management Project (KIIWP)	150,000,000	11,622,806,138	-	11,772,806,138	9,711,397,115	82
Gabiro Agri-Business Hub Project	25,000,000,000	-	-	25,000,000,000	27,880,349,127	112
Sustainable Agricultural Productivity and Market linkage Project (SAPMP)	100,000,000	-	723,765,512	823,765,512	691,823,357	84
Rehabilitation of Bugesera Irrigation Schemes (166 Ha)	150,000,000	-	-	150,000,000	148,943,798	99
Rural Poor Stimulus Facility project	-	-	890,699,828	890,699,828	1,081,497,420	121
Partnership for Resilient and Inclusive Small Livestock Markets (PRISM)	150,000,000	5,674,678,066	-	5,824,678,066	4,398,369,989	76
Total	42,276,800,696	41,720,108,900	17,026,590,391	101,023,499,987	103,096,976,341	102

Annex 5: Districts Budget Execution on Agriculture Programs

Districts	Revised Budget	Executed Budget	%
4000 NGOMA DISTRICT	1,466,382,856	1,640,564,998	112
D501 Sustainable Crop Production	1,297,129,993	1,460,912,136	113
D502 Sustainable Livestock Production	167,245,569	177,645,568	106
D503 Producer Professionalization	2,007,294	2,007,294	100
4100 BUGESERA DISTRICT	1,610,115,337	1,791,384,730	111
D501 Sustainable Crop Production	1,427,443,623	1,607,593,017	113
D502 Sustainable Livestock Production	131,060,001	132,180,000	101
D503 Producer Professionalization	51,611,713	51,611,713	100
4200 GATSIBO DISTRICT	1,669,702,293	1,745,063,612	105
D501 Sustainable Crop Production	1,527,302,504	1,602,663,823	105
D502 Sustainable Livestock Production	142,399,789	142,399,789	100
4300 KAYONZA DISTRICT	1,423,060,937	1,861,862,851	131
D501 Sustainable Crop Production	1,290,581,800	1,724,483,715	134
D502 Sustainable Livestock Production	130,397,307	135,297,306	104
D503 Producer Professionalization	2,081,830	2,081,830	100
4400 KIREHE DISTRICT	1,446,362,631	1,714,184,129	119
D501 Sustainable Crop Production	1,251,469,756	1,506,751,255	120
D502 Sustainable Livestock Production	146,768,100	159,308,099	109
D503 Producer Professionalization	48,124,775	48,124,775	100
4500 NYAGATARE DISTRICT	4,214,188,492	4,287,154,873	102
D501 Sustainable Crop Production	4,076,923,349	4,149,889,730	102
D502 Sustainable Livestock Production	137,265,143	137,265,143	100
4600 RWAMAGANA DISTRICT	1,399,387,531	1,403,787,531	100
D501 Sustainable Crop Production	1,236,385,419	1,236,385,419	100
D502 Sustainable Livestock Production	127,563,399	131,963,399	103
D503 Producer Professionalization	35,438,713	35,438,713	100
4700 HUYE DISTRICT	840,182,010	840,182,010	100
D501 Sustainable Crop Production	695,483,445	695,483,445	100
D502 Sustainable Livestock Production	144,698,565	144,698,565	100
4800 NYAMAGABE DISTRICT	1,987,445,258	1,991,765,258	100
D501 Sustainable Crop Production	1,854,399,909	1,854,399,909	100
D502 Sustainable Livestock Production	133,045,349	137,365,349	103
4900 GISAGARA DISTRICT	1,533,811,280	1,536,151,280	100
D501 Sustainable Crop Production	1,410,480,818	1,410,480,818	100
D502 Sustainable Livestock Production	123,330,462	125,670,462	102
5000 MUHANGA DISTRICT	687,716,171	693,668,171	101
D501 Sustainable Crop Production	563,138,470	563,138,470	100
D502 Sustainable Livestock Production	124,577,701	130,529,701	105
5100 KAMONYI DISTRICT	418,474,963	421,354,963	101

Districts	Revised Budget	Executed Budget	%
D501 Sustainable Crop Production	391,642,532	391,642,532	100
D502 Sustainable Livestock Production	24,406,235	27,286,235	112
D503 Producer Professionalization	2,426,196	2,426,196	100
5200 NYANZA DISTRICT	769,854,658	775,684,658	101
D501 Sustainable Crop Production	488,589,867	488,589,867	100
D502 Sustainable Livestock Production	278,838,595	284,668,595	102
D503 Producer Professionalization	2,426,196	2,426,196	100
5300 NYARUGURU DISTRICT	2,517,720,332	2,455,308,609	98
D501 Sustainable Crop Production	2,216,744,992	2,149,983,269	97
D502 Sustainable Livestock Production	290,102,046	294,452,046	101
D503 Producer Professionalization	10,873,294	10,873,294	100
5400 RUSIZI DISTRICT	1,448,308,939	1,451,908,938	100
D501 Sustainable Crop Production	1,123,449,165	1,123,449,165	100
D502 Sustainable Livestock Production	316,958,480	320,558,479	101
D503 Producer Professionalization	7,901,294	7,901,294	100
5500 NYABIHU DISTRICT	1,712,252,527	1,712,252,527	100
D501 Sustainable Crop Production	1,556,869,662	1,556,869,662	100
D502 Sustainable Livestock Production	118,348,252	118,348,252	100
D503 Producer Professionalization	37,034,613	37,034,613	100
5600 RUBAVU DISTRICT	1,747,172,446	1,748,812,445	100
D501 Sustainable Crop Production	1,582,328,333	1,582,328,333	100
D502 Sustainable Livestock Production	99,412,270	101,052,269	102
D503 Producer Professionalization	65,431,843	65,431,843	100
5700 KARONGI DISTRICT	1,507,228,661	1,507,228,661	100
D501 Sustainable Crop Production	1,239,457,369	1,239,457,369	100
D502 Sustainable Livestock Production	267,771,292	267,771,292	100
5800 NGORORERO DISTRICT	1,801,492,258	1,806,974,064	100
D501 Sustainable Crop Production	1,648,342,925	1,648,342,925	100
D502 Sustainable Livestock Production	115,124,320	120,606,126	105
D503 Producer Professionalization	38,025,013	38,025,013	100
5900 NYAMASHEKE DISTRICT	1,674,918,793	1,677,888,792	100
D501 Sustainable Crop Production	1,564,512,001	1,564,512,001	100
D502 Sustainable Livestock Production	110,406,792	113,376,791	103
6000 RUTSIRO DISTRICT	1,094,407,864	1,100,107,863	101
D501 Sustainable Crop Production	944,252,352	944,252,352	100
D502 Sustainable Livestock Production	150,155,512	155,855,511	104
6100 BURERA DISTRICT	2,299,908,776	2,307,678,775	100
D501 Sustainable Crop Production	2,170,950,347	2,170,950,347	100
D502 Sustainable Livestock Production	128,958,429	136,728,428	106
6200 GICUMBI DISTRICT	1,247,851,560	1,247,851,560	100
D501 Sustainable Crop Production	1,062,627,483	1,062,627,483	100
D502 Sustainable Livestock Production	137,354,864	137,354,864	100

Districts	Revised Budget	Executed Budget	%
D503 Producer Professionalization	47,869,213	47,869,213	100
6300 MUSANZE DISTRICT	3,108,723,980	3,108,723,980	100
D501 Sustainable Crop Production	2,961,903,526	2,961,903,526	100
D502 Sustainable Livestock Production	115,898,854	115,898,854	100
D503 Producer Professionalization	30,921,600	30,921,600	100
6400 RULINDO DISTRICT	1,196,444,723	1,197,284,723	100
D501 Sustainable Crop Production	1,021,661,689	1,021,661,689	100
D502 Sustainable Livestock Production	123,136,893	123,976,893	101
D503 Producer Professionalization	51,646,141	51,646,141	100
6500 GAKENKE DISTRICT	1,606,257,690	1,606,257,690	100
D501 Sustainable Crop Production	1,408,202,426	1,408,202,426	100
D502 Sustainable Livestock Production	143,806,623	143,806,623	100
D503 Producer Professionalization	54,248,641	54,248,641	100
6600 RUHANGO DISTRICT	519,497,188	519,497,188	100
D501 Sustainable Crop Production	370,685,575	370,685,575	100
D502 Sustainable Livestock Production	108,460,000	108,460,000	100
D503 Producer Professionalization	40,351,613	40,351,613	100
7000 KIGALI CITY	716,683,857	716,683,857	100
D501 Sustainable Crop Production	558,657,752	558,657,752	100
D502 Sustainable Livestock Production	158,026,105	158,026,105	100
Total	43,665,554,011	44,867,268,736	103

ANNEX 6: PROJECTS PERFORMANCE FOR 2021/2022 FY

#	Project Basic Information	Details of the project progress	Ranking
	<p>National Strategic Grain Reserve (NSGR) Project funded by GoR and implemented by MINAGRI</p> <p>FY2021/22 Revised Budget: Frw 4,767,542,630</p> <p>The objective of the project is to ensure national food security, mitigate the impacts of potential shocks to the food supply, and reduce malnutrition and hunger among the population while avoiding market distortion.</p> <p>Outputs:</p> <ul style="list-style-type: none"> - Food security enhanced through NSGR. - Post-harvest facilities constructed and utilized. <p>Annual targets</p> <ul style="list-style-type: none"> - MT of food commodities stored as Strategic Food Reserve (Maize: 2,500, Beans: 2,000) - 100% of identified vulnerable families assisted with food reserve <p>Location:</p> <p>Nyagatare, Kicukiro, Nyanza, Nyamagabe and Nyabihu.</p>	<p>Annual budget spending: 100%</p> <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> ▪ 6,000 against 2,500 MT of maize have been stored as Strategic Grain Reserve. ▪ 2,718 against 2,000 MT of Beans have been stored as Strategic Grain Reserve. ▪ 3,224 against 3,224 MT of rice have been stored as Strategic Grain Reserve. ▪ The national Grain Reserve Stock position at the end of June 2022 was as follow: Maize: 13,805.013 MT and beans: 3,299.548 MT. ▪ 3,490.483 MT of beans, 432.335MT of maize, 3,878.435 MT of maize flour & 3,223.975 MT of rice have been distributed to the City of Kigali and districts: Muhanga, Ruhango, Huye, Kamonyi, Burera, Rubavu, Rutsiro, Musanze, Gicumbi, Nyagatare, Rwamagana, Bugesera, Kayonza, Kirehe, Rusizi & Gasabo to assist families affected by lockdown due to COVID 19 and families affected by disasters. <p>As it was expected Kicukiro warehouse has been extended (at 100%) with 1500 MT storage capacity.</p>	

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	<p>Howard G. Buffet Foundation Project funded by GoR and Howard Buffet Foundation and implemented by MINAGRI</p> <p>FY2021/22 Revised Budget: Frw 73,604,112 (counterpart funding)</p> <p>The objective of the project is to build the practical capacity of agricultural practitioners through learning by doing.</p> <p>Outputs:</p> <ul style="list-style-type: none"> - Improved on-farm productivity through investments in proper land, water, and inputs utilization for enhanced food security; - Increased access to and adoption of technologies that enhance agricultural value chains and conserve the environment. <p>Annual targets</p> <ul style="list-style-type: none"> - Expropriations done at 100% for Kabarondo-Nasho 30 KVA power line construction to supply Nasho Irrigation Scheme? <p>Location: Kirehe, Bugesera</p>	<p>Annual budget spending: 100%</p> <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - Compensation of affected properties was done at 95%. The remaining 5% did not avail of the required documents on time - Construction of powerhouse at Kagese is completed 100% and the testing was done. - All the payment of Taxes for Rwanda Institute for conservation Agriculture (RICA) are done successfully to implement the planned activities. <p>Project achievements in previous fiscal years</p> <p>This project completed to develop the irrigation and agriculture mechanization infrastructures.</p> <ul style="list-style-type: none"> - Nasho Solar-powered Irrigation Project includes pivot irrigation systems serving 2,099 small scale farmers, with a capacity of 3.3 megawatts to power the irrigation system, with 2.4 MW battery storage and a model village of 144 houses. - 1,176 ha were irrigated with the solar-powered irrigation system. - Beneficiaries of the irrigation systems at Nasho were grouped into a cooperative; Nasho Irrigation Cooperative (NAICO) based in the Nasho sector, in Kirehe District; which utilize and maintain the infrastructure. The cooperative also serves as an Agro-dealer and seeds multiplier to its farmers. - The cooperative has different machines to use in different agriculture processes (cultivation, harvesting and post harvesting). - The machines are regularly monitored and maintained by the Engineers in place that were trained (25 locals). - For the sustainability, and cooperative operations, there is a 5-Years Business plan that was developed and it is under implementation. - During the recent agriculture seasons 2021 A&B at Nasho Irrigation Scheme, the productivity was done as follow: Maize seeds: 81 MT (Season 2020B); Soybean seeds: 39 MT (Season 2021A); Maize seeds: 114 MT (Season 2021B). 	

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	<p>Agriculture Insurance Project funded by GoR and implemented by MINAGRI</p> <p>FY2021/22 Revised Budget: 434,277,530</p> <p>The objective of the project is to de-risk agriculture through ensuring crops and livestock</p> <p>Output:</p> <ul style="list-style-type: none"> - Crops and livestock insurance rolled out <p>Annual targets</p> <ul style="list-style-type: none"> - Number of live animal insured (Cows: 826 , Chicken: 5,116 Pigs: 200) - Agriculture crops/Ha insured (Rice: 4,051, Maize: 2,300 , Irish potatoes:200 ,Green beans: 10 Chili: 20) - Digitalization of livestock insurance (2500 RFID Microchip for cattle identified) <p>Location:</p> <p><i>Countrywide</i></p>	<p>Annual budget spending: 100%</p> <p>Background:</p> <ul style="list-style-type: none"> - The insurance scheme policy was approved by Cabinet in November 2018 and then in partnership with Insurance companies, the mobilization and enrollment started to insure crops (Maize & Rice). In 2020/21 FY, the program was actually scaled up in other districts and to more crops (cassava, banana, soya beans, beans, chili, Irish potato) and livestock (chicken and poultry). <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - Animals insured: Cows: 35,517 against 826; Chicken: 163,124 against 5,116; Pigs: 3,477 against 200. - Crops: Rice: 22,047 Ha against 5,102; Maize: 4,730.56 Ha against 1,150; Irish potatoes: 1,027.6 Ha against 200; Green beans: 9.51 Ha against 10 ha, Chili: 151.8 Ha against 20. - As expected 26,333 Microchips were purchased and distributed in Districts. <p>Achievements in previous fiscal years:</p> <ul style="list-style-type: none"> - Crops farmers enrolled: Ha 48,609.27 - Enrolled livestock: 52,815 cows; pigs 4,039; chicken 228,961 - So far the compensation of crop farmers was 672,830,818 Frw, and 470,418,327 Frw for livestock. In addition, Frw 2,024,970,345 of credit was given to farmers by financial institutions after using the items in insurance scheme as the guaranty. 	
	<p>Deeping Efforts to accelerate Nationally Determined Contribution (NDC) implementation project funded by UNDP and implemented by MINAGRI</p> <p>Type of funding:</p> <p>Grant (NDC/UNDP) : FRW 950 Million</p> <p>FY2021/22 Revised Budget: Frw 452,522,314</p>	<p>Annual budget spending: 100%</p> <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - Final report on the situational analysis of low carbon and climate resilient in the agriculture sector was completed, and the road map has been developed. - Report on Analysis of climate Investment and financial flows in agriculture sector was done. - The final report was produced on Risk Mapping and mitigation measures to orient private investment opportunities in climate resilient agriculture and piloting best practices activities. 	

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	<p>The objective of the project is to implement the milestones of the Nationally Determined Contribution (NDC) falling under Agriculture Sector</p> <p>Output:</p> <ul style="list-style-type: none"> - Inclusive Sectorial Transformation (Deep Dive) accelerated - Enabling environment established for Private and Public Sector Investments Mobilization <p>Annual targets</p> <p>Inclusive Sectorial Transformation (Deep Dive) accelerated</p> <ul style="list-style-type: none"> - Annual Report on Situational analyses conducted on low carbon, climate resilient in the agriculture sector conducted - Report on Analysis of climate Investment and financial flows in agriculture sector in place - 5 bankable NDC projects developed and linked to funding source 	<ul style="list-style-type: none"> - 5 project proposals have been developed and submitted to the NDC Partnership for funding mobilization 	
	<p>Smart Agriculture Integrated System (SAIS) funded by GoR and implemented by MINAGRI</p> <p>Cost: FRW 6.6 Billion</p> <p>Start date: 1/07/2017</p> <p>End date: 31/06/2024</p> <p>Type of funding:</p> <p>Domestic Financing: FRW 32,000,000 million</p> <p>Grant: Frw 223,282,824 million provided by ENABEL</p> <p>FY2021/22 Revised Budget Frw 255,282,824</p> <p>The objective of this project is to have an integrated agricultural system that can interlink all agricultural activities with a reporting structure.</p> <p>Output:</p> <ul style="list-style-type: none"> - Printed and audio visual agriculture extension materials to audiences availed; - Agricultural information to stakeholders availed through Management Information System; and 	<p>Annual budget spending: 97%</p> <p>FY 2021-22 annual achievements against targets:</p> <p>This project with the aim of have an integrated agricultural system that can interlink all agricultural activities with a reporting structure has achieved the following milestones:</p> <ul style="list-style-type: none"> - 98 shows against 55 were produced and broadcasted; 9 TV and radio spots about the nutrition and economic benefits of poultry farming and how to do it; were produced and broadcasted. - 3,364 against 1000 didactic audio visual contents to raise Awareness on poultry and piggery production and marketing regulatory framework. - Business analysis and System requirement specification have been produced to develop a web based application system for Smart managing warehouse and Silos Storage facilities developed. - The System testing environment for Certification Service Support was deployed and hosted in National Data Center (http://icss.rica.gov.rw/). - The MIS was upgraded from version 2.30.1 up to Version 2.35.8 - As planned, 3 Monthly reports on the market price for crops and livestock products are available 	

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	<ul style="list-style-type: none"> - E-soko+ operationalized. <p>Annual targets</p> <ul style="list-style-type: none"> - Awareness campaigns on consumption of animal proteins sources including chicken and pig products carried out (55 Radio shows, 8 Radio & TV spots); 1000 didactic audio- visual and printed contents multiplied and disseminated - 12 Reports on the market price for crop and livestock products produced and disseminated - A web based application system for Smart managing warehouse and Silos Storage facilities developed. - Management Information System upgraded - Agriculture Common Data Warehouse upgraded. 	<ul style="list-style-type: none"> - The Agriculture Common Data Warehouse was upgraded. So far the System was upgraded by adding LODA MEIS and Land Administration Information System (LAIS) of RLMUA and The sector performance dashboard was finalized and made public on MINAGRI website (http://agridwh.minagri.gov.rw). - The Final draft on National Digital Agriculture Strategy was done and pends for validation. 	
	<p>Rwanda Dairy Development Project (RDDP) funded by IFAD & GoR and implemented by RAB</p> <p>FY2021/22 Revised Budget: Frw 10,016,244,000</p> <p>The project objective is to increase the Volume and value of milk sold from targeted small-holder dairy farmers while aggregating on the Volume of milk exported and penetration in the East Africa Community dairy market while increasing on the Average consumption of milk at household level.</p> <p>Annual targets:</p> <ul style="list-style-type: none"> - Coaching of 832 L-FFS facilitators and farmer groups - Training of 840 Champions through Gender Action Learning Approach (GALS) - Establishment of new 682 L-FFS groups - Construction of a new bull station located in Songa/ Huye district (at 70%) - Forage Planting (1000 Ha). vi. Purchase and install 6 Bulls in RAB Station for genetic improvement 	<p>Annual budget spending: 99%</p> <p>FY 2021-22 annual achievements against targets:</p> <p>In order to increase the Volume and value of milk sold from targeted small-holder dairy farmers, the following were done:</p> <ul style="list-style-type: none"> - As planned, the construction works of the 12 Milk Collection Points (MCPs) located in Gicumbi (4), Burera (4), and Musanze (4) Districts were completed. - Against 60 MCCs that were planned to be rehabilitated, 58 McShane been rehabilitated and the final handover have been done to the 55 MCCs and 3 MCC are under provisional handover. - As planned, 8 Milk Collection Centres (MCCS) were upgraded into SMEs - The construction of a modern bull station is ongoing reaching at 70.6 of its completion. The target was 100%. - RDDP in collaboration with Heifer International Rwanda planned to acquire 6 bulls to be placed in RAB for Artificial Insemination activities. 2 Bulls from Kenya were delivered and placed in Songa Station and the remaining 4 bulls from Netherlands are expected to be delivered in early August 2022. - As planned, the awareness campaign for milk consumption has been conducted on RBA Radio station and it is ongoing to reach the planned 	

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	<ul style="list-style-type: none"> - Drilling and installation of 10 Boreholes in Gatsibo District - Construction of 15 spray races in Nyagatare, Gatsibo and Kayonza Districts. - Connecting of 5 MCCs to existing National water supply and provision of rain water harvesting facilities. - 30 % of works of 12 remaining Milk Collection Points (MCPs) to support in milk collection. - RDDP Impact survey conducted <p>Location: 14 Districts:</p> <p style="padding-left: 40px;">East: Nyagatare, Rwamagana and Kayonza</p> <p style="padding-left: 40px;">North: Gicumbi, Burera and Musanze</p> <p style="padding-left: 40px;">West: Nyabihu, Rubavu and Rutsiro</p> <p style="padding-left: 40px;">South: Nyanza, Huye and Ruhango.</p>	<ul style="list-style-type: none"> target and the project conducted another campaign on Agri-show done at Remera and 14 districts. - The training on nutrition champions at district level was done whereby the 465 against 150 nutrition champions from Nyanza and Ngororero districts have been trained. - As it was targeted, 765 groups were coached in 14 districts of project interventions. The main topic focused on milk hygiene and mastitis prevention at farm level. - 840 against 210 Gender Action Learning Approach (GALS) champions were trained as ToTs by DUHAMIC ADRI and 7,300 farmers from L-FFS groups were trained by the champions. - 1480 ha of forage were planted in 14 Districts. - 259 against 50 business plans have been developed and approved. - 232 against 50 farmers have been trained of financial literacy and business plan development. - 489 against 400 business plans were financed and implemented. - The impact Study of RDDP was produced and approved as planned. 	
	<p>Gako Integrated Beef project funded by GoR and Different Investors and implemented by Gako Meat Company Ltd</p> <p>Type of funding: Joint Venture</p> <ul style="list-style-type: none"> o GoR: 52% Shares. o Cattle Ville Ranchers: 31% Shares o Gako Beef Company Ltd: 17% Shares <p>FY2021/22 Allocated Budget: Frw 25,802,961,011</p> <p>The objective of the project is to increase beef production through providing basic infrastructure in Gako farm.</p> <ul style="list-style-type: none"> - Improve Beef farm productivity and production - Process live cattle into meat products - Add value in Rwanda by developing quality meat products - Attract investment into the Rwandan agriculture and meat sector <p>Outputs:</p>	<p>Annual budget spending: 99%</p> <p>The project is one of the government interventions that seek to modernize the country's agriculture industry, including the livestock sector, from largely subsistence production to a market-oriented activity. Besides, positioning Rwanda as an alternative source of quality beef products is essential to enhance the country's foreign exchange receipts, and ensure the local livestock sector becomes more profitable. The project started in 2015 and here below are the achievements:</p> <p>Annual achievements:</p> <ul style="list-style-type: none"> - Livestock (Beef farm): Already 5,270 cows are in the farm, the artificial Insemination & cross-breeding and embryo transfer are ongoing. The fencing of 62.8 Km, 6 spray races are done while the bush clearing is ongoing. The administration block was completed and is currently in use. - Feedlot (Fattening): Not yet started, however the contract was signed with consultant to develop the feasibility studies. The initial proposal is 	

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	<ul style="list-style-type: none"> - Cows in Gako farm increased - Bore holes drilled - Irrigation system established for Gako farms 	<p>to fatten 2,000 bulls per year. The construction is expected to start in September 2022.</p> <ul style="list-style-type: none"> - Infield irrigation: The contract was signed (With SJC China and TECOL as supervisor) to develop the infrastructure on 1,344 Ha (1,154 ha to be served by Center pivots while 190 Ha will be served by Sprinklers). So far the contractor site was established while the design review is at final stage. - Feed mill (Factory): The feed mill factory was decided to be put on hold as it is expensive and is supposed to be functional after the full establishment of the farms. However, the small unit was adopted to be established to start producing the fodder reserved for the cows in the feedlot (to be developed). The study is ongoing within the same contract of feedlot. - Tannery & Rendering (Livestock waste treatment): This business was decided to be put on hold as it is expensive and is supposed to be functional after the full establishment of the farms. Future discussions will lead the next steps. - Abattoir: The designs are ongoing and so far the technical specifications were developed. The abattoir is expected to be completed by the end of June 2020. Initially, the proposal was to construct an abattoir with the capacity of 200 cows per day (@ USD 12.5 Million); but it was decided to go with that of 50 cows per day (@ USD 3.5 Million), as it was found to be more efficient as it can work in more than 1 shift per day to have the capacity of 100 to 150 cows per day. <p>The experts team of Burmeister is on site supporting GMC until December 2023.</p> <p>Challenges:</p> <ul style="list-style-type: none"> - Even though, the establishment of Gako beef is ongoing; there is a gap in Meat Policy, Regulations and Value Chain Certifications that will be required to GMC to compete at International level. - There are continuous damages of roads that were constructed in the farms in 2015/16 FY. - There are some solar powered boreholes (6 out of 13) that are not operational and the company/GMC cannot repair them as they are still in the Liability period of the contractor (The Contract manager is still RAB). - There are delays on the site of the contractor to start civil works given the contract period (already 3 months out of 12). 	

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		<p>Recommendations:</p> <ul style="list-style-type: none"> - MINAGRI and RICA/MINICOM; to initiate and fast track the Meat Policy, Regulations and Value Chain Certifications to support the Company Policy being developed by GMC to their out growers; to ensure that the required standards are met. - Continuous mobilization and consideration of roads rehabilitation by concerned parties (District, RTDA). - RAB to liaise with the contractor to rehabilitate the damaged boreholes as soon as possible, before the final handover is done. 	
	<p>Kayonza Irrigation and Integrated Watershed management Project (KIIWP) funded by IFAD and GoR and implemented by RAB</p> <p>FY2021/22 Revised Budget: Frw 11,772,806,138</p> <p>The project objective is to improve food security and incomes of 50,000 rural households on a sustainable basis.</p> <p>Outputs:</p> <ul style="list-style-type: none"> - Catchment rehabilitation and protection - Irrigation infrastructure established - Formation and strengthening management committees <p>Annual targets</p> <ul style="list-style-type: none"> - Establish 700 ha of land husbandry techniques - Planting of 440,000 horticulture fruits seedlings - Farm pond for irrigation of fruits - Construct/rehabilitate of 15 valley tanks. - Drilling & installation of 20 boreholes. - Irrigation studies conducted <p>- Location: Kayonza</p>	<p>Annual budget spending: 82%</p> <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - 700 ha of land husbandry established in Ndego (200 ha), Kabarondo & Ruramira (200 ha), Kabare (200 ha) and Murama (100 ha) Sectors. - Cumulatively, 100,000 avocado seedlings, 160,000 mango seedlings, 60,000 citrus seedlings, 60,000 tree tomato and 60,000 jack fruits planted in Kabarondo, Murama and Remera Sectors. - Installation of farm ponds were completed to serve 1150 ha. - 10 valley dam/tanks were completed while other 5 valley tanks/dam are ongoing (Kigarama: 85.6%; Rukore:82.2%; Cyamburara: 80.93%; Murundi :43.9%; Cyamusenyeri: 82.9%). - Against 20 boreholes that were expected to be completed, 7 boreholes are operational, 3 are under installations, other 10 are ongoing - As planned, 1,750 Tons of lime was delivered and applied in fruits plantation. - The final feasibility Study report of Gishanda irrigation scheme was approved by technical team and will send to IFAD for comments and approval. - The draft feasibility Study report of Kanyeganyege irrigation scheme was produced and the validation meeting is scheduled in July 2022. - 	

#	Project Basic Information	Details of the project progress	Ranking
	<p>Gabiro Agri-Business Hub Project funded and implemented by GoR/RAB in a Joint Venture with NETAFIM</p> <p>FY2021/22 Revised Budget: Frw 25,000,000,000</p> <p>The objectives of the project are:</p> <ul style="list-style-type: none"> - Create a "leap-frog" development of Rwanda's agricultural ecosystem - Ensure food security to Rwanda through cutting edge technology, knowledge, knowhow and best practices - Attract significant foreign investments to Rwanda - in in-field technologies and processing factories - Increase export of high value crops and agriculture-generated, value-added, products - Substantially increase employment and livelihood of local community <p>Outputs:</p> <ul style="list-style-type: none"> - Demo Farm Constructed - Water Infrastructure for Irrigation Developed: - Land developed for Hillside Irrigation - Roads connecting farm (km) - Resettlement of people affected - Private Sector Engagement done 	<p>Annual budget spending: 112%</p> <p>Background:</p> <p>This is a Joint Venture partnership between GoR (90%) and NETAFIM (10%) with the objective of establishing a modern value chain on approximately 15,600 ha of irrigated land in Nyagatare. At a total Budget of \$ 73.8 Million, it was launched on 20th May 2020, and expected to last 18 months. The construction works are ongoing for the Phase 1 (5,600 Ha).</p> <p>The Project is developed by NETAFIM and supervised by SNEC LTD.</p> <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - Bulk water supply stands at 77% against 50% that was targeted. The general progress of Bulk Water Supply (Canal, Siphons, Delivery pipes, and Demo Farms). - 49 Km of roads are constructed against 40 km that were targeted. As there are the ongoing works, the overall progress is at 86% on roads. - Rural Resettlement: Houses construction for 192 households were completed as targeted for both sites of Shimwa Paul and Akayange. The construction works for Rwabiharamba are ongoing and the overall progress is at 69%. - For power supply; Only 5 km against 30 km were covered with electronic Poles. This was due to delays caused by series of technical discussions/to agree on the designs. The asset compensation is at 80%. 	

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	<p>Export Targeted Modern Irrigated Agriculture Project (ETI) funded by the EXIM BANK of India and implemented by RAB</p> <p>Start date: 1/7/2015</p> <p>Initial end date: 30/06/2017</p> <p>End date: 31/6/2021 (To be extended)</p> <p>FY2021/22 Revised Budget: Frw 14,706,380,696</p> <p>The project objective is to provide Modern Irrigation facilities suitable to command areas for boosting the agriculture potential from the present subsistence level to Export targeted crops.</p> <p>Outputs:</p> <ul style="list-style-type: none"> - Irrigation infrastructures increased (1100 ha for Mpanga) - Irrigation infrastructures increased (1,750 ha Mahama 1) - Irrigation infrastructures increased 2,500 ha for Mahama 2); - Mechanization Center of excellence established at Reutilize (Kicukiro); - 1 Tomato and 1 Maize processing Factories established. - Increased capacity (trainings). - Solar system developed. 	<p>Annual budget spending: 99%</p> <p>Background:</p> <p><i>The overall status of the project is provided below. However, both initial and current stages of the project have faced/are still facing the constraints related to the points stated below:</i></p> <ul style="list-style-type: none"> - The agreement was signed in 2013, then later project has had delays of about 4 years in first stages of its implementation due to long bureaucracies to operationalize the Line of credit as well as the permanent installation of the project supervision firm from India to Rwanda. - After these delays, on 7th Dec 2015, the Government of India issued new guidelines for Lines of Credit to various countries under the Indian Development and Economic Assistance Scheme (IDEAS). As ETI was still in early process of procurement of EPC contractors, it was affected as well by these guidelines, hence further delays occurred. <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - Construction works for the Center of Excellence in Mechanization were at 66.6% against 100%. However, there is still the slow progress of works. The contractor has requested the extension of end September 2022 despite not respecting the initial extension of end March 2022. - Mahama 1 and 2: the site works are estimated at 20% at both Mahama 1 and 2. - Mpanga: The physical progress is at 94.6%. The recent extension was awarded to the contractor up to end September 2022. - Solar Power Plant, maize and tomato factories were cancelled, the amount related will be used on developing additional irrigation schemes. <p>Challenges:</p> <p><i>Irrigation infrastructures increased (1100 ha for Mpanga):</i></p> <ul style="list-style-type: none"> - 659 ha under hillside irrigation were not completed as it was planned in Mpanga/Kirehe. The several changes in designs, slow performance of the contractor and currently the delays in shipment of transformers due to Covid 19 have delayed the project. - There are the electrical poles that need to be relocated along the command area. As the necessary preparations and negotiations were done between EDCL and Contractor; there is a need to fast-track the relocation. 	

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		<p><i>Mechanization Center of excellence established at Rubilizi (Kicukiro);</i></p> <ul style="list-style-type: none"> - The contract of USD 12,286,575 was signed in May 2017 and works started in October 2017 with a duration of 12 months from the commencement date. - Due to slow performance of the contractor/ TECHNOFAB ENG Ltd, the works have been stopped at 64% since March 2019. RAB extended the Contract to June 30th, 2021 then to end March 2022 and currently to September 2022. - There is still the slow progress of works as the contractor claims the slow cash flow issue due to delays in tax refunding procedures. In addition, there are delays in shipment of materials from India as there are two containers of materials that are stalled at Dar-Es-Salam Port. Technofab need to make necessary payments to allow the delivery of materials. 	
	<p>Immediate Action Irrigation Project (Government Fund Irrigation Project-GFI) funded by the GoR and implemented by RAB</p> <p>FY2021/22 Revised Budget : Frw 5,924,211,236</p> <p>The project's objective is to develop and manage soil, water resources and sustainable irrigated agriculture in selected marshlands and promote, food security and generate incomes for farmers.</p> <ul style="list-style-type: none"> - Increased area under feasibility and detailed studies for Irrigation projects development; - Marshlands and Hillside irrigation schemes operationalized, maintained and managed. - Hillside and Marshland Irrigation schemes rehabilitated; <p>Annual targets</p> <ul style="list-style-type: none"> - 10,333 Ha of irrigation schemes Managed and maintained by Youth - 100% progress towards completion Cyabayaga Dam (475 Ha) rehabilitation - 90% progress towards completion of Bugarama (100 Ha) Marshland Rehabilitation - 85% Progress towards completion of ongoing Feasibility study completed (Karangazi: 11,000 Ha 	<p>Annual budget spending: 93%</p> <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - As planned, Farmers capacity building and proximity coaching for operation and management of irrigation schemes is done on 10,333 Ha. - The construction works for Cyabayaga dam were at 95% against 100% that was planned - The construction works for Bugarama and Kamiranzovu dams were at 97% and 99%, respectively against 100% that was planned. - 60% Progress towards completion of Karangazi: 11,000 Ha (Draft feasibility study approved). The target was the completion. - The Draft Feasibility Report was submitted for Mugesera as it was planned. - 4,286.8 against 2,126 Ha of radical terraces constructed through earmarked funds. - Irrigation schemes Management model under development is at 48% against 50% that was targeted. <p>Challenges:</p> <ul style="list-style-type: none"> - Unpredicted heavy rain and floods which affected the Project achievements in previous fiscal years in Kamiranzovu (Heavy rains) and Bugarama (Floods); hence the requirements for additional works and funds as well. 	

#	Project Basic Information	Details of the project progress	Ranking
	<ul style="list-style-type: none"> - Mugesera Final feasibility study and Draft Detailed Design Report. 	<ul style="list-style-type: none"> - For Cyabayaga dam, there were delays in expropriation to start the canal connecting the constructed weir to the existing canal. 	
	<p>Technology Development for Enhancement of Food Safety and Value Addition in Agriculture funded by GoR and implemented by RAB</p> <p>FY2021/22 Revised Budget: Frw 200,000,000</p> <p>The objective of the project is to acquire the facilities to help in processing and harvest of maize produce.</p> <p>Output:</p> <ul style="list-style-type: none"> - Mob and Cob-driers supplied and installed. <p>Annual targets</p> <p>Post-harvest losses reduced and quality of agriculture commodities improved for selected crops</p> <ul style="list-style-type: none"> - 3000 sheetings/tarpaulins purchased - Processing, Quality/value addition and Nutritional preservation of agriculture products developed: - 5 protocol developed and nutrients analysed for wheat, rice, cassava and sweet potatoes; - 30 laboratory tests for wheat, Vegetables, Fruits, Cassava and Sweet Potato done - 21 Cassava processing methods tested. 	<p>Annual budget spending: 100%</p> <p>This project has initially proposed to construct an anti-aflatoxin plant, however the quick wins' option of using the acquired facilities was adopted. Hence the initial Total cost of Frw 2.7 Billion.</p> <p>FY 2021-22 annual achievements against targets:</p> <p>Post-harvest losses reduced and quality of agriculture commodities improved for selected crops</p> <ul style="list-style-type: none"> - 3,810 against 400 consolidated sites of maize and rice were mobilized on improved harvesting and post harvesting handling. - As expected, 5 crop varieties research protocols were developed for wheat, cassava, fruits and vegetables. - As expected, the canned products were tested for titratable acidity, Vitamin C, Beta-carotene, color, Total counts, yeast and molds. 10 samples were analyzed 5 times in laboratory. In total 30 laboratory tests for wheat, Vegetables, Fruits, Cassava and Sweet Potato done samples were analyzed in UR-CAVM laboratory. - Two products developed and available: 1. soybean milk, 2. soybean flour, orange fleshed sweet potato(puree) and fish (small) powder, and disseminated.in five Districts of Rwanda selected: Nyabihu, Musanze, Burera, Nyamasheke and Nyaruguru. Seventy- nine (79) participants and one hundred forty- three (143) children participated in the training and consumed the recipes developed. - As planned, Cassava starch and flour extraction were evaluated for 21 varieties. 	
	<p>Livestock Intensification Project funded by GoR and implemented by RAB</p> <p>FY2021/22 Revised Budget: Frw 3,004,680,212</p>	<p>Annual budget spending: 347%</p> <p>FY 2021-22 annual achievements against targets:</p> <p>Animal Health improved</p> <ul style="list-style-type: none"> - 110,495 cows were inseminated and 42,195 calves were registered. 	

#	Project Basic Information	Details of the project progress	Ranking
	<p>The purpose of this project is to improve the competitiveness of the livestock subsector in regional and international markets.</p> <p>Outputs:</p> <ul style="list-style-type: none"> - Bovine Genetic improved; - Access of vulnerable group/families to livestock through small stock increased; - Animal Nutrition Improved; - Animal Health improved; - Bee keeping and honey value chain strengthened. 	<ul style="list-style-type: none"> - animals were vaccinated against different diseases (Foot Mouth Diseases, Lumpy Skinny Diseases, Rift Valley fever, Brucellosis, and Rabies). <p>Small livestock Distribution</p> <ul style="list-style-type: none"> - 12,254 against 1,194 Pigs were distributed to youth and women cooperatives in Nyaruguru, Nyanza, Karongi and Rusizi. - 142,843 against 15,000 chickens were distributed to youth and women cooperatives in Nyaruguru, Nyanza, Karongi, and Rusizi. - 4,663 of rabbits, 17,631 of goats and 7,153 of sheep distributed 	
	<p>Priority Crop Intensification Project (Including Fertilizer Import (CIP) funded by GoR implemented by RAB</p> <p>FY2021/22 Revised Budget: Frw 2,848,881,661</p> <p>The objective of the project is to increase the productivity levels of maize, rice, wheat, beans, soybean, cassava, Irish potato, and banana country wide.</p> <p>Outputs:</p> <ul style="list-style-type: none"> - Agricultural productivity increased through land use consolidation and use of improved agro-inputs - Increased number and quality of basic seeds produced locally for priority crops - Extension and proximity advisory services to the farmers enhanced; - Capacity development in post-harvest activities strengthened; - Seed quality control insured. 	<p>Annual budget spending: 88%</p> <p><i>Since 2007, the program has been supported regularly the interventions aiming at increasing the productivity levels of maize, rice, wheat, beans, soybean, cassava, Irish potato, and banana country wide through providing inputs, supporting land consolidation, best agro-practices sensitization, among others.</i></p> <p>FY 2021-22 annual achievements against targets:</p> <p>MT of improved seeds timely delivered and used by farmers:</p> <ul style="list-style-type: none"> - 5,912.2MT of improved seeds distributed and used by farmers composed of Maize: 4,123.4, Wheat: 1,477.1 and Soybean: 311.7. The target was 5,707 MT. <p>MT of fertilizers timely delivered and used by farmers:</p> <ul style="list-style-type: none"> - 70,071.4MT of fertilizers were delivered and used by farmers; DAP: 24,590.2MT, Urea: 17,873.4MT, NPK: 21,657.7MT, KCL+Blends: 5,949.9MT. The target was 35,908.1 MT of fertilizers. - 15,857.6 against 16,459 MT of lime was delivered and applied by farmers. 	

#	Project Basic Information	Details of the project progress	Ranking
		<p>Land consolidated and planted</p> <p>In Season 2022A:, 766,750 Ha were planted against 776,651 Ha:</p> <ul style="list-style-type: none"> - Maize: 252,271 Ha - Rice: 14,448 Ha - Beans: 371,277 Ha - Irish Potato: 60,203 Ha - Wheat: 5,784 Ha - Soybean: 4,691 Ha - Cassava: 51,968 Ha - Vegetables: 6,108 Ha <p>In Season 2022B: 539,217 Ha were planted against 536,473 Ha:</p> <ul style="list-style-type: none"> - Maize: 57,593 Ha - Rice: 15,102 Ha - Beans: 342,075 Ha - Irish Potato: 50,607 Ha - Wheat: 34,999 Ha - Soybean: 4,867 Ha - Cassava: 29,567 Ha - Vegetables: 4,407 Ha <p>Through mobilization of farmers and seeds multipliers, the following were realized:</p> <ul style="list-style-type: none"> - Maize Basic seed: 54.1 MT against 50 Certified seed: 5,371.2 MT against 5,000 - Wheat: Basic seed: 76.36MT against 60 Certified seed: 1,281 against 950 - Soybean: Basic seed: 49.4 MT against 60 Certified seed: 517.4 MT against 400 - Rice Basic seed: 51.2 MT against 37. Certified seeds: 753.2 MT against 640 - Irish potato: Basic seed: 2,129.8 MT against 1600. Certified & QDS: 53,649.7MT against 30,000 	

#	Project Basic Information	Details of the project progress	Ranking
		<ul style="list-style-type: none"> - Cassava QDS: 110,257,500 against 110,000,000. - Beans Basic seed: 86.3 MT against 85 Certified seed: 679.86 MT against 650 	
	<p>Sustainable Agricultural Intensification and Food Security Project (SAIP) funded by WB & GoR and implemented by RAB.</p> <p>FY2021/22 Revised Budget: Frw 10,185,530,901</p> <p>The project objective is to increase productivity, market access, and food security of the targeted beneficiaries in the project area. This project was initiated to help farmers in production in selected sites to ensure the sustainability of RSSP 3 and LWH projects.</p> <p>By the end of the project, harvested yield of targeted crops will be increased by 15% whereas the produced commodities in targeted value chain marketed by participating producers increased by 25%. Furthermore, the food consumption score among project beneficiaries will be at 90%</p> <p>-</p>	<p>Annual budget spending: 92%</p> <p>Background: This project became effective on 14th December 2018, and implementation started in April 2019. Here below are the achievements:</p> <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - Improvement of water use efficiency was supported to farmers operating at 435.12 Hectares in (Nyanza-118.3, Karongi-2.9, Muyanza-74, Rwamagana-45, Kayonza-186, Gatsibo-13.2). The target was for 300 Ha. - SSIT establishment was done on 408.6 Hectares (Nyanza-58, Karongi-3, Rwamagana-172, Kayonza-232 Gatsibo-59.5). 607 farmers have benefited these services. - Avocados: 488,000 as planned and Mangoes: 37,561 against 21,000 have been planted. - As planned, Passion fruits: 79,379; Tree tomatoes: 47,110. Papaya: 4,712 have been planted. - As planned, 7,670 tons of compost supplied in Nyanza, Karongi-Muyanza, Rwamagana, Kayonza-Gatsibo and Nyabihu Districts. - As planned, 510 tons of lime were supplied (Nyanza Karongi, Muyanza, Rwamagana-Kayonza, Gatsibo, Nyabihu. - 65,430 against 49,000 people have received improved nutrition services and products - USD 126,027 of credit was mobilized by farmers and farmers' organizations whereas contracts amounting to USD 170,147 was negotiated. - 3783.4 against 2,912 MT of agricultural production processed by post-harvest facilities established with project support 	

#	Project Basic Information	Details of the project progress	Ranking
	<p>The Project for Valorization of Rurambi Irrigation Scheme in Bugesera District funded by GoR and implemented by RAB.</p> <p>FY2021/22 Revised Budget: Frw 1,070,232,086</p> <p>The objective of the project is to rehabilitate the scheme and increase Rice Productivity through improvement of topographical status of land.</p> <p>Outputs:</p> <ul style="list-style-type: none"> - 850 ha valorized - Dykes rehabilitated <p>Annual targets</p> <ul style="list-style-type: none"> - 100 % progress towards completion of dyke increase at 9.4 Km) and other related activities at Rurambi. <p>Location: Bugesera</p>	<p>Annual budget spending: 120%</p> <p>FY 2021-22 annual achievements against targets: Dykes rehabilitated; 100% of 9.4 km constructed for flood protection at Rurambi marshland:</p> <ul style="list-style-type: none"> - The execution of works is completed. Provision handover has been done in February 2022. 	
	<p>Aquaculture and Fisheries Development Project funded by GoR and implemented by RAB</p> <p>FY2021/22 Revised Budget: Frw 799,551,045</p> <p>The objective Fisheries and Aquaculture Development Project (FADP) is about intensification of fish production to increase national fish production from current 31,465 MT to 45,000 MT in 2018/2019 and 65,000 MT in FY2020/21 according to the PSTA 4.</p> <p>Outputs:</p> <ul style="list-style-type: none"> - MT of fish produced - Fingerling production increased and diversified. <p>Location: Rwamagana, Rutsiro, Rusizi, Rulindo, Ruhango, Rubavu, Nyaruguru, Gisagara and Nyarugenge</p>	<p>Annual budget spending: 67%</p> <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - 41,530 MT against 45,000 MT of fish were produced - 38,300,000 against 40,000,000 fingerlings were produced - An online training of technicians from 12 tilapia hatcheries was conducted as planned on 24/06/2022. - As planned; 40,000 brood stocks are being distributed to 13 hatcheries for tilapia breeding. - In order to decrease illegal uncontrolled and unregulated fishing, 10 lake surveillances were conducted in collaboration with Police marine in eastern Lakes, where 1,507 illegal fishing gears, and 600kg of fish illegally captured were seized and destroyed in open view. - As planned, 6 Scientific Manuscripts were produced for fishing research development purpose. - 2 Project Proposals were developed for funding purpose: Development of an inclusive and private led aquaculture and fisheries value chain in Rwanda that contribute to food security, nutrition and economic growth; 	

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		<p>and Building climate resiliency for fisher communities through promotion of fish value chain.</p> <ul style="list-style-type: none"> - Against 100; 40 trainees (youth) have benefited practical training on fish farming at Rwamagana/Munyiginya on Fresh Fish farm. In addition, 70 Cooperative members in fish farming have been trained on site on good farm practices and management. During the training demonstration of fish manipulation was conducted on 12,000 fingerlings that were transferred from happas to cages of KOABANYA. - As planned, one training manual was prepared on Rice-fish integration system in collaboration with FAO. - Research on rice fish farming have been conducted, trials of rice fish integration have been set in Bugugu and Cyimpima and the follow up is ongoing 	
	<p>Partnership for Resilient and Inclusive Small Livestock Markets (PRISM) funded by IFAD, ENABEL, GoR & other stakeholders and implemented by RAB</p> <p>FY2021/22 Revised Budget: Frw 5,824,678,066</p> <p>The project development objective is to improve food and nutrition security and incomes of poor rural households and through better performance of the targeted value chains.</p> <p>Outputs:</p> <ul style="list-style-type: none"> - Small livestock farmers are socially, technically and economically empowered - Value chain actors access improved inputs, services and output markets, - Institutional and policy environment improved. <p>Annual targets</p> <ul style="list-style-type: none"> - Conducting PRISM Project awareness 15 campaigns at District and Sector level - Procurement and distribution of 33,750 Chickens to farmers - Procurement and distribution of 1750 Swine/pigs to farmers 	<p>Annual budget spending: 76%</p> <p>Official launching of the project at National Level, PRISM Project has been officially launched on 8th September 2021 in Nyamagabe District. Different institutions, local government entities, international organizations, development partners, and farmers’ organizations have attended the event either physically or through livestreaming. These include 15 Districts of PRISM operations and respective provinces, MINAGRI, RAB, MINALOC, IFAD, FAO, ENABEL, ORORA WIHAZE, and Security organs.</p> <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - Currently 14 District livestock markets were starting their construction works and 1 of them delaying to start its works due to district wishes to reallocate the initial sites due to other plans on previous sites and these took long time for taking decision and find another appropriate site namely Nyamasheke site. The overall status was estimated at 50.7%. - IFAD provided no objection on the contract for hiring Reserve Force for rehabilitation and upgrading ten (10) Public Pig slaughter slabs and contract was signed by Reserve Force and SPIU/RAB. Construction works are ongoing in Rulindo, Musanze, Gicumbi, Burera, Huye, Ruhango, Nyamasheke, Rutsiro and Karongi Districts. The overall progress works of public pig slaughter slabs is reached at 50%. - The Project mobilized the beneficiaries to establish the Self-Help Groups (SHGs). This activity was completed in all 15 Districts of project 	

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	<ul style="list-style-type: none"> - Rapid market appraisal conducted for the Small Ruminant Value Chains - Construct & equip 20 proximity veterinary posts/clinics. - Conduct ESIA for public slaughter slabs for pigs. - Build/rehabilitate 10 public pig slaughter slabs. - Rehabilitate 15 District livestock markets <p>Location: Musanze, Nyamagabe, Rutsiro, Nyamasheke, Burera, Huye, Gisagara, Ruhango, Rulindo, Gakenke, Nyaruguru, Ngororero, Gicumbi and Karongi District.</p>	<p>intervention zones. In total, out of 244 groups planned, 290 groups were formed (283 groups were validated, 7 groups are on waiting list).</p> <ul style="list-style-type: none"> - As planned, 1577 swine houses constructed by farmers and supported by project for roofing materials. - 3,375 poultry houses constructed by farmers and supported by project for roofing materials - As planned, 748 pigs purchased and distributed to famers in Gisagara, Gicumbi, Ngororero, Rutsiro, Rulindo, Ruhango, Karongi and Huye Districts. - As planned, 18,892 chicken cockles purchased and distributed to farmers - As planned, 12,794 pullets purchased and distributed to farmers - As planned, 3,997 farmers were trained on poultry management - As planned, 2,022 farmers were trained on pig management - As planned, all the 117 Community Facilitators (CFs) were trained in Heifer 12 Cornerstones© and leadership and already engaged in the project`s activities 	
	<p>Horticulture Center of Excellence (HCoE) funded by the GoR and implemented by RAB</p> <p>FY2021/22 Revised Budget: Frw 188,050,360</p> <p>The objective of this project is to transfer of knowledge; capacity building and demonstration; agro-inputs (nurseries for better seedlings and varieties) and fresh produce that will boost the exports</p> <p>Outputs:</p> <ul style="list-style-type: none"> - Training and demonstration horticulture technology & innovation established and operationalized at Mulindi; - Modern horticulture technologies R&D developed and adapted; - Farmers, extension staff, students and researchers trained on modern horticulture technologies; - Clean planting materials produced and disseminated. 	<p>Annual budget spending: 86%</p> <p>Background:</p> <p>This project was initiated to set up a special center for advanced horticulture designed for all levels of the farming community, from small holder farmers to commercial farmers. In partnership with MASHAV (Israel’s Agency for International Development Cooperation).</p> <p>The center displays a wide range of technologies for horticulture productions,</p> <p>FY 2021-22 annual achievements against targets:</p> <p>The following were done at Mulindi/Gasabo Horticulture Center of Excellence:</p> <ul style="list-style-type: none"> - As planned, 3.98 ha were under orchard production using modern technologies (fertigation system). - 8,199 against 4000 clean planting materials of fruits were produced. 	

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		<ul style="list-style-type: none"> - 175,343 against 54,000 clean planting materials of vegetables produced through horticulture innovations. - 60.2 MT against 60 MT of vegetables were produced in the HCoE - 40 extension officers; 2077 farmers; 593 students; 17 researchers were reached through continuous non-formal education on modern horticulture production techniques. The target was 35 Extension officers, 2000 farmers, 150 students, 17 researchers. - 620 against 500 extension materials were developed. - As planned, 6 new horticulture innovations were adopted in the HCoE 	
	<p>Development of market Responsive Plant Varieties and Seed Systems to Reduce Rwanda's Dependency on Seed Importation Project funded by GoR and implemented by RAB</p> <p>FY2021/22 Revised Budget: Frw 1,298,000,000</p> <p>The project objective is to achieve national self-sufficiency in improved seeds and reduce Rwanda's dependency on seed imports by enhancing plant breeding research capacity and developing seed systems.</p> <p>Output:</p> <ul style="list-style-type: none"> - Upgraded laboratories with advanced equipment; - Old screen houses rehabilitated, and new ones constructed; - Irrigation facilities to support research for breeding new varieties acquired and installed; - New varieties, pest and disease management technologies and good agronomic practices developed; - High quality, disease cleaned TC (Tissue Culture) planting materials produced. 	<p>Annual budget spending: 78%</p> <p>FY 2021-22 annual achievements against targets:</p> <p>In order to enhance plant breeding research capacity and developing seed systems, the following were done;</p> <ul style="list-style-type: none"> - As planned, 12 bio-fortified potatoes, 5 bio-fortified beans, 2 bio-fortified cassavas, 3 bio-fortified sweet potato trials were conducted. - 8 against 10 demonstration plots of biofertilisers use (4 in season A, and 4 in season B) were established in Huye and Nyanza - As planned, 2 Protocols developed (Oyster mushroom and ganoderma were tested in Rwandan agro-ecology). - As planned, cleaning of viral crop diseases was initiated for cassava, and use of molecular markers in crop breeding was initiated as well. - Five new biofertiliser strain was characterized for new protocols for biofertiliser strians development. - 8 against 5 coffee commercial varieties were purified - 4.3 against 5 MT coffee clean seeds were produced - 58 against 60 private coffee seed multipliers were trained on coffee seeds business - tissue culture plantlets, and mini-tubers (Cassava: 3,500, Sweet potato: 4,529, Banana: 1000, Irish potato: 396,303) were produced and distributed. The target was; cassava: 5000, sweet potato: 4000, banana: 2000, and potato: 400,000. - Cassava: 100,000 as planned, Irish Potato: 3,045 against 6,045 MT seeds were produced 	

#	Project Basic Information	Details of the project progress	Ranking
	<p>Development of efficient and inclusive market-systems for value chains of poultry and pig industries Project funded ENABEL and implemented by RAB</p> <p>FY2021/22 Revised Budget: Frw 2,692,490,185</p> <p>The objective of the project is to ensure the development of the more efficient inclusive market-systems for the value chains of poultry and pork.</p> <p>Outputs:</p> <ul style="list-style-type: none"> - Priority investments in pig and poultry value chains are realized by the private sector - Productivity and profitability in poultry and pig value chains increased - Affordable and quality feed, which includes locally sourced soya and maize ingredients supplied by the feed industry <p>Annual targets</p> <ul style="list-style-type: none"> - Number of Livestock FFS established - Poultry and pig nutrition technologies established and Evaluated - Poultry and pig genetic improvement Technologies established and evaluated - Poultry and pig genetic health technologies established and evaluated. <p>Location: Muhanga, Nyamasheke, Gasabo, Rwamagana, Rusizi, Gatsibo, Rubavu, Musanze, Huye, Burera and Bugesera</p>	<p>Annual budget spending: 56%</p> <p>This project is implemented together with PRISM (Partnership for Resilient and Inclusive Small Livestock Markets Programme) which is the interdependent project to this component/project funded by ENABEL.</p> <p>The overall of this project is to reduce poverty by empowering poor rural men, women and youth to participate in the transformation of the Rwanda livestock sector and to enhance their resilience.</p> <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - 600 groups (410 poultry groups for chicken farmers and 190 pig groups for pig farmers) were formed by Farmer facilitators whereas 15000 farmers including (9300 poultry farmers and 5700 pig farmers) are benefiting the extension services - 3 technologies in nutrition were evaluated for Poultry and pig genetic health improvement. - Two technologies in diseases diagnostic were improved in pigs and poultry (Utilization of PCR in testing ASF, Utilization of Avian Influenza Kits, Newcastle and Gumbolo kits). In addition, the animal health reagents and consumables were delivered to RAB laboratory to diagnose pig and poultry diseases whereas the control of swine Erysperas is being done by using the Erysperas vaccine. - 42 FFS facilitators were trained, and so far, the total of Maize and soybean facilitators are 114 FFS facilitators. 4500 farmers were trained on Soybean and maize, therefore, 30 big sites are under soybean and maize production 	
	<p>Rural Poor Stimulus Facility (RPSF) project funded by IFAD and implemented by RAB</p> <p>FY2022/22 Revised budget: Frw 890,699,828</p> <p>The IFAD funded project is new (came in revised budget) with the objective of Supporting smallholder farmers to mitigate COVID-19 related shocks by improving their food security, resilience and livelihood status.</p>	<p>Annual budget spending: 121%</p> <p>The following are the planned interventions to support the smallholder farmers to mitigate COVID-19 related shocks. Here below is the progress status on implementation of Rural Poor Stimulus Facility (RPSF) Project.</p> <p>Achievements against Annual targets</p> <p><i>Provision of agriculture inputs and basic assets for production</i></p> <p>Purchased and distributed Improved seeds and planting materials:</p>	

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	<p>Outputs:</p> <ul style="list-style-type: none"> - Provision of agriculture inputs and basic assets for production - Facilitation of access to markets 	<ul style="list-style-type: none"> - 5,400 Kg of hybrid maize (RHM1407) against 1000 Kg were distributed and planted by the beneficiaries located in 5 Sectors (Rweru, Rilima, Mayange, Mwogo, and Juru) of Bugesera District. - 5,000 Kg (RWR3194) certified beans against 10,000 kg were distributed and planted by the beneficiaries of Bugesera, Kayonza, Kirehe, and Rusizi Districts who are more affected by drought that happened in the last agricultural season 2022A and affected by the effects of COVID-19. - 3,470,712 against 5,00,000 certified sweet potato vines were planted by farmers of Kayonza, Kirehe, and Rusizi Districts for the increase of availability for stable crops to the farmers who are more bitted by long drought for increasing the production and productivity in season B. <p>Purchased and distributed Inorganic Fertilizers</p> <ul style="list-style-type: none"> - 21,600 Kg of DAP against 40,000 kg were purchased, distributed and applied by the beneficiaries located in 5 Sectors (Rweru, Rilima, Mayange, Mwogo, and Juru) of Bugesera District. - 21,600 Kg against 10,000 of Urea were purchased, distributed and applied by the beneficiaries located in 5 Sectors (Rweru, Rilima, Mayange, Mwogo, and Juru) of Bugesera District. 	
	<p>Improving coffee production, productivity and quality funded by GoR and implemented by NAEB</p> <p>FY2021/22 Revised Budget: Frw 2,190,200,000</p> <p>The objective of the project is to increase coffee production and productivity as well improving coffee quality. The Coffee production volumes will be increased (2.8 to 3.0kg/tree).</p> <p>Outputs:</p> <ul style="list-style-type: none"> o Coffee inputs acquired and distributed o Coffee seedlings produced. o Extension services supported. o Coffee Washing Stations constructed. 	<p>Annual budget spending: 99.9%</p> <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - 15,303 MT against 23,241 MT of coffee were exported - 76,165,470 against 82,000,000 USD were generated from coffee exported. - As planned, 2,690 new Ha were planted with coffee seedlings during FY 2021/2022. - 3,466.5 MT of coffee fertilizers were purchased and applied. This was composed by 2,351 MT purchased by NAEB and the remaining by CEPAR. 	
	<p>Tea expansion project funded by GoR and implemented by NAEB</p>	<p>Annual budget spending: 100%</p>	

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	<p>FY2021/22 Revised Budget: Frw 1,573,300,000</p> <p>The objective of the project is to Increase tea production and export through supporting in the expropriation, Resettlement & livelihood restoration, Expansion program & seedlings production, and factories construction.</p> <p>Outputs:</p> <ul style="list-style-type: none"> - Tea inputs acquired and distributed - Land acquisition at Rugabano, Munini & Kibeho completed. - Rwanda tea promoted & branded. - 404 households resettled at Rugabano. - 128 houses constructed in Nyaruguru 	<p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - 102358280 against 99,750,000 USD generated from tea exports. - 2,142 against 1,012 Ha was planted with prepared tea seedlings including 173 Ha for Unilever Phase II. - 35,121.5 MT against 35,383 MT of made tea was produced - As expected, during FY 2021/22 a total of 12,523.9 MT was purchased and distributed. Among them 5,776.9 MT was delivered to tea factories/cooperatives for Season A 2022, whereas Season B 2022 a total of 6,747 MT of fertilizers was distributed. - During FY 2021/2022, a total of 5,000 Tea pluckers as planned were trained in tea plucking skills and post-plucking leaf management in all tea factories and cooperatives. - For tea planting materials; 10,446 MT of sheeting and 13,935 MT of tubings were distributed to four cooperatives of RUTEGROC, HOT/SORWATHE, COOTHECYAKA, COTHEGAB. - Activities for land expropriation for tea expansion in Nyaruguru weren't done in the FY 2021/2022 as targeted. This was due to insufficient funds for the activity. 	
	<p>Commodity Chain Programme (Horticulture Intensification and quality Management) funded by GoR and implemented by NAEB</p> <p>FY2021/22 Revised Budget: Frw 128,365,000</p> <p>The objective of the project is to support and develop the horticulture value chain and new agricultural export chains.</p> <p>Outputs:</p> <ul style="list-style-type: none"> - Horticulture marketing exhibitions held/supported exports increased; - New Horticulture chains supported (avocado, macadamia, Geranium, Patchouli, Chili, etc. 	<p>Annual budget spending: 90.7%</p> <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - 11,438,563 against 31,905,000 USD were generated from horticulture exports - 13,256.104 against 33,235 MT of horticulture exported - As planned, 150 ha were planted with Macadamia and Avocado. - As planned, 12 pest and disease surveillance and 10 interventions on horticulture crops was carried out. - As expected, 2 marketing operations on horticulture exports were conducted through attending exhibitions of SIA in Paris and AGRITEQ in Doha. - As planned, Emerging commodities value chain standards and regulatory compliance were monitored including; Meeting with dry chili pepper exporters to China on compliance with market requirements and discussion process on meat export from Rwanda to UAE by completing questionnaire on compliance with veterinary requirements. 	

#	Project Basic Information	Details of the project progress	Ranking
		<ul style="list-style-type: none"> - As planned, 11 new commercial exporters for horticulture business were assisted in complying with market and issued with export licenses. - As planned, Data on fruits, flowers and vegetables for export for enhanced analytics was updated. 	
	<p>Flower Park Construction funded by GoR and implemented by NAEB</p> <p>FY 2021/22 budget: Frw 3,000,000,000</p> <p>The objective of the project is to create competitive advantages in Rwandan floriculture by providing incentives to local and international investors such as provision of suitable land and facilities, to stimulate investment in floriculture and make Rwanda a player in the global market.</p> <p>Outputs:</p> <ul style="list-style-type: none"> - 100 Ha for flowers acquired and operationalized; - Flower exports increased; - Private investors mobilized. 	<p>Annual budget spending: 100%</p> <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - 6,865,261 against 8,093,855 USD were generated from Exported flowers - 41,118,968 flower stems were exported during FY 2021/2022 by companies of Bella flowers, Blooms hills, Bright harvest, T-M quality production and Jotete investment company. The target was 40,825,000 stems. - Cumulative planted area with roses is 45 Ha. However, Phase 4 construction of greenhouses haven't started yet however civil works and land levelling of greenhouses 5, 6, & 7 have been completed. The target was to have 10 Ha done in 2021/22 FY. - 	
	<p>Sericulture Project funded by GoR and implemented by NAEB</p> <p>FY 2021/22 budget: Frw 412,635,000</p> <p>The objective of the project is to increase production of Cocoons in Rwanda in both quantity and quality. This project tackles on sericulture extension services (mobilization & mulberry plantations) as well as the construction of some infrastructures such as silkworms' collection centers. The project was helping in the implementation of a 10 years' partnership MoU that was signed between GoR and HEWorks/Korean Investor to operationalize the Silk factory (constructed under IFAD funded project/PRICE). Unfortunately, this contract was terminated.</p> <p>Output:</p>	<p>Annual budget spending: 99.4%</p> <p>FY 2021-22 annual achievements against targets:</p> <ul style="list-style-type: none"> - Silk factory was well managed. However, there is still mobilization of investor in its operationalization to start production. The contract negotiation is still being done by RDB. - 10 Sericulture technicians were availed in support silk worm eggs production and expected to be increased next fiscal year after acquiring a new investor - 1,159.5 young silkworms were distributed and supported to farmers for production rearing. The target was to produce 3,500 silkworms. - 15,452.3 kg of fresh cocoons were produced. The target was 50 MT of cocoons. - The Projected targets by 2024 is to plant 5000ha with Mulberry. So far 2,815 ha are planted with mulberry countrywide. - <p>Challenges:</p>	

#	Project Basic Information	Details of the project progress	Ranking
	<ul style="list-style-type: none"> - 3 silk/mulberry collection centers rehabilitated and operationalized in Gatsibo, Nyanza and Karongi. - Farmers supported with planting materials - 1 egg production constructed at Nyanza - Sericulture Factory equipped at Special Economic Zone 	<ul style="list-style-type: none"> - The Sericulture project suffered financial gap after the investor (HEworks) left the sector in 2019. For the sector's sustainability, NAEB had not only to acquire HEworks' assets (factory machines and six sericulture centers' assets across the country) but also maintain the provision of extension services and purchase of cocoons from farmers. Some of the activities that were put on hold are: farmers training in mulberry production, supporting farmers with iron sheets for constructing rearing houses, sericulture saplings production and planting, etc. - The new investor was mobilized and approved by the Public Investment Committee meeting of 14th February 2022. So far the contract negotiations with the bidder are ongoing at RDB. - 	