Dereva Hotel – Rwamagana DistrictWednesday, 12th June 2019

Report on Maize Value Chain Round Table

Theme: "*Creating the Future of Maize Value Chain in Rwanda: Challenges & Opportunities*"

TABLE OF CONTENTS

Executive Summary and Information about the CREATE Rwanda Project..... 3

Welcome speech Bralirwa plc (Heineken International)..... 5

Agenda..... 6

Farm to market alliance – Rwanda 2017/18 Season review and way forward 8

Aggregation Challenges (East African Exchange)..... 12

Aflatoxin Mitigation (IITA)..... 14

How to have a sustainable maize value chain? 23

Awarding Ceremony..... 32

Closing Remarks and Lessons Learned 33

Concluding Workshop Recommendations 37

EXECUTIVE SUMMARY

This report records the proceedings of the roundtable meeting on Maize Value chain with the theme: **"Creating the Future of Maize Value Chain in Rwanda, Challenges & Opportunities".** As the CREATE project comes close to its closure, EUCORD organized together with BRALIRWA Plc and its partners a roundtable meeting on the Maize Value Chain**.** The event took place on June 12th 2019 at Dereva Hotel in Rwamagana District, Eastern Province.

The roundtable meeting gave various stakeholders in the maize value chain the opportunity to share and learn from each other and come up with key resolutions on building a **viable and sustainable maize value chain in Rwanda**. The key actors in the maize value chain were present, including AIF, Bralirwa, EAX, ICCO Cooperation, IFC, Kumwe Logistics, Prodev, Minimex, MINAGRI/RAB, and WFP/FtMA. Right after the meeting, there was an award ceremony for outstanding cooperatives that have worked with the CREATE project over the last 5 years.

The **main objectives** of the roundtable were:

- To identify the challenges and opportunities in the maize value chain in Rwanda
- To address the important challenge of aflatoxin mitigation
- To have an open Discussion on how to have a vibrant and sustainable maize value chain
- To discuss the way Forward to close the gap between supply and demand
- To provide a platform to network, share experiences and identify areas of further interventions
- To identify core recommendations and lessons learned from the CREATE project in Rwanda

The CREATE Rwanda Project

The CREATE Rwanda project aims to increase maize productivity and establish linkages from farmers, to processors and to HEINEKEN's operating company **BRALIRWA (**Heineken Group)**.** It has been funded by the Netherlands Ministry of Foreign Affairs (MinBuZa), Heineken International and IFC. The **CREATE program works since 2014 on strengthening and improving of the maize value chain in Rwanda**.

Since then the CREATE Rwanda Project can count several **successes**: the number of cooperatives has increased from 20 to 50, and the number of participating households from 3,256 to 15,598. The volume of maize sold to ProDev has increased from 693 tons in 2015 to 4,718 tons in 2018, thanks to increases in the cultivated area and maize productivity improvement from less than 2 MT/ha to an average of 3 MT/ha. The expansion of activities is done partly in collaboration with **RWARRI** (Rwanda Rural Rehabilitation Initiative), a local NGO supported by WFP under its FTMA (Farm to Market Alliance) program.

CREATE Rwanda has been training farmer cooperatives on improved agronomic practices, facilitating access to improved inputs (seed and fertilizer), arranging contracts between cooperatives and the buyer (ProDev), and facilitating maize collection, drying, shelling, storage and transport.

After the first full year of the project, several other **challenges** were identified that were important for the **long-term sustainability of the value chain**. The key areas identified were: cooperative business skills development, resilience to drought and improved practices to reduce post-harvest losses (which was reaching up to 30%, currently estimated to be 15%). This led to a collaboration between the CREATE project and IFC, which started in 2015 with an expanded scope to include:

1. Enhancing the leadership and management of cooperatives (using SCOPE Insight tools);
2. Improving climate resilience with the introduction of small-scale irrigation technologies; and
3. Initiating contacts to assist cooperatives to gain access to finance

WELCOME SPEECH BRALIRWA PLC (HEINEKEN INTERNATIONAL)

Dear Stakeholder/Partner,

BRALIRWA Plc, a subsidiary of HEINEKEN International in its brewing process have been using maize grits as an adjunct. Maize grits is one of the byproducts of maize grain currently they are supplied by a local miller, MINIMEX. In order to meet maize grits needs, the amount of locally sourced maize needed to be increased to reduce the quantity of imported maize. It is in this regards that in 2013 BRALIRWA Plc in partnership with EUCORD Rwanda have been implementing a project called **"Community Revenue Enhancement through Agricultural Technology Extension project otherwise known as CREATE"**. The project was funded by the Netherlands Ministry of Foreign Affairs, HEINEKEN International and International Finance Corporation (IFC). The aim of the project was to **limit the dependency on imported maize in Rwanda**. CREATE project provided training to farmers on **improved agronomic practices, facilitating access to seed and fertilizer, arranging contracts between cooperatives and the buyer, and training farmers on post-harvest handling**. The project also conducted demonstrations on new production technologies, such as the use of maize hybrids and micro-nutrients.

As the project come close to its closure, BRALIRWA Plc and its partners are organizing a **roundtable meeting on Maize Value chain with theme: "Creating the Future of Maize Value Chain in Rwanda, Challenges & Opportunities"**. The roundtable meeting will give various stakeholders in the maize value chain opportunity to share and learn from each other and come up with key resolutions on building a viable and sustainable maize value chain in Rwanda. Right after the meeting, there will be an award ceremony for outstanding cooperatives that have worked with the CREATE project over the last 5 years. Both events are scheduled to take place on June 12th 2019 at Dereva Hotel in Rwamagana District, Eastern Province.

It is in this regards that you are cordially invited to this roundtable meeting and also in the CREATE Cooperative Award Ceremony. Attached here the agenda of the day. For confirmation and additional information reach out to Mr. Fabien NGOGA on +250788350101 or fabien.ngoga@heineken.com.

Yours sincerely,

Merid Demissie

Managing Director

Bralirwa

PART OF THE HEINEKEN COMPANY

AGENDA

Maize Value Chain Round Table
Theme: "*Creating the Future of Maize Value Chain in Rwanda: Challenges & Opportunities*"
Dereva Hotel – Rwamagana District
Wednesday, 12th June 2019
Agenda

Time	Topic	Lead
09:00-09:10	Introduction of Participants	Fabien
09:10-09:15	Welcome Remarks	Paul Stanger/ MD BRALIRWA / Mayor of Rwamagana
09:15-09:30	Opening Remarks	Representative of MINAGRI
09:30-09:45	Maize value chain Challenges & opportunities & Lessons learned	Niels, Fabien, Jean Paul – CREATE Project
09:45 – 10:00	Maize value chain Challenges & opportunities & Lessons learned	Farmer Representative
10:00 – 10:15	Maize value chain Challenges & opportunities & Lessons learned	Ammar KAWASH - FTMA/WFP
10:15 – 10:30	Maize value chain Challenges & opportunities & Lessons learned	Joshua RUGEMA - EAX
10:30 - 10:45	Maize value chain Challenges & opportunities & Lessons learned	Prosper NDAYIRAGIJE - AIF
10:45 – 10:55	IITA: Aflatoxin Mitigation	Madjaliwa Nzamwita
10:55 - 11:15	Maize Value Chain Sustainability	Director General, RAB
11:15 - 11:30	Health Break	
11:30 – 12:30	▪ Open Discussion on how to have a vibrant and sustainable maize value chain? ▪ Way Forward to close the gap supply and demand	Moderator: Carian of Netherlands Embassy
12:30 – 12:45	Closing Remarks	Representative of MINAGRI

CREATE Cooperatives Award Ceremony
Dereva Hotel – Rwamagana District
Wednesday, 12th June 2019
Agenda

Time	Topic	Lead
13:30 – 14:00	Arrival of Participants and Registration	BRALIRWA/ EUCORD
14:00 - 14:10	Introduction of Participants	BRALIRWA/ EUCORD
14:10 - 14:20	Welcome Remarks	BRALIRWA MD: Merid Demissie
14:20 - 14:30	Opening Remarks	Guest of honor
14:30 – 14:45	Presentation on CREATE Program and Way Forwards	Fabien Ngoga
14:45 – 15:45	Awarding Ceremony	Niels, Fabien, Invitees
15:45 - 16:00	Closing Remarks	Paul Stanger MINAGRI Representative
16:00 – 17:00	Cocktail party	BRALIRWA
17:00 –	Departure	

FARM TO MARKET ALLIANCE – RWANDA 2017/18 SEASON REVIEW AND WAY FORWARD

Rwanda FtMA value chain partners

VC partners on the Rwanda Platform

Off-takers: RGCC LTD, SARURA COMMODITIES, ProDeV

EAX EAST AFRICA EXCHANGE, Africa Improved Foods

Financial institutions: KCB, CLECAM EJOHEZA

Funders: USAID, UKaid, AGRA, Rabobank, IFC

FARM TO MARKET ALLIANCE, WFP

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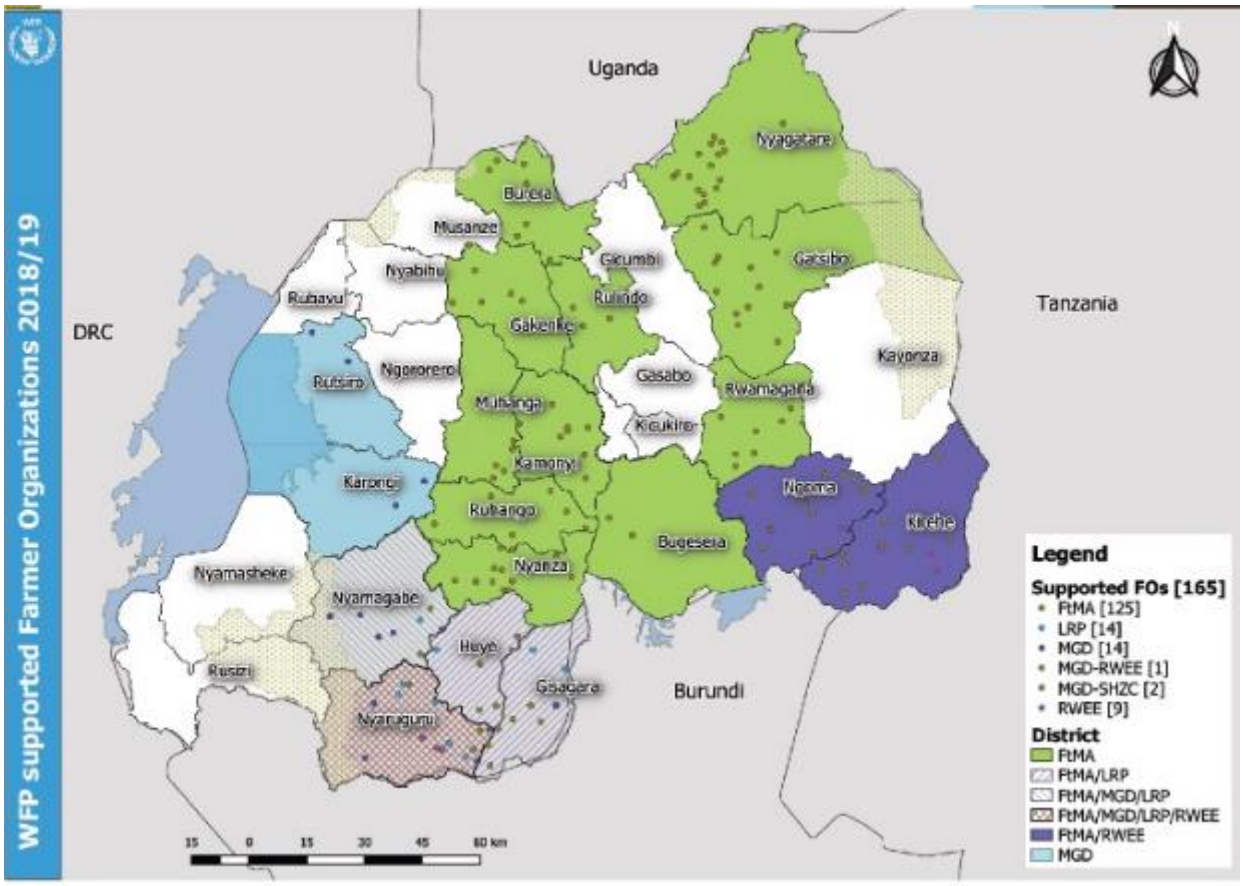

Rwanda FtMA 2018C & 2019A at a glance

- 162 cooperatives with more than 54,000 members in 17 districts connected to markets
- 152 forward delivery contracts signed for 9,150 MT of maize (average of 60 MT per cooperative)*
- 25 cooperatives accessed RWF 261 million (~USD 290,000) in facilitated credit
- 29,500 farmers (46% women) trained on Good Agriculture Practices (GAP)
- 28,800 farmers (47% women) trained on Post-harvest handling and storage (PHHS)
- 2,200 MT of improved inputs (seeds, fertilizers) purchased by FtMA-supported farmers

*Excludes COAIGA cooperative which signed 3,000 MT contracts with 3 buyers.

FARM TO MARKET ALLIANCE WFP

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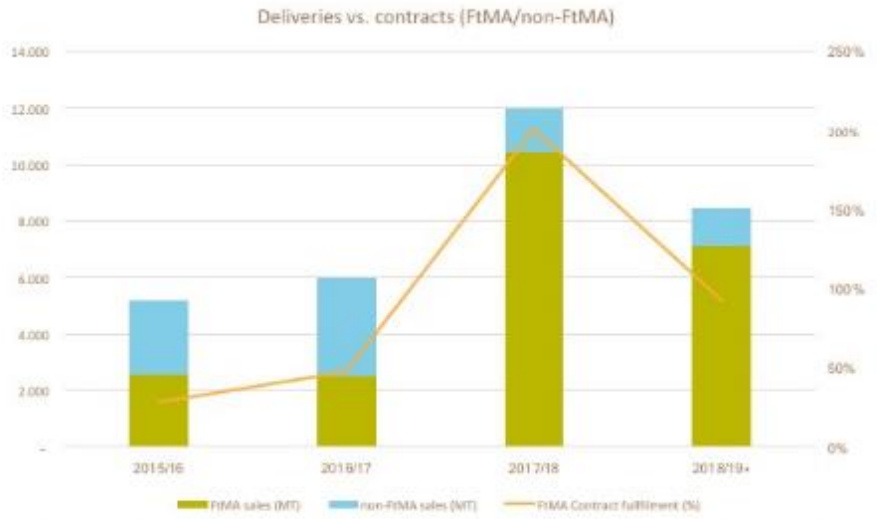
Deliveries vs. contracts (FtMA/non-FtMA)



FARM TO MARKET ALLIANCE WFP

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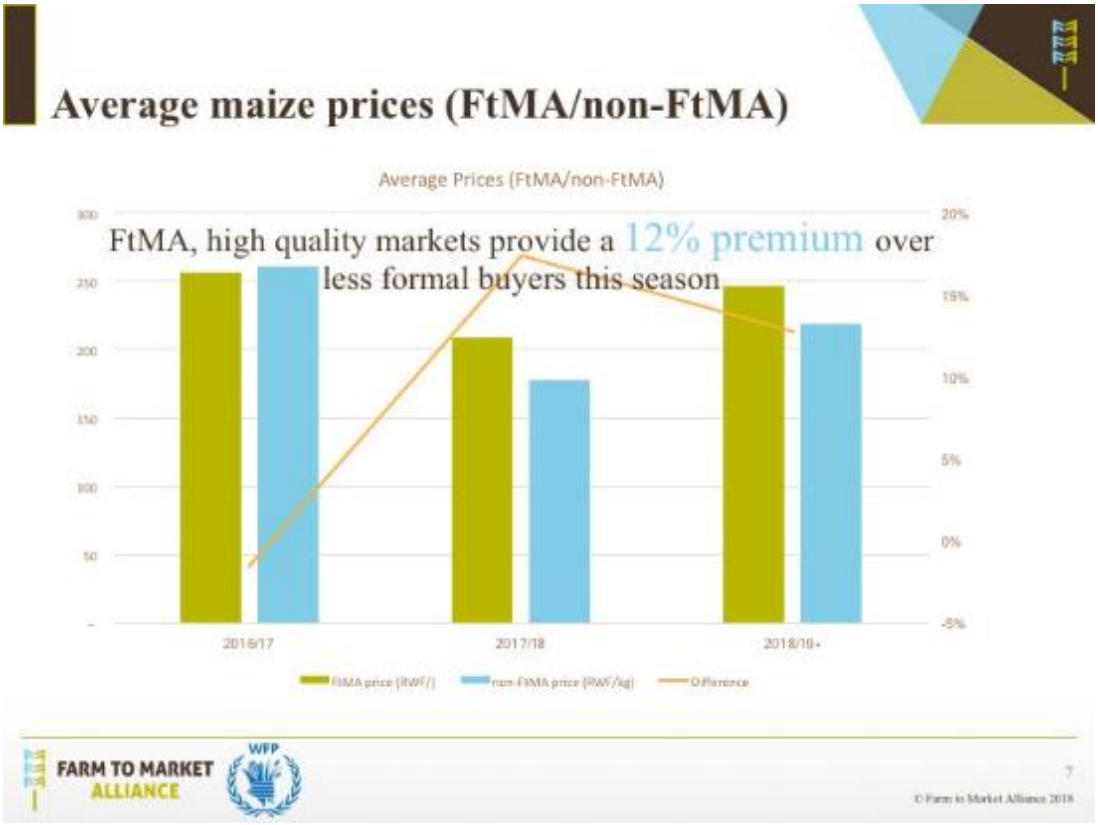
Average maiden prices (FtMA/non-FtMA)
Average Prices (FtMA/non-FtMA)
FtMA, high quality markets provide a 12% premium over less formal buyers this season
2016/17
2017/18
2018/19
FARM TO MARKET ALLIANCE
WFP


FARM TO MARKET ALLIANCE
Murakoze Cyane!
syngenta
Rabobank
IFC
BAYER
AGRA
YARA
GROWAFRICA

AGGREGATION CHALLENGES (EAST AFRICAN EXCHANGE)

EAX
EAST AFRICA EXCHANGE

Connecting Markets. Growing Trade.

EAX
EAST AFRICA EXCHANGE

AGGREGATION CHALLENGES

- Quality issues
- Poor post-harvest handling and knowledge gap for farmers
- Fragmented supply from farmers and low volumes
- Limited access to market and market information
- Limited access to finance

EAX SOLUTIONS

- Professional storage infrastructure
- Collateral management services
- Trainings and capacity building for farmers
- Market data dissemination
- Electronic Warehouse Receipt financing

Thank You

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Kiyovu, Nyarugenge
Phone: 0788 19 7000

AFLATOXIN MITIGATION (IITA)

DEREVA, Rwamagana, 12 June, 2019

Safer Crops, Better Health, and Higher Income:

Aflatoxin Biocontrol

Madjaliwa Nzamwita
On behalf of
Aflasafe Team and African partners

Two phases of contamination

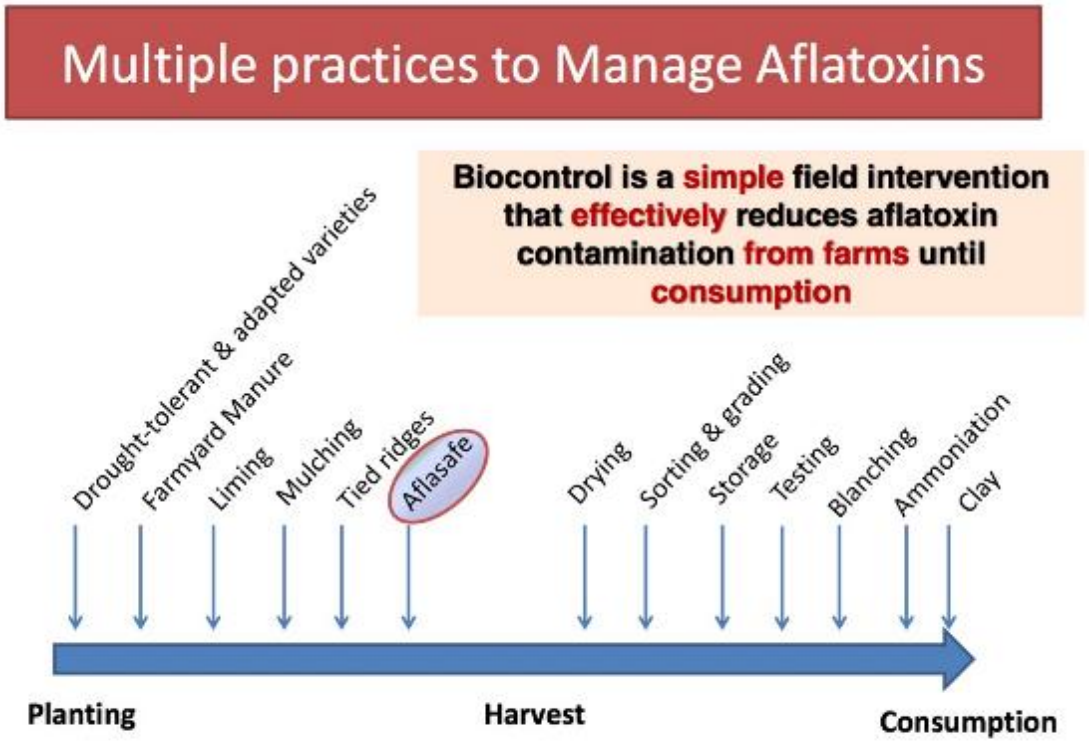
Intervention needed in this phase

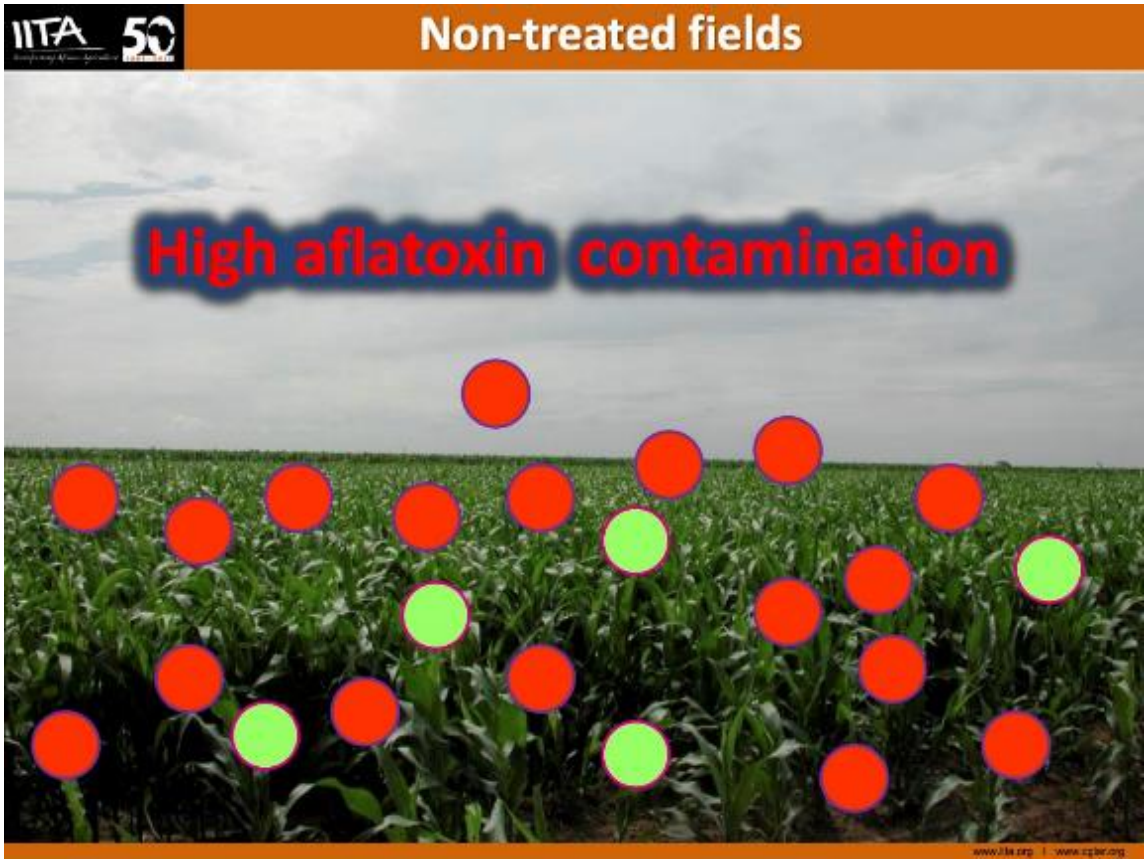
Phase I: Before Crop Maturity

- Developing crops become infected
- Associated with crop damage (insect, bird, stress)
- Favored by high temperature and dry conditions

Phase II: After Crop Maturity

- Aflatoxin increases in mature crop
- Seed is vulnerable until consumed
- Rain on the mature crop increases contamination
- Associated with high humidity in the field & store, insect damage, improper crop storage or transportation


Multiple practices to Manage Aflatoxins
Biocontrol is a simple field intervention that effectively reduces aflatoxin contamination from farms until consumption
Drought-tolerant & adapted varieties
Farmyard Manure
Liming
Mulching
Tied ridges
Aflasafe
Drying
Sorting & grading
Storage
Testing
Blanching
Ammoniation
Clay
Planting
Harvest
Consumption

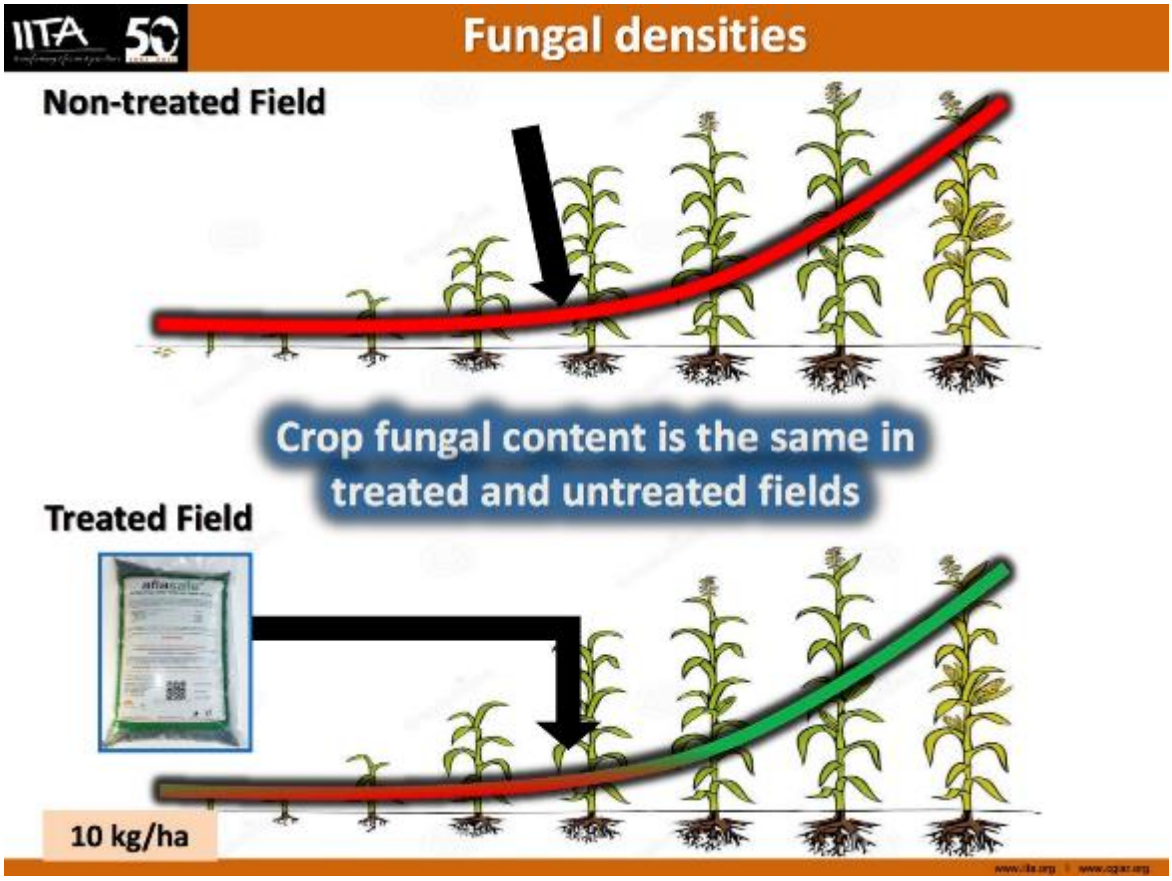

IITA
Non-treated fields
High aflatoxin contamination

Treated fields

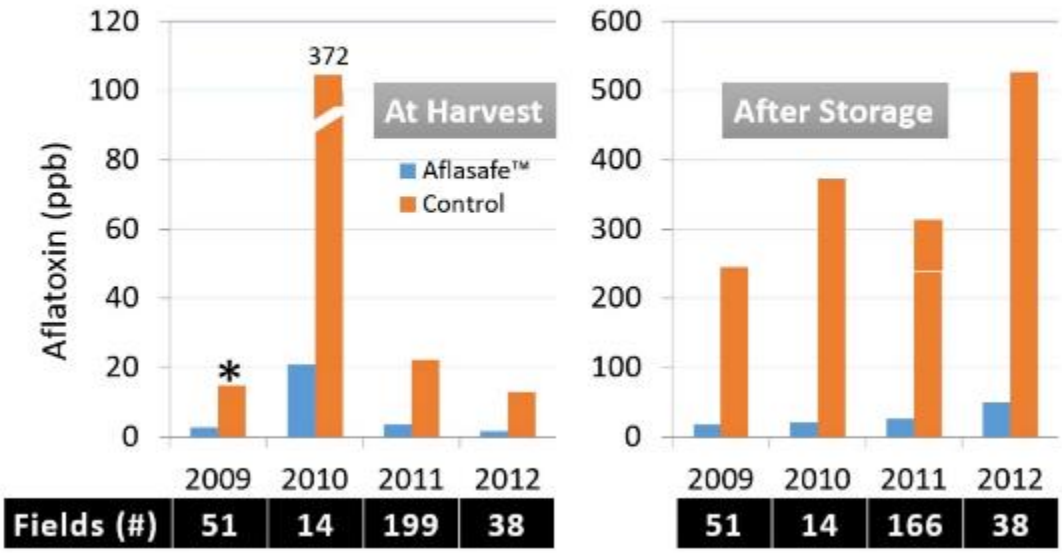
Development of Aflasafe products

- **Collection and identification of isolates**
  - Over **5,000** individuals of *Aspergillus flavus*
  - Identification of atoxigenic strains **native** to major producing areas of **target nations**
  - Determination of reasons of **inability** to produce aflatoxins
- **Four atoxigenic strains** selected to create **an aflasafe product**
- Tests to ensure **biosafety** of the atoxigenic isolates
- **Efficacy trials** in farmer fields (over **80% reduction**)
- Development of methods for **mass production** of aflasafe
- **Scale-up** and **commercialize** Aflasafe products


Aflasafe Production


IITA
50
Fungal densities
Non-treated Field
Crop fungal content is the same in treated and untreated fields
Treated Field
10 kg/ha

Nigeria: Efficacy trials on Maize



3 active manufacturing plants: Nigeria, Kenya, Senegal

4 manufacturing plants planned: Tanzania, Rwanda, Mali, Mozambique

2 exclusive distribution agreements in place: Ghana, Burkina

6 tech transfer counterparts selected

enough aflasafe sold to protect **185,730 ha** *(2/3 of this in Nigeria, 1/2 thanks to AgResults)*

Impacts (2013-2017)

- 32 agribusinesses
- 49,500 farmers
- 63,000 ha maize grown
- 600 tons Aflasafe purchased

Productivity: 3.1 tons/ha compared to 1.5 tons/ha national average

Grain lots (n = 2,362) with aflatoxin concentration	%
<4 ppb	90%
<10 ppb	94%
<20 ppb	96%

Meets food safety standards

More income

194,310 tons of grains harvested

- 57% aggregated for sale
- 27% consumed at home
- 16% sold in local market

More trade

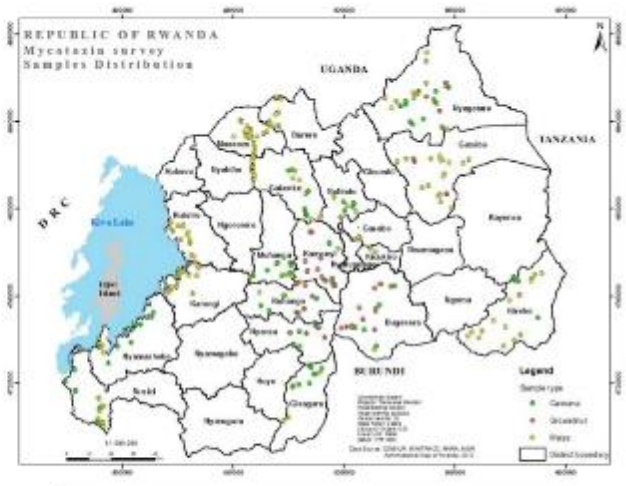
Better health

- 10.7% premium in the market over normal maize
- $1.491 million in net earning from premium

IITA 50 Rwanda Mycotoxin Project (2013-

Mycotoxin analysis

- 329 maize samples
  - 175 pre-harvest
  - 144 post-harvest
- 222 cassava samples
  - 114 chips
  - 108 processed.
- 35 groundnut samples



IITA and IFA-Tulln

IITA and USDA-ARS

Biocontrol

- 175 pre-harvest maize
- 35 groundnut samples

Aflatoxin levels in maize in farmers'

At harvest

Province	Samples (No)	Aflatoxin (ppb)		Samples exceeding limits (%)		
		Mean	Maximum	EU	EAC	US-FDA
Eastern	50	6	19	76	6	0
Northern	40	9	19	98	38	0
Southern	20	7	13	75	15	0
Western	65	6	15	68	6	0
Overall	175	7	19	79	16	0

EU: 4 ppb EAC: 10 ppb US-FDA: 20 ppb

Aflatoxin producing potential of

Province	Isolates (No.)	Aflatoxin potential (ng/g)		Proportion of strains (%)	
		Mean	Maximum	Atoxigenic	Toxigenic
Eastern	271	1,118	8,953	24	76
Northern	249	610	7,784	43	57
Southern	297	1,135	23,499	19	81
Western	399	592	7,984	35	65
Overall	1,216	863	23,499	30	70

Eastern: Bugusera, Gatisibo, Kirehe, Nyagatare
Northern: Burera, Gakenke, Musanze, Rurindo
Southern: Gisagara, Kamonyi, Mahunga, Ruhango
Western: Karongi, Nyabihu, Nyamasheke, Rusizi, Rutsiro

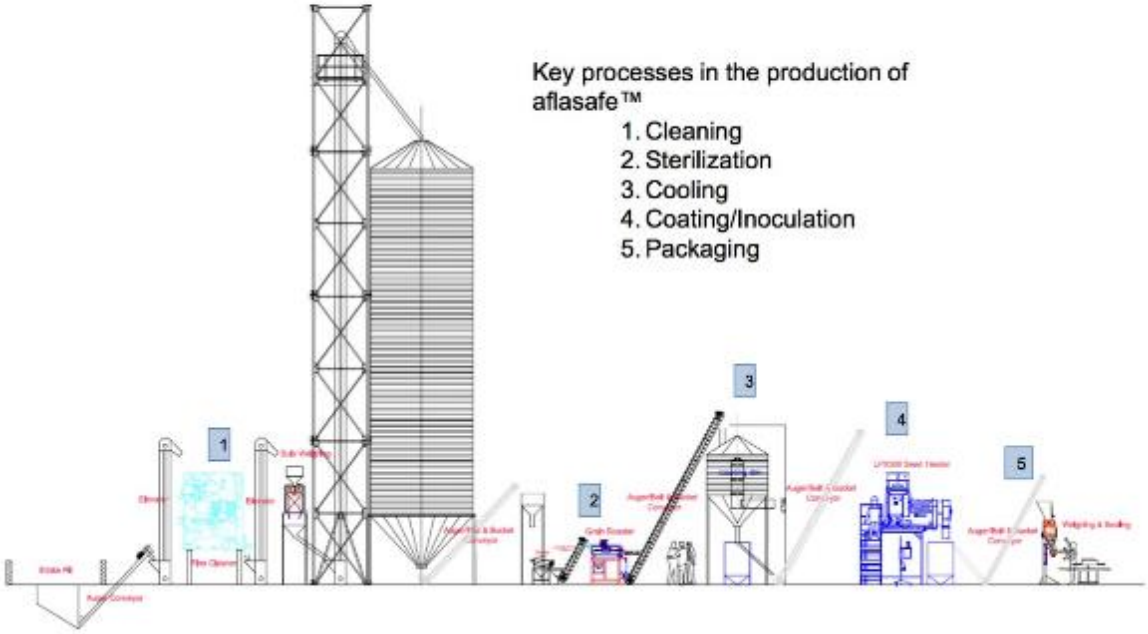
Conclusions from on-going work

- Extensive field, microbiology and DNA analysis
- Four genetic groups constituting the registered biocontrol product **Aflasafe KE01** commonly co-occur in **Uganda, Kenya and Burundi BUT not in Rwanda**
- **Rwandan strains are genetically unique**
- Identified genetic groups that occur in high frequency in several parts of Rwanda
- An Aflasafe product, with Rwandan atoxigenic strains as the active ingredients, can be tested in efficacy trials

Making Biological Control Commercial Ready and Incorporating its Use in Integrated Management of Aflatoxin in Rwanda

Goal: To contribute to food safety and security, income, and regional trade by availing to the market a suitable package for aflatoxin mitigation strategies centered in employing atoxigenic strains of *Aspergillus flavus* as biocontrol agents and good post-harvest practices for use in Rwanda.		
Outcome 1: Increased adoption of aflatoxin mitigating technologies.	**Outcome 2:** Increased access to knowledge about aflatoxin and use of aflatoxin management strategies.	**Outcome 3:** Increased commercialization and availability of an Aflasafe product in Rwanda.
Outputs		
1.1 Developed and registered one Aflasafe product for use in Rwanda that will reduce aflatoxin content by at least 80%. 1.2 Established 360 farmers' fields to test the Aflasafe product.	2.1.1 Capacity of farmers and other value chain actors built on usage of the Aflasafe technology and other aflatoxin management strategies, and their benefits.	3.1.1 Developed and implemented strategy to guide Aflasafe technology transfer and commercialization. 3.1.2 Commercialized Aflasafe product 3.1.3 Private sector manufacture and distribute, or procure, Aflasafe to cover at least 50,000 ha in 5 years.
Activities		
1.1.1 Select atoxigenic strains. 1.1.2 Formulate product for testing. 1.1.3 Select and train 360 farmers to conduct efficacy trials of Aflasafe in their fields. 1.2.1 Prepare and submit dossier for registration of the product with regulatory authorities 1.2.2 Demonstrate product value, conduct market linkages	2.1.1 Capacity development, awareness, sensitization. 2.1.2 Develop training materials. 2.1.3 Training of a RAB scientist at IITA-Ibadan.	3.1.1 Develop commercialization strategy. 3.2.1 Mobilize investors and key stakeholders. 3.2.2 Evaluate business cases of investors. 3.3.1 Select manufacturer and distributor. 3.3.2 Work with manufacturer and distributor.

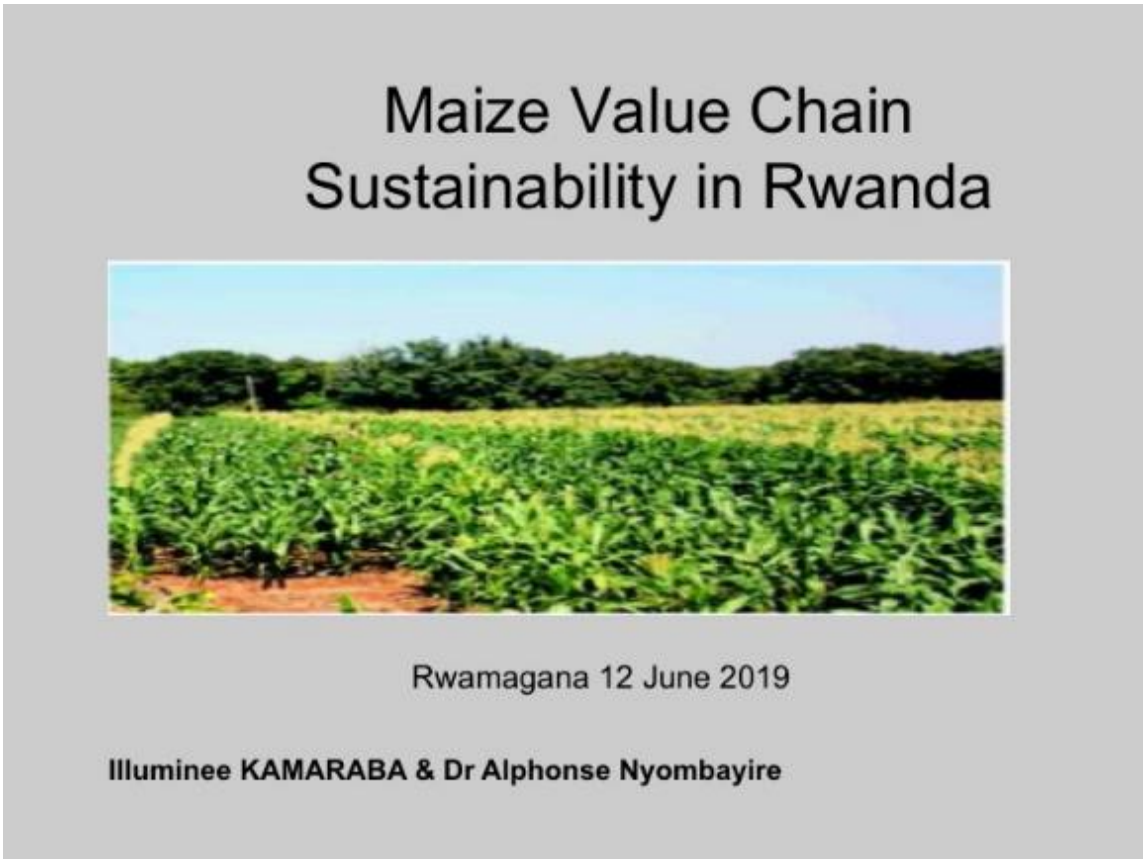
Aflasafe plant in Rwanda-Supported by the Govt



Integrated Aflatoxin Management System

HOW TO HAVE A SUSTAINABLE MAIZE VALUE CHAIN?

By Rwanda Agricultural Board



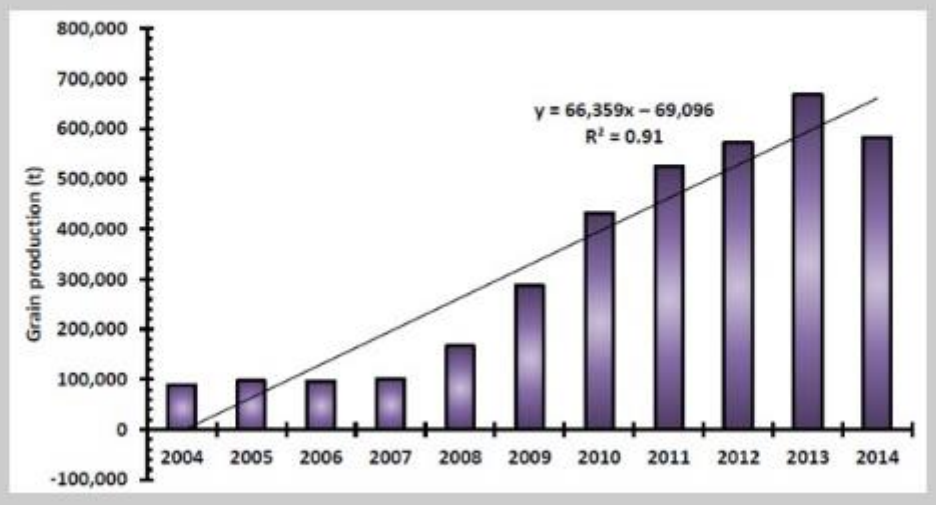
Maize cropping background in Rwanda

Maize production trends

- Maize has become an important crop in Rwandan agriculture

➢ Grain production evolved from 101,659 t in 2007 to 583,096 t in 2014 (FAO, 2018).

Maize cropping background in Rwanda



Main drivers of current maize production trends in Rwanda

- Crop Intensification Program(focus on inputs)
- Changes in policies
- Shift of cropping from highlands to mid-altitudes
- Changes in cropping systems i.e. rotation with beans or soya beans instead of intercropping in season A with beans as emphasis
- Existence of market at national and regional levels
- Various utilizations including industrial uses, etc.

Benefits from current maize production trend

❖ **Maize products diversification**

- The intensification of maize cultivation has resulted in changes of maize utilization where the uses evolved from home consumption to diverse economic uses including food, feed, milling and brewing industry.

➢ More actors were involved in the value chain

Benefits from current maize production trend

- From July 2016 to June 2017, approximately 7000 MT of maize grain were exported with a value of 1.7 million US dollars whereas 21,000 MT of maize flour were also exported with a value of 10.0 million US dollars (NISR, 2017).

Road towards a sustained maize value chain

- Changes in variety requirement by shifting from maize Open Pollinated Varieties (OPVs) to hybrid varieties.
- Shift from imported maize hybrid seed to locally seed produced
- Focus on developing local maize hybrids(RHM 104,RHM 1402,RHM 1407,etc)
- Strengthening local seed production as main pillar in the maize value chain in Rwanda

Road towards a sustained maize value chain

❖ **Maize research transfer ecologies in Rwanda**

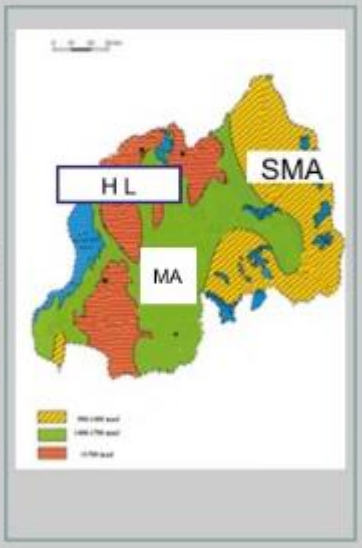
❑ Rwandan Maize agro-ecologies

❑ The mid-altitudes 67.5% :

- semi-arid mid-altitude(SA),(900-1200masl)
- moist mid-altitude(MA), (1200-1700masl)

❑ The highlands(HL), 32.5% :

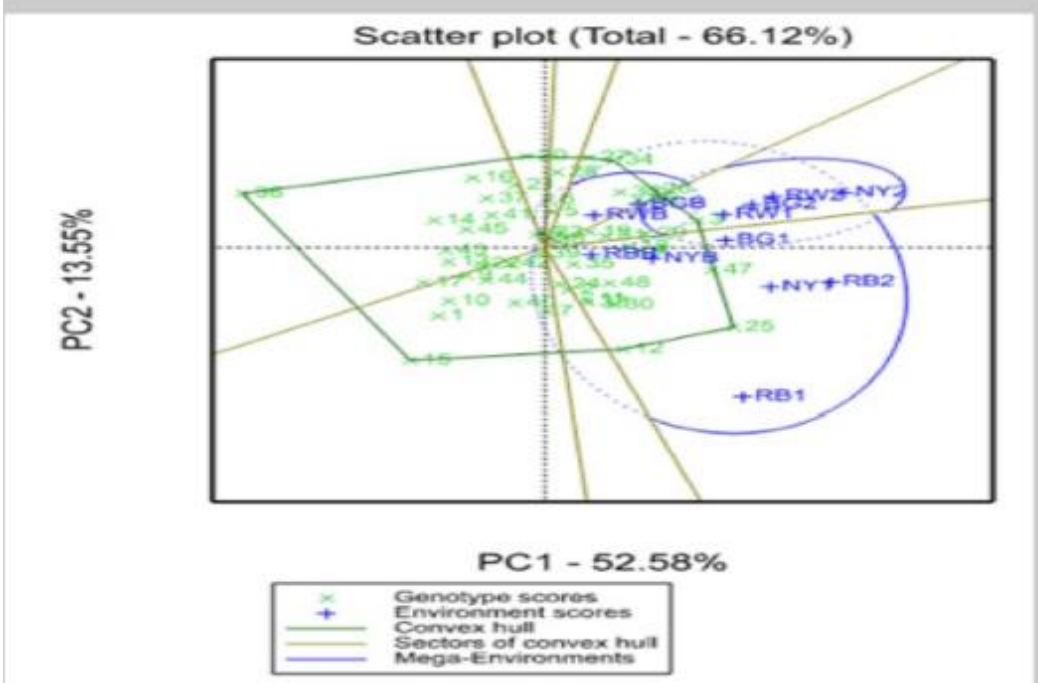
- 1700-2200 masl and beyond,



Problems addressed by maize research

- Grain yield
- Adaptation
- Soil fertility response
- Resistance to various stresses
- Resistance to lodging
- Disease resistance
- Insect resistance
- Quality traits
- Technology Transfer

Which varieties wine where?



Road towards a sustained maize value chain

❖ **Maize value chain efficiency consideration**:

- Horizontal and vertical integration between actors for improvement of their competitiveness,
- Horizontal linkages (relationships between actors on the same level of the value chain) being talked
- eg: capacity building to seed producers, farmer associations, cooperatives, etc

Road towards a sustained maize value chain

❖ **Maize value chain efficiency consideration**:

- Vertical linkages (relationships between actors along the chain) are considered
- eg linking producers to traders and processing groups

Focus on seed value chain

Plant breeding research: variety development, promotion and dissemination

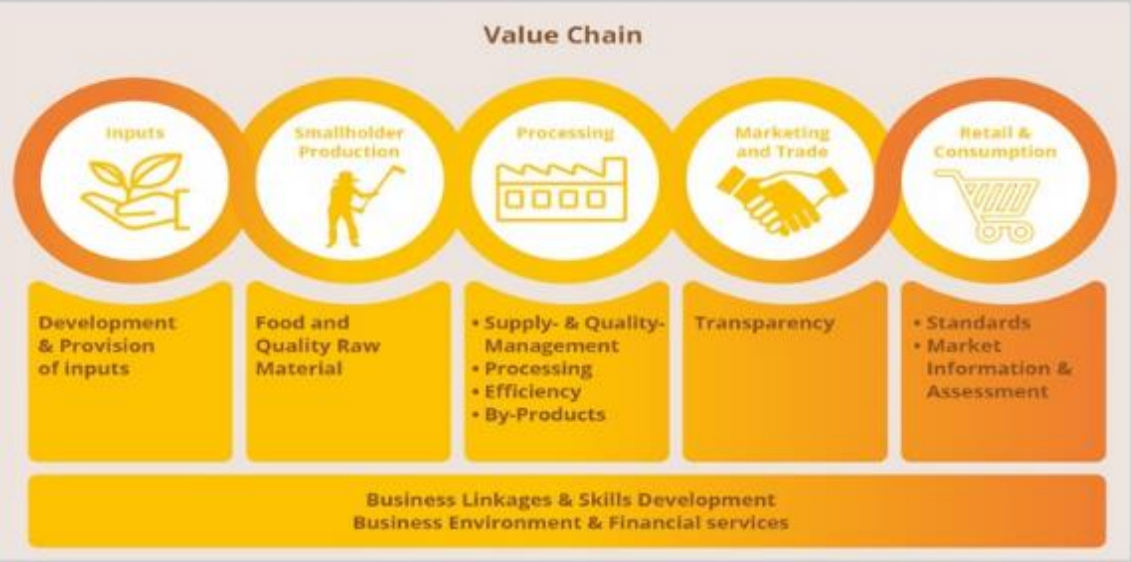
↓

Seed production

↓

Sales

Maize value chain sustainability



Maize Post harvest and handling

- In Rwanda, MINAGRI through the Strategic Plan for Agricultural Transformation – Phase IV (PSTA4) has prioritized food security through postharvest reduction of losses and providing value addition

Today we still have challenges of maize losses: In 2010 estimated losses for Maize was between 16-22 %

This is due to:

- Lack of proper and sufficient facilities and infrastructure for grain drying, shelling, packaging and storage at farm level which contribute to the loss of grain quality with negative implications on the economy.

- In Rwanda, Farmers still depending on sun drying for grain moisture reduction but the drying process can be lengthy during the rainy season.

Most smallholder farmers are not capable to acquire all the necessary postharvest infrastructures such as grain dryers, shellers, threshers and proper storage facilities to maintain grain quality and to comply with standard requirements

RAB intervention to ensure the sustainability in quantity and quality of MAIZE

RAB interventions for food losses reduction vary from one commodity to another.

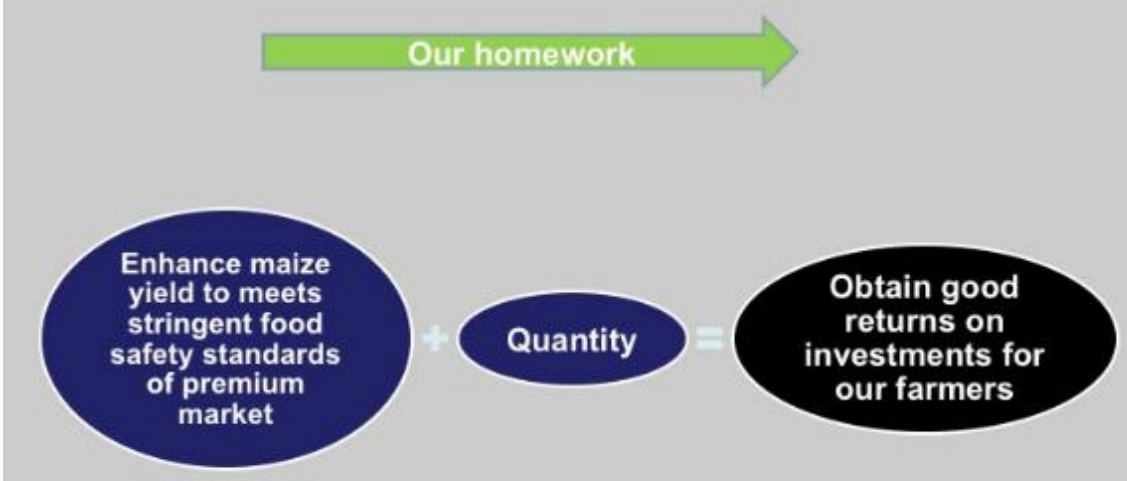
- For maize RAB in collaboration with partners are offering training, coaching farmers on postharvest handling and management, use of appropriate harvesting, packaging and transport equipment.
- Some achievements were made following specific actions by MINAGRI-RAB to reduce losses including:

❑ Training and coaching of farmers/ToT/RAB staff on improved postharvest practices; and cooperative management

❑ Promoting of postharvest technologies, equipment and materials (shelling machines, threshing machines, tarpaulins, hermetic storage bags);

❑ Construction of postharvest infrastructures (drying grounds/shades, warehouses, silos).

❑ Linking farmers/producers to markets



AWARDING CEREMONY

AWARD CRITERIAS

1. TOTAL MAIZE SUPPLIED TO MINIMEX

CAT	COOPERATIVE NAME	AWARDS				
	RWAMAGANA	Weighing scale	sprayers	moisture meter	safety	Quantity in MT
1	ISUKA IRAKIZA	1	5	1	8	320,2
2	COPAVABU	0	3	1	4	212,7
3	COCUMAKI	0	2	1	4	126,7
KAYONZA						
1	IMBERE HEZA KABARE	1	5	1	8	242,1
2	ABAKUNDANA	0	3	1	4	152,6
3	TWUNGUBUMWE	0	2	1	4	101,6

2. MAIZE PRODUCTIVITY MT/ha

	RWAMAGANA					
1	COCUMAKI	1	5	1	8	4,70
2	COHUNYA	0	3	1	4	4,59
3	Isuka Irakiza	0	2	1	4	3,81
	KAYONZA					
1	TWUNGUBUMWE	1	5	1	8	4,23
2	ABANYAMURAVA	0	3	1	4	3,78
3	TWITEZIMBERE NYABOMBE	0	2	1	4	3,56

3. INVESTMENT VALUE+LOAN MA

	RWAMAGANA					
1	JYAMBERE MUHINZI	1	5	1	8	5.500.000
2	ISUKA IRAKIZA	0	3	1	4	1.800.000
3	COCUMAKI	0	2	1	4	1.000.000
	KAYONZA					
1	IMBERE HEZA KABARE	1	5	1	8	15.000.000
2	TWUNGUBUMWE	0	3	1	4	7.900.000
3	MURYAWETU	0	2	1	4	6.900.000
	TOTAL	**6**	**60**	**18**	**96**	
	COST	420.000	1.320.000		240.000	
Overall the best is ISUKA IRAKIZA		**Shelling machine**				

CLOSING REMARKS AND LESSONS LEARNED

The CREATE program of the European Cooperative for Rural Development with Bralirwa (Heineken Group) works since 2013 on strengthening and **improving the maize value chain** in Rwanda.

EUCORD aims to increase farmers' capacity to sustainably grow quality crops matched to the commercial needs of the agribusiness sector and develop the private sector through private public partnerships. An important issue is to facilitate farmers' access to the market. Farmers need to produce what they can sell and in this sense they need an insurance in order to be willing to invest. Among the services delivered by the project one can count: technical assistance to farmers and cooperatives to increase maize yield. The project provided tailor made training on selected topics: improvement of quality of maize, post-harvest handling and linkages to finance. Agronomists from the CREATE project helped farmers in land preparation, access to improved seeds, training on fertilizer use, crop rotation, awareness of cost of production and joining markets by farming contracts.

EUCORD assists Heineken in the development of a **local supply chain**. Local sourcing is very important in order to decrease the dependency of raw material imports from other countries. It has a positive impact on Rwanda's economy and farmers. The BRAMIN farm and the funding of CREATE were established to ensure a consistent supply of locally produced maize. There is need to change the challenges in maize into actionable opportunities.

Involving and linking value chain actors

The project has been able to link 50 cooperatives to **Prodev** who sells maize to **Minimex** who sells the maize grits to **Bralirwa**. Minimex is a maize milling company and produces grits and maize flour for both human consumption and animal feed. Prodev has a drying a storage facility at Rwamagana and buys maize from the local market. Prodev went from 90% imports to 60% local sourcing of maize. ProDev dries maize on behalf of Minimex which processes it into grits for the brewery, flour for human consumption and bran for animal feed. IFC joined the program to enhance the cooperatives' management capacity, to enable them to develop a business plan to access finance through banks and microfinance institutions.

Other **World Food Programme** (**WFP**) cooperatives participating in the **Farmers to Market Alliance** (**FTMA**) have also joined the program. WFP is implementing the Farmer to Market Alliance (FTMA) project which assist cooperatives with:

- Access to quality inputs
- Access to finance
- Access to markets
- Access to effective technologies in agriculture

FTMA is working with 54,000 farmers and 152 cooperatives. Last season 28,800 farmers were trained on post-harvest, 29,500 on good agricultural practices and bought 2,200 MT of improved inputs (seeds, fertilizers). An increase in contract buyers is necessary, which changes the way coops see the market. Value chain development and committed businesses

are working more closely with farmers through the creation of a maize value chain platform. It is imperative to reduce time of farmer's payment from buyers. Farmers want to sell to high quality buyers, 85% is produced for formal buyers.

The project also worked closely with the **Rwanda Agriculture Board (RAB)** at district level. There is a maize intensification program which integrate seeds and other inputs. Some interventions focus on changes in policy: mono-cropping and shift of production to mid-altitudes when in the past maize was mainly cultivated in high altitude. RAB is shifting its focus on developing local maize hybrids and strengthening local seed companies. Currently three hybrids are being produced by local seed companies: RHM 104, RHM 1402 and RHM 1407.

East African Exchange's (EAX) role is to link buyers to sellers, as it is an aggregator/off-taker. EAX is working with 252 cooperatives, of which 80 are big ones. Challenges in aggregation generate quality issues. In this regard, farmers are encouraged to focus on qualities issues. Smugglers pay cash and do not care about quality. The root of poor post-harvest handling is the knowledge gap but it is good to see that trainings are changing the mindset. EAX used to reject 60% of maize up until 2018; this year it was 20%. EAX is introducing an electronic warehouse receipt finance scheme where farmers bring maize to the warehouse and they get a receipt, then they can use 70% of storage as collateral for loan. This is a solution in order to address the problem of low interest of banks to invest in agriculture, because risk is high. The Urwego bank accepted stored grain as collateral.

Kumwe is a post-harvest handling and logistics company combining lean operations with smart technology to drive efficiency and minimize losses in agricultural value chains. Founded in 2016, Kumwe has quickly grown to Rwanda's largest aggregator of premium maize and domestic freight broker. Kumwe would like to engage in bridging the gap between demand and supply. They plead for a closer work with those other channels to contribute to a more formal value chain.

The International Institute of Tropical Agriculture (IITA) is an important actor in aflatoxin biocontrol and is working to introduce Aflasafe in maize cultivation. Biocontrol using Aflasafe reduces aflatoxins till consumption by 80%. Aflasafe is applied 2-3 weeks before tassling stage. Three manufacturing plants are currently operational in Nigeria, Kenya and Senegal. Four more are planned including in Rwanda. The Rwanda strains of Aflatoxin are genetically unique and therefore require specific, country specific Aflasafe. The construction of an Aflasafe production plant in Rwanda is supported by GoR. Key processes in Aflasafe are cleaning, sterilization, cooling, coating/inoculation and packaging.

Some major **achievements** of the CREATE project are:

1. The number of cooperatives has grown from 14 to 50 cooperatives;
2. 3,250 to 15,000 households have increased income;
3. Maize yield increased from 2 to 3 tons/ha; maize sales to MINIMEX increased from 693 to 8,688 tons in 2019.
4. The project also established an irrigation pilot which is currently being scaled up with banks to improve access to irrigation.
5. Maize quality has also improved, resulting in a decrease in maize rejected at Prodev from >30% to 5%. This is because there is more knowledge on post-harvest handling and Prodev ships the maize quicker.

Lessons learned

One of the important lessons learned from the CREATE project are that smallholder suppliers can produce large quantities. A production of 6 to 7 ton/ha is possible. Irrigation practice in season C is also possible which can help to access finance and inputs for season A. Quick payments to coops helps with strengthening the value chain. The maize price is highly dependent on what happens in neighboring countries. The government should accelerate domestic seed production, enforce maize quality standards and support investment in harvest and post-harvest infrastructure. Farmer organizations in the maize value chain should be more business oriented, and get management skills training.

Prodev and Minimex highlighted another lesson learned, saying that the out-growers scheme is an indispensable necessity. 80% of the population is dependent on agriculture, but land holdings are small. Farmers need to move from subsistence to market oriented agriculture. There should be farmer engagement between processors, farmers and coops, as well as collaboration to start commercial farming.

The **Farmer to Market Alliance (FTMA)** project stressed that there has been a big increase in price of FTMA versus non-FTMA buyers between 2016/17 and 2018/19. In addition, one can observe a big jump in farmers wanting to sell to FTMA buyers. This season high quality markets provided a 12% premium over less formal buyers compared to 18% last year. Moreover, there is a pool of committed pro-active buyers. When coops have trust, commitment and understanding of the market demand, rejections will go down. Quick payment also increases trust of farmers. An important lesson learned is that governance training is leading to better financial management at the cooperative level, but still more investment is needed as there is still a disconnection between members and the cooperative leadership. Furthermore, successful farmers should be put forward as an example, as they still need support and oversight. There is also a necessity to promote a savings culture and capitalization so farmers can sell to formal buyers.

Rwanda Agriculture Board (RAB) stresses the importance of increasing maize production and of strengthening the soil testing part. Problems are adaptation, soil fertility, resistance to stressors, diseases and insects and quality traits. In order to contribute to maize value chain efficiency linkages a focus on seed value chain (plant breeding research) and post-harvest handling is crucial. Most smallholders are not capable to acquire all the necessary post-harvest infrastructure. Training and coaching are needed to create awareness. To achieve this, an important engagement of the private sector is needed, as well as the management of facilities, contract farming, while ensuring quality and obtaining good returns on investments for farmers.

An important finding raised by **EAX** is that the root of poor post-harvest handling is the knowledge gap but it is good to see that trainings are changing the mindset. Other issues are related to the fragmented and low volume supply from farmers, while transportation also needs improvement. There is limited access to market and finance. One can also observe a low interest of banks to invest in agriculture, because risk is high. Some solutions to these problems are professional storage infrastructure; such as warehouses with mechanical dryers. There is also a need for collateral management services, trainings and capacity building in aflatoxin reduction.

Africa Improved Foods (AIF) is one of the biggest maize buyers. They learned that there are different maize grades that can be produced for different types of production. Buyers need to focus on post-harvest handling and proper drying and storage. There is a price issue in maize and Rwanda has the highest price in maize in the region. This can be improved by increasing yield. Yield is low so we should look into fertilizers, seeds and finance. Buyers need to work together to achieve higher yield and lower prices, cooperation between different partners is important to make interventions. AIF was able to source 50% of maize needs in Rwanda but to go to 100% they need additional investments.

Kumwe highlights the fact that the challenges and opportunities regarding the maize value chain are that maize is out there and also that there are large buyers with quality requirements. The difficulty is the observed gap between the two. Where do we get the maize and where is it going? It is not clear how much maize is available, figures are ranging between 100k tons to 700k tons. Kumwe would be interested to know how much maize is available and how to bridge the gap between demand and supply. We have to work with those other channels to make it a more formal value chain. Production costs are high and logistics are a big problem. Kumwe would also like to attract informal traders into the chain. In this sense, the idea is to have hubs around the whole country, while also considering input provision.

Another important lesson raised by the **International Institute of Tropical Agriculture (IITA)** is that aflatoxin infestation already starts in the field and has to be solved from the field. After crop maturity maize is still vulnerable to aflatoxins. Biocontrol using Aflasafe reduces aflatoxins till consumption by 80%. The Rwanda strains of Aflatoxin are genetically unique and therefore require specific, country specific Aflasafe. The construction of an Aflasafe production plant in Rwanda is supported by GoR.

CONCLUDING WORKSHOP RECOMMENDATIONS

The workshop recommended to focus mainly on two core areas (a) yield improvement and (b) post-harvest.

(a) Yield Improvement:

- Costs of inputs, capital all impact on price
- Need to understand where all the maize is, where it is going etc. According to DG MINAGRI: 25-30% is consumed, some maize is lost, the remainder goes to small millers and large buyers like AIF, EAX, ProDev etc. about 400k tons is maize is produced but this is not enough; about 100k tons is available for the market; around 70% of maize is produced in the East.
- Need to go to new areas and work with new cooperatives to do contract farming.
- Rwanda currently has a population of 12 million which will double in 30 years. There is a need to increase yields exponentially. Demand for maize is around 350k tons. Currently about 1/3 of total demand is locally produced, 2/3 are imported.
- Hybrid seeds should be available at farmer level on time and in sufficient quantities.
- There is also need to increase the uptake of fertilizer.
- There isn't a strong link between inputs and outputs; Kumwe is interested in exploring this. Maybe pay a higher price if farmers adopt the whole package.
- The main challenges are still on inputs supply, labor availability during the peak season, output transportation, price fluctuation, cooperatives governance.
- Focus to organize farmers and connect to markets.
- Use more successful farmers as an example.

(b) Post-harvest:

- There is 20-30% loss at farmer level; farmers need drying floors and sheds.
- Middlemen buying from cooperatives are not ensuring quality.
- Focus on trainings to cooperatives on quality aspects including harvest and post-harvest handling.
- Encourage farmers to supply to processors as soon as possible.
- FTMA is currently working with 54k farmers but this is the tip of the iceberg; need to make this bigger for which a strong extension system is needed; post-harvest handling needs to be integrated into the extension program.
- The single most important thing during the last 2 years is that farmers are now using tarpaulins.
- Work to create links of cooperatives to different partners.
- Work on the aspect on the need of prior harvest finance of farmers/cooperatives.
- Check feasibility of the maize planting for the season B & C as it can be harvested during the dry season.