

ANNUAL REPORT FY 2021-2022

RWIRIRIZA Jean Marie Vianney, CEO of RYAF, during his courtesy visit at our CLIMATE SMART AGRICULTURE MODEL FARM, MUSANZE-Rwanda

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NAP: National Agriculture Policy

MINAGRI: Ministry of Agriculture and Animal Resources

RAB: Rwanda Agriculture and Animal Resources Board

UR: University of Rwanda

CAVM: College of Agriculture, Animal science and Veterinary Medicine

RYAF: Rwanda Youth in Agribusiness Forum

GAP: Good Agriculture Practice

NGO: Non- Government Organization

PPP: Public Private Partnership

FY: Fiscal Year

CSA: Climate Smart Agriculture

UBUKANGURA MBAGA MU GUTEGURA IGIHEMBWE CY' IHINGA 2022A

26 KANAMA - 26 NZERI 2021

MUHINZI KANGUKIRA:

• Kwitabira kwiyangikisha muri SNS kugira ngo ugire amahirwe yo kubona nkunganire ku mbuto n' ifumbire

• Guhingira ku gihe

• Kurwanya isuri

• Gukoresha inyongeramusaruro (imbuto nziza, ifumbire y'imborera, ifumbire mvaruganda,

imiti yizewe... zaguzwe kubacuruzi babifitiye uburenganzira "agro dealers")

• kurwanya indwara n'ibyonnyi

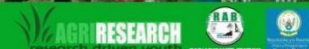
• Gufata neza ibikorwaremezo byo mu buhinzi

• Kubahiriza ibipimo bigenwe

• kubahiriza inama ugirwa n'abamamaza buhinzi.



2022A CROPPING SEASON PREPARATION AWARENESS CAMPAIGN POST. MUSANZE, RWANDA



CLIMATE SMART AGRICULTURE MODEL FARM

We have installed a climate smart agriculture model farm that showcased all mitigation, adaptation and sustainable production strategies to the community levels to sustainably improve farmers' livelihood. So far, more than 30,000 people have learnt CSA practices, including, among others, women and youth, university students including 108 AGRIRESEARCH club members, farmer promoters and farmer facilitators from Musanze district.

DIGITAL TECHNOLOGY

Upgrading and maintenance of two mobile application technology, AGRITrials and SmartInput. AGRITrials, a digital extension tool, was upgraded to improve its feasibility. It now has more than 1000 users and more than 150 question were asked by farmers and answered right away. We have launched a new weekly AGRITrials E-Newsletter to help users get agribusiness advices, weather information and up to date farming information straight to their email inbox. SmartInput also was upgraded with artificial intelligence technology that help farmers to easily identify pests and diseases of their crops.

RESEARCH ACTIVITIES

- ♦ The last phase of our research "Effect of Earthing up on yield of Irish potato crop in Rwanda" was conducted successful.
- ♦ Conducted research on grafting tomato and potato for double harvest on single plant. So far, more than 100 people have visited the study area and learn from the ongoing research
- ♦ We conducted research on grafting tamalliro onto Soda apple to produce tamarillo seedlings resistant to drought, pest and diseases.
- ♦ Our paper "Evaluation of effectiveness of potato planting structures and combining preventive fungicides to control late blight on potato crop in Rwanda" has won poster presenta-

EXTENSION AND ADVISORY SERVICES

- 10 demonstration plots and 1 farmer fields were installed with 234 recorded direct beneficiaries
- Awareness campaign on cropping season 2021A preparation was conducted in Musanze district with the aim of helping the farmers to shift from producing enough to producing surplus
- 1 kitchen gardens and Nursery were installed to reduce malnutrition
- 9 Compost pits were installed to teach farmers

Agriculture is the main economic activity in Rwanda with around 72% of the working population employed in the sector and accounting for 33% of the national GDP. Despite these numbers, productivity remains very low and the potential represented by the sector is far from being met. 75% of Rwanda's agricultural production comes from smallholder farmers. However, the majority are still doing a rain-fed subsistence farming that is most vulnerable to the negative effects of climate change. 2021-2022 Fiscal Year was also so challenging due to the vilest consequences of covid-19 and climate change. The world was quite busy looking for building resilience after several waves of the pandemic that shook badly its economic development. Amidst this battle, agriculture remains to be the hope for resilience and sustainability of the planet.

Collective actions by public private partnership (PPP) and civil societies that promote research and innovation as well as building flexible extension services tailored to farmers' needs, continued to be the cornerstone of agriculture transformation. This integration is critical in resolving most of existing challenges in our farming system. The strategies that call forth investors and youth engagement in agriculture sector will also continue to play a pivotal role in building resilience and sustainability of the sector. This is so crucial because with our current farming system dominated by illiterate and old farmers, will transform it towards commercialized agriculture.

In above context, AGRIRESEARCH Organization, a national non-governmental organization is working relentlessly towards making Rwanda's agriculture a less climate sensitive, environment friendly and economic leading sector through agriculture research and extension services. With our vision, whereby 2025, we will be a youth leading innovation hub that empowers farmers in Rwanda to be wealthy and healthy. So far, several researches that are demand-driven were conducted. Our extension and advisory services are doing a great job especially in Musanze district in training and teaching farmers to do profitable farming and improve their livelihoods. They are doing these through campaigns, installation of smart kitchen gardens, demonstration and farmer field school plots in different villages, model farms and so forth. Furthermore, in this era where ICT is playing critical role in economic development, agriculture should not be a left behind sector.

Therefore, we developed different technologies to help farmers to do lucrative agriculture. The technologies include but not limited to mobile application technology with artificial intelligence embedded and automated crop irrigation technology.

The impacts are amazing! So far, our services have reached to more than 30,000 people countrywide with farmers testimonies of how they boosted their yield. Furthermore, Climate smart agriculture practices including mitigation of greenhouse gases, adaptation to the existing climate shocks and sustainable production practices were not only learned but also adopted at community level by smallholder farmers through installed climate smart agriculture model farm. In fact, farmers' lives are being transformed towards better livelihoods, wealthy and healthy.

A. RESEARCH AND INNOVATIONS

We are committed in doing demand-driven agricultural research. This means that our researches are designed in resolving the challenges farmers are facing. Since our research is linked to extension services, it makes it easier for us to do demand-driven research as we know most of challenges farmers faces.

1. Effect of Earthing upon yield of Irish potato crop in Rwanda

This topic was conducted both phases at RAB/MUSANZE Station, Kinigi site. With combination of other GAPs, the research aims at boosting the yield of Irish potatoes by showcasing the real time of earthing up. Data were recorded and analyzed; the publication is in progress where it will be published first in the seminar we are planning soon.



2. Pomato grafting

We conducted this study in Musanze district, at UR\CAVM where we grafted tomatoes onto potatoes so that we will have double harvest from single plant. This means that with this graft, in harvesting, Irish potatoes will be harvested underground and tomatoes aboveground but on single plant. This research will not only save the land by harvesting more on small land area but also

minimizing production cost by minimizing labor and inputs costs respectively. So far, more than 150 students from university and secondary have visited and learnt about this technique.



4. Grafting tamalliro onto Soda apple

According to different problems found in red tree tomato farming like diseases and being high susceptible to drought we come up with solution of grafting those tree tomato onto soda apple as it is more resistant so that we will boost tree tomato productivity.

The experiment was done and get success as indicated in the picture below

5. Adaptability of fig tree in Rwanda

Fig is one of needed plant in our daily life but all related products are still imported from Middle Asian countries. So, we tried to raise the fig in the seed bed so as indicated in the following picture the fig seedlings are read to be planted.

6. Plasticulture

In order maximize productivity and optimize cultivated land and save environment from being damaged by used plastics, we install a vertical farming using plastics bottles where we planted vegetables in space.



7. Apple seedling raising

We tried to raise apple cuttings; we met a challenge rooting hormone for apple we will have another trial very soon.

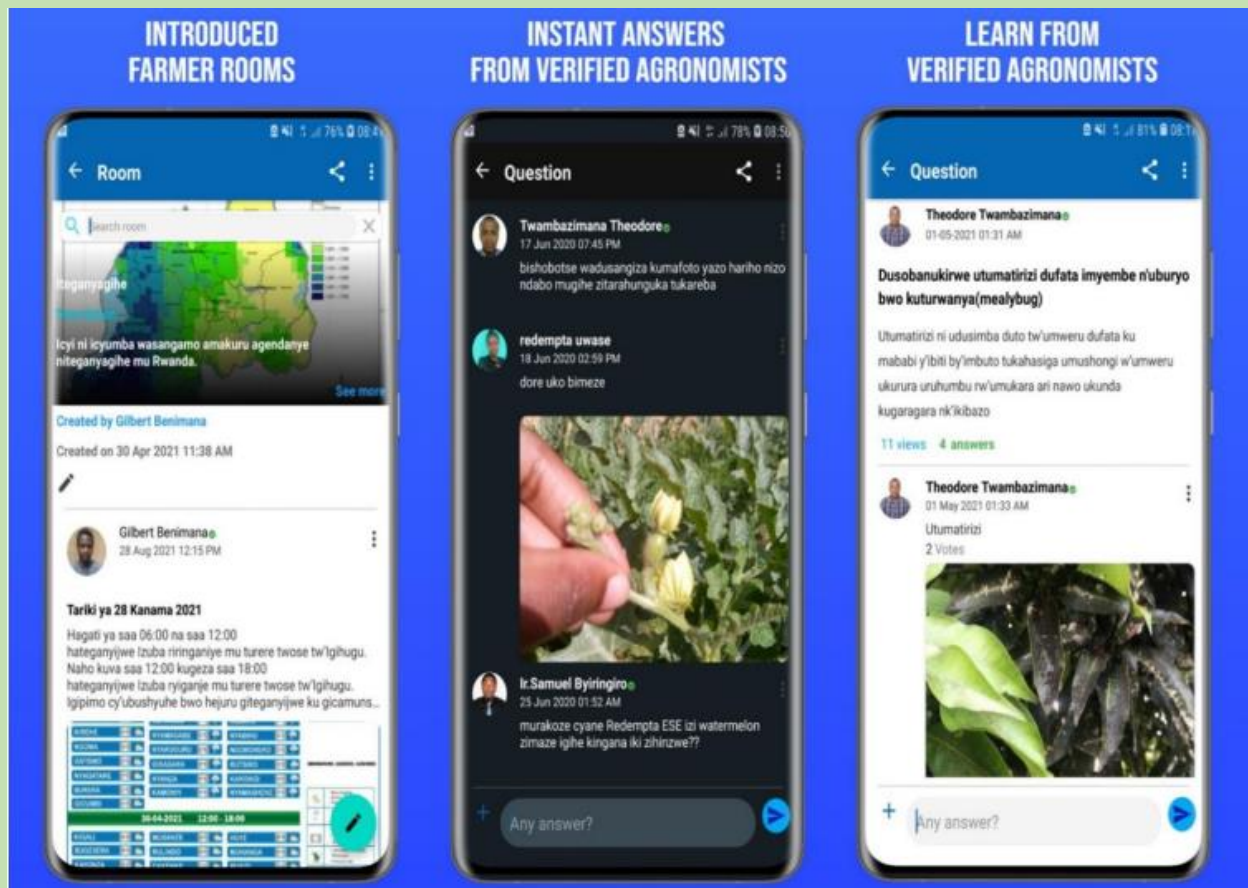
8. APA poster presentation

In this year our topic abstract wins a poster presentation in 12th African Potato Association conference, Lilongwe, Malawi.

B. INFORMATION COMMUNICATION TECHNOLOGY

I. Mobile Applications Technology

I.I. AGRITrials



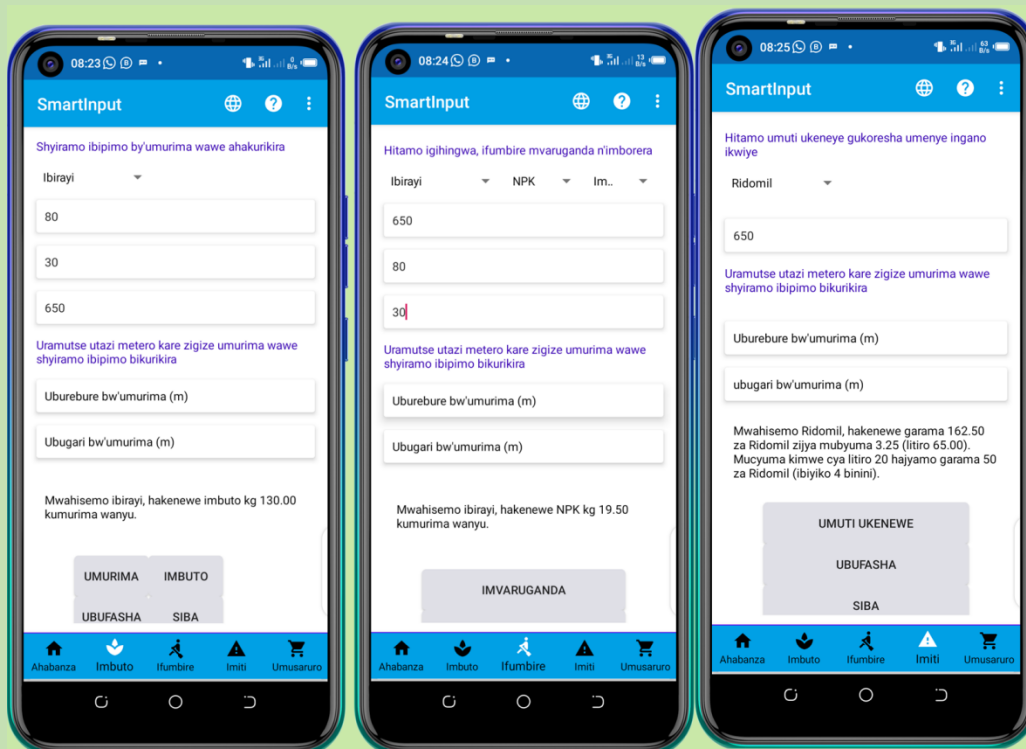
As AGRIRESEARCH Organization does agricultural research and extension services, we have thus widened the role of our extension to include issues in rural areas that go beyond agriculture. Therefore, we disseminate agricultural information to help farmers adopt good agricultural services and information to help farmers adopt good agricultural services and information about markets and facilitation of linkages among market actors and consumers by using AGRITrials platform. Briefly, this apps work on two aspects that are integral in food systems; educating farmers how to sustainably produce food and finding potential markets to their produce.

Since its early release in May 2020, AGRITrials was very popular among farmers mainly in Rwanda as it was a solution to their daily farming challenges especially amid COVID-19 where

movement were restricted to contain the spread of the virus. During this time farmers weren't able to meet agronomists and get their farm produce to potential markets. AGRITrials helped more than 500 farmers, mainly young women and men get buyers and find solutions to their daily farming challenges in real time. With this being said, AGRITrials was one of the awardees of Young Entrepreneurs Resilience Fund, launched by The Ministry of youth and culture in partnership with the United Nations Development Programme (UNDP) Rwanda and the Embassy of the Republic of Korea through the Korea International Cooperation Agency (KOICA-Kigali) during the pandemic in support of the government's economic recovery plan. AGRITrials was awarded as an innovation in response to the pandemic.

AGRITrials was also Developing Local Extension Capacity (DLEC) video competition winner in April 2021. This app was among top 3 global initiatives in digitalization of extension services by DLEC project.

I.II. SmartInput



AGRIRESEARCH has also developed an intuitive mobile application that leverages emerging technologies including artificial intelligence to help farmers use precisely calculated agricultural inputs. As of now, SmartInput is operational at small scale with a user base of 1000 local farmers. This app helps in mitigation of climate change impacts as well as reducing production cost as farmers now use regulated inputs. It in this regard, SmartInput won different awards including but not limited to being featured in United Nations Sustainable Development Solutions Network Youth Solutions report 2020 as one of 50 youth-led global innovative solutions with a \$20,000 grant.

2. Social media

2.1. Launching AGRITrials E-Newsletter

Since its early release in May 2020, AGRITrials helped more than 500 farmers to get farming informations, market linkages and clear their daily farming challenges in real time. Bringing together current insights from the users, from March 2022, we launched a new weekly AGRITrials E-Newsletter to help users get agribusiness advices, weather informations and up to date farming informations straight to their email inbox. In this context, many users are accessing real time informations easily because email is a more professional and accessible platform.**photo**

2.2. Training University Students on ICT for Agriculture

One of AGRIRESEARCH Missions is youth engagement in agriculture. Educating youth and instilling an interest in agriculture is about recognizing and investing in the future of our country. Rural youth are the future of food security. Yet around the world, few young people see a future for themselves in agriculture or rural areas. Rural youth face many hurdles in trying to earn a livelihood. While most of the world's food is produced by (ageing) smallholder farmers in developing countries, older farmers are less likely to adopt the new technologies needed to sustainably increase agricultural productivity, and ultimately feed the growing world population while protecting the environment. In this context, we provided training and insights on the role of ICT and the use of social media to communicate information in agriculture.

Now, students from University of Rwanda - College of Agriculture, animal sciences and veterinary Medicines mainly youth grouped in AGRIRESEARCH Club located in this college changed old-mind-sets on Agriculture and transform to a business-oriented Agriculture, giving employment to a large population and boosting sustainable economic development and an inclusive food system. They have started initiatives like AGRIRESEARCH INSPIRATION TALKS, where they exchange ideas about different topics related to agriculture.

C. EXTENSION AND ADVISORY SERVICES



Productivity increase, Good health and well being of the farmers

We went through TWIGIRE MUHINZI Program, to teach farmers how they could increase their productivity and have good health at the same time. Ten (10) demonstration plots and 1 farmer field school plots (FFS) were installed with the purpose of showcasing good agricultural practices to the farmers so as to increase their productivity. Furthermore, during the follow up on the above said activities, we showed and advised farmers how to use agro-inputs (seeds, fertilizers and pesticides) at precisely manner as the results of having good health and well being of the farmers. Through in the above said, many farmers leant on these activities and their productions were increased respectively, as Good Agricultural Practices (GAPs) were adopted and they have gained skills and knowledge on how to use precise inputs to their farm.

234 farmers were recorded as direct beneficiaries in season 2021 A leant Good Agricultural practices from the installed demonstration plots in Busogo, Gataraga and Kimonyi sector in Musanze district and above 6526 farmers were recorded as indirect beneficiaries via social media platforms. Crop productivity increase of the farmers who worked with us in season 2021 A as follow: Maize from 2.3T/ha to 4.86T/ha, Wheat from 1.8T/ha to 3.37T/ha and we are waiting to record data on beans and potatoes in this season 2021 B which is not yet finished.



AWARENESS CAMPAIGN ON CROPPING SEASON 2021 A PREPARATION

Together with Musanze district and RAB/Musanze station, we prepared and conducted awareness campaign on cropping season 2021A preparation where we had a theme of” **Empowering smallholder farmers to do modern agriculture as a way of shifting from producing enough to producing surplus**”.in this regards,the campaign helped farmers to use agricultural inputs as precise as possible (seeds, fertilizers and pesticides),to register in Smart Nkunganire System and it helped them to be aware on and use of improved seeds, all good agricultural practices was disseminated to the farmers in this campaign.



REDUCING MALNUTRITION



I. Kitchen Gardens

During in this fiscal year of 2021- 2022,in the part of reducing malnutrition, we installed a kitchen garden where farmers were leant from it how to grow more vegetables, in this regards, we grew more vegetable varieties in hand of showcasing all agricultural practices of growing more vegetables at home. 5 vulnerable families were leant a lot from the installed gardens and were got vegetables from it a day per day.

II. Nursery installation,

In hand of community outreach, we installed nursery of vegetables and fruit trees where farmers were leant how they could have their own nurseries at farm level at lower cost. we also gave and distributed vegetable seedlings with technical support of growing them to 13 families in Busogo sector in Musanze district and we are planning to extend these services to many people who are struggling for the issue of malnutrition. These said families were sold some vegetables and their children got vegetables with no cost and the problem of getting balanced diet was resolved.



ADVISORY SERVICES AND USE OF MOBILE SERVICES TO DELIVER EXTENSION SERVICES TO THE FARMERS

I. Compost pits making



Figure 1 Compost pit in Musanze district, Busogo sector with local governance (sector agronomist, village chairman and farmer facilitators) and

Through in our advisory services that we give to the farmers, we advised and showed the farmers in Gahanga site/Busogo sector in Musanze district how to make compost pits in the regards of improving the use of organic manure in their farm. 9 compost pits were successful installed and subsequently gave the organic manure that were improve the soil fertility in the said area. the neighbors of the farmers from the said region were also leant from the installed compost pits and recycled the residue at home.

II. DIGITAL EXTENSION AND ADVISORY SERVICES.

We also went in digital service for disseminating skills and knowledge to the farmers and link them to the market either local or internationally by using our Digital tool “AGRITrials” as our digital extension tool that help farmers in building their capacity on climate resilient agriculture by ensuring clean agriculture value chain from Farm to Fork and It provides useful information regarding market, good agriculture practices, weather forecasting and climate smart agriculture practices.

III. PROMOTING CLIMATE SMART AGRICULTURE PRACTICES



Figure 2 Abdu USANASE, CEO of AGRIRESEARCH Organization in planting agroforestry trees (Calliandra) and Fodder grass (elephant grass) at Climate Smart Agriculture Model Farm, Musanze district

With the negative impact of climate change, we installed and developed a climate smart agriculture model farm as community-centered” approach to promote climate smart agriculture practices to the farmers. this model farm was in Busogo Sector in Musanze district and it covered practices which are involved in all three pillars of climate smart agriculture such as sustainably increase agricultural productivity and improve the incomes and livelihoods of farmers; Build resilience and adaptation to climate change; and reduce and/or remove GHG emissions, where possible.



It is in above context, many farmers and students from UR-CAVM Busogo campus were learnt a lot from the above mentioned strategies with related to its practices include but not limited to Inter-cropping for maximizing space and pest control; Improved water management options like making trenches to control erosion; planting of Agroforestry trees not only help in carbon sequestration but also in improving soil fertility; planting resistant varieties to pest and diseases; mulching crops; Composting and organic fertilizer; and so on.



Figure 3 Climate Smart Agriculture Model Farm, Musanze District



YOUTH ENGAGEMENT IN AGRICULTURE



One of the missions of AGRIRESEARCH is to engage more youth in agriculture and fostering research culture in youth. Within this said context, we made follow up on AGRIRESEARCH CLUB and trained its members on different aspects related with Agriculture. above 108 members of the club were trained on Good Agricultural Practices and they are helping community through the skills that have gained from the club. the students from UR-CAVM are also motivated through the different weekly topics on CMB radio in the talk “AGRIRESEARCH INSPIRATION TIME”. we also worked with the internees from UR-CAVM and trained and showed them how to do profitable farming and they were motivated to join agriculture sector by showing them the opportunities exist for youth who joined agriculture sector.

The club has won CMB youth challenge award as the best club of the year 2021-2022, in University of Rwanda, College of Agriculture Animal resources and Veterinary Medicines. It has also been featured in University of Rwanda monthly report as the best and promising club in agriculture transformation.

AGRIRESEARCH CLUB



AGRIRESEARCH INSPIRATION TIME

THEME: "Role of Climate Smart Agriculture practice in ensuring Food security while conserving Environment"

on CMB Radio

Saturday at 10:am

UR CAVM Busogo campus



Cyilli Angelo
student at UR CAVM
Moderator



Niyitanga Darlene
student at UR CAVM
speaker



Iyakaremye Modest
student at UR CAVM
speaker



Nitegeka j. Bosco
student at ur CAVM
speaker



Figure 4 Field Day of AGRIRESEARCH Club members in acquiring hands-on practices on compost making