AGRIRESEARCH
research driven youth

AGRIRESEARCH ORGANIZATION ANNUAL REPORT /FISCAL YEAR 2023-24

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ABREVIATION

NISR: National Institute of Statistics Rwanda

GDP: Gross Domestic Product

SAS: Season Agriculture Survey

AGRIPI: Agriculture Green Innovation Park Initiative

RAB: Rwanda Agriculture and Animal Resources Board

UR: University of Rwanda

CAVM: College of Agriculture, Animal science and Veterinary Medicine

FY: Fiscal Year

CSA: Climate Smart Agriculture

2023-2024 **HIGHLIGTHS**

Research and Innovations

- **Regenerative Agriculture:** Our research on the effectiveness of regenerative agriculture practices on beans, maize, and Irish potatoes has concluded. We conducted a three-phase study in partnership with CAVM, assessing the impact of these practices on sustainable agricultural production in Rwanda. Data analysis is complete, and the research findings are currently being prepared for publication.
- **Bean Staking:** In collaboration with UR/CAVM, we investigated the use of threads as stakes for climbing beans, an innovative approach that aims to reduce tree cutting and promote environmental sustainability. Our study, conducted in Musanze district, demonstrated the potential of this method to increase bean production while minimizing environmental impact.
- **Pomato:** We continued our research on pomato, a grafted crop combining tomatoes and potatoes. The third phase of this study was conducted in the current fiscal year, 2023-2024, to validate our previous findings. Data analysis is currently underway, and the publication of the research results will follow.

Extension and Advisory Services

- **Youth Engagement:** Our AGRIRESEARCH Club at the University of Rwanda's College of Agriculture, Animal Science, and Veterinary Medicine in Nyagatare continues to engage young people in agriculture and promote entrepreneurial opportunities. With a growing membership of 150 students, the club is inspiring the next generation of agricultural leaders.
- **Climate Smart Agriculture:** We have implemented various initiatives to promote climate-smart agriculture practices and improve post-harvest handling for farmers. In Musanze district, we expanded our existing climate-smart agriculture model farm by adding training sites focused on fecal treatment, biopesticide production, and vermicomposting. These resources are empowering farmers to adapt their agricultural practices to changing climate conditions.

ICT in Agriculture

- **SMARTINPUT Adoption:** Our digital platform, SMARTINPUT, has gained significant traction among farmers. With 402 new users in the past year, this tool is helping farmers to use agricultural inputs more precisely, leading to increased production and better record keeping. By tracking their farm-level activities, farmers can make informed decisions about their operations and assess profitability.

EXECUTIVE SUMMARY

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. Climate change is already drastically impacting food and nutritional security, with impacts projected to intensify in the coming decades. Climate impacts such as irregular rainfall, drought, floods, pests and diseases, together with limited land for agriculture and global commodities price fluctuations continue to affect food security.

Over 40% of soils are degraded in Rwanda, and productivity is declining while food demand increases. These challenges have caused, among other things, some of the lowest agricultural production per unit area in the country. For example, in 2023, the average yield of Irish potatoes, beans, maize, and all vegetables was 8.2 t/ha, 0.6 t/ha, 1.7 t/ha, and 8.1t/ha, respectively (NISR, SAS 2023 REPORT). In the past two decades, significant achievements have been made in poverty reduction, gender equality, environmental sustainability, education and public health, yet 38.2% of the population in Rwanda continue to live below the poverty line and almost one-fifth in Rwanda are food insecure.

Furthermore, 75% of Rwanda's agricultural production comes from smallholder farmers but majority of them lack information and skills on the best practices and the use agricultural inputs that leads to very low yields, deadly human health conditions and environmental pollution.

The commitment to address the aforementioned issues that promote research, innovation, and the dissemination of new technologies through extension services is a crucial step toward transforming agriculture and meeting farmers' needs.

In light of these contexts, AGRIRESEARCH Organization offers a comprehensive package of agricultural solutions designed to address local needs, respond to market demands, improve farmers' livelihoods, promote sustainable practices, and align with Rwanda's national vision and policies for the 2023-2024 fiscal year.

To support these goals, AGRIRESEARCH has conducted several demand-driven research activities, and the findings are currently being prepared for publication. In addition, our extension services have focused on helping farmers adapt their practices to climate change and promoting sustainable agriculture through initiatives like "Agriculture green innovation park initiative(AGRIPI) that was designed where researchers, farmers, academia and entrepreneurs come together to develop and test new technologies and practices that promote sustainable agriculture." To tap it off, we have also leveraged ICT to enhance our agricultural extension efforts.

The impact of our work in this fiscal year 2023-24 was significant. Three green research projects were conducted, benefiting 3,234 farmers directly. Our extension

services reached 10,032 farmers, promoting climate-smart agriculture practices and local post-harvest handling adoptable. Additionally, we gained 402 new users of our SmartInput digital platform, a valuable tool for precise agricultural input management and record keeping.

A. RESEARCH AND INNOVATIONS

1. Evaluation of Effectiveness of Regenerative Agricultural Practices on Irish Potato, Beans and Maize towards Sustainable Agricultural Production in Rwanda

This research was conducted in partnership with CAVM across two phases at the CAVM site to assess the impact of regenerative agriculture practices on beans, maize, and Irish potatoes. The first phase was completed in the 2022-2023 fiscal year, and the second and third phases were conducted in the current fiscal year, 2023-2024, to validate the initial findings. Data collection and analysis have been completed, and the publication process is underway.

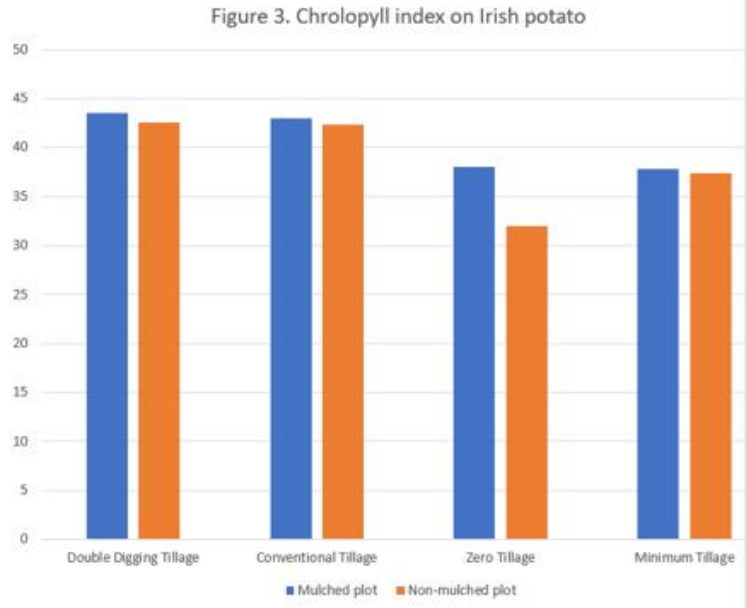
Chlorophyll index on Irish potato

Mulching increased the leaf chlorophyll index on potato crop by providing insulation and protecting the soil from extreme temperatures.

This helped to maintain an optimal soil temperature for the root system, allowing it to absorb more nutrients and water, which can in turn increase the chlorophyll content of the leaves.

It also helped to reduce the evaporation of water from the soil, again helping to retain more of the necessary nutrients for the crop.

Mulching helped to reduce the competition for available resources by deterring weeds, which can lead to increased chlorophyll production.



Regenerative agriculture research on Irish Potato

2. Effectiveness of staking heights using threads stakes on the yield of climbing Beans.

In collaboration with UR/CAVM, we conducted this study in Musanze district to investigate the use of threads as stakes for climbing beans instead of traditional tree

supports. This innovative approach not only eliminates the need to cut down trees but also contributes to environmental protection and climate change mitigation. Ultimately, the goal of this research is to increase bean production through sustainable and environmentally friendly practices.

Research on Bean Staking with Threads

3. Research on Pomato

In collaboration with UR-CAVM, we conducted the third phase of our research on pomato, a grafted crop that combines the aboveground production of tomatoes with the belowground production of potatoes. While the first two phases have been completed, the current fiscal year, 2023-2024, saw the implementation of the third phase to validate our previous findings. Data analysis is currently underway, and the publication of the research results will follow.

Research on pomato

B. EXTENSION AND ADVISORY SERVISES

1. **Youth Engagement in Agriculture**

One of our key missions is to engage young people in agriculture. To achieve this, we established the AGRIRESEARCH Club at the University of Rwanda's College of Agriculture, Animal Science, and Veterinary Medicine in Nyagatare. This club aims to inspire youth to pursue agricultural careers and explore entrepreneurial opportunities within the sector. With a current membership of 150 students, the Nyagatare club follows the success of the inaugural AGRIRESEARCH Club, which was initiated at the Busogo campus in 2022,

AGRIRESEARCH Club Nyagatare Launch

2. **Implementing Climate Smart Agriculture Practices**

During the 2023-2024 fiscal year, we implemented various initiatives to promote climate-smart agriculture practices and improve post-harvest handling for farmers. In Musanze district, we expanded upon our existing climate-smart agriculture model farm by adding training sites focused on fecal treatment, biopesticide production, and vermicomposting. These additional resources aim to empower farmers to adapt their agricultural practices to changing climate conditions.

Feacal treatment and Biopestecides making training site

C.ICT in AGRICULTURE

Our digital platform, SMARTINPUT, has gained 402 new users in this fiscal year. This tool is empowering farmers to use agricultural inputs more precisely, leading to increased production and better record keeping. By tracking their farm-level activities, farmers can make informed decisions about their operations and assess profitability.

SmartInput Technology