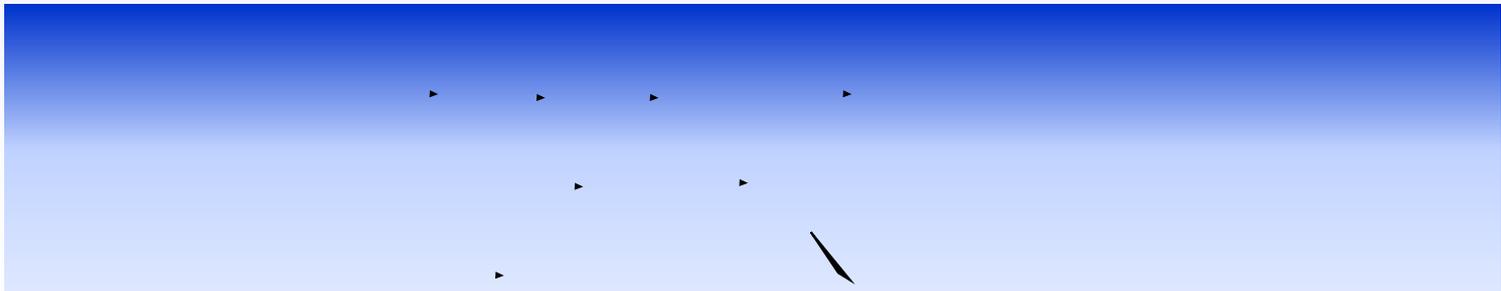


# Test of Agronomic Performance of Green Manure Cover Crops (GMCC) in Rwanda. Case of 5 varieties in 6 representative Districts



# 1. Presentation Outline

## 1. Introduction

## 2. Methodology

## 3. Key findings

- \* **The germination capacity of seeds**
- \* **Foliar development of GMCCs**
- \* **GMCCs Height growth**
- \* **Resistance of GMCCs to pests & diseases**
- \* **Soil cover capacity of GMCCs**
- \* **Biomass production capacity**
- \* **Comparison of Black & Red Varieties of Lablab**
- \* **Effects of GMCCs on soil fertility**

# Introduction

- **The gradual decline of soil fertility in Rwanda**
- **High density of population, no Fallow**
- **Overexploitation of arable land**
- **Reduced production of organic manure at the farm level**
- **Organic manure = The first limiting factor of agricultural productivity;**

## **Composting of crop and Livestock waste issues**

- **All this factors accelerate the destruction of the organic matter and the structure of the soil.**

# Why Green Manure Cover Crops, GMCCs?

- **CA based farming systems increase the organic matter content of the soil by carbon storage and a greater availability of nitrogen for crops due to more favorable temperature and moisture conditions for decomposition of soil, its introduction in Rwanda could be an alternative to the lack of organic manure from animal and crop residues.**
- **It is in this context that a study is planned to test the agronomic performance of several varieties of Green Manure Cover Crops and to draw recommendations on the most efficient GMCCs varieties in the ecological conditions of Rwanda.**

# Methodology

- **Four different treatments (varieties of GMCC) will be compared with the control (untreated)**
- **Completely Randomized Block Design (CRBD)**
- **Five treatments:**
  - 1. Control,*
  - 2. Lablab p. (black/Red)*
  - 3. Pigeon Pea,*
  - 4. Cowpea,*
  - 5. Velvet Bean*
- **4 replications (blocs)**
- **Area: 6 Districts & 2Sectors per District**

# Methodology

## Description of varieties (treatments)

The agronomic performance of 5 varieties of GMCC will be tested and compared to the control (untreated).

## Table 2. Green Manure/Cover Crop Species

# Methodology

## Areas and periods of experiment

**Six more representative Districts over the country have been selected to be part of the studied areas: Ruhango, Gicumbi, Burera, Kayonza, Kirehe, Bugesera with two experimental sites per District.**

**- The study will be carried out during the 2019 agricultural seasons (A & B: from September 2018-January 2019 and February-June 2019).**

# Methodology

## Experimental planning

The trial will be led out in a Completely Randomized Block Design (CRBD), where four different treatments or varieties of GMCC will be compared to the control in five replications (blocs).

Each elementary plot will be established at 3m x 3m (9 m<sup>2</sup>) of area with 50 cm separation distance between the plots within the blocks and 100 cm between the blocks.

Figure 1.

# Methodology

## Experimental planning

Six elementary plots each of 3m x 3m (9 m<sup>2</sup>) were built in each block, making a total of 30 elementary plots. Given the distance of 50 cm between plots within blocks and 100 cm between blocs, the total area to be used is estimated at 21m x 19.5 m = 472.5m<sup>2</sup>.

# **KEY FINDINGS**

# 1. The germination capacity of GMCCs seeds

**Varied behavior of GMCCs in germination capacity**

Summary of ANOVAs of germination rate per District & per experimental site

Germination rates distribution per district & per experimental site

## **2. Foliar development of GMCCs**

**GMCC varieties also showed very significant differences in foliar development.**

**Summary of ANOVAs of foliar development per District & per experimental site**

**LEAVES DISTRIBUTION PER DISTRICT & PER EXPERIMENTAL SITE**

### **3. GMCCs Height growth**

**GMCC varieties also showed very significant differences in terms of height growth.**

**1. Summary of ANOVAs of height growth per District & per experimental site**

**2. Height growth distribution per district & per experimental site**

## **4. Resistance of GMCCs to pests & diseases**

**GMCC varieties resist very differently to pests, insects and climatic hazards**

**1. Summary of ANOVAs of foliar development par District & per experimental site**

**2. Pests & diseases distribution per district & per experimental site**

## **5. Soil cover capacity of GMCCs**

**The soil cover capacity varies very highly and significantly with the GMCC variety**

**1. Summary of ANOVAs of Soil Cover Rates per District & per experimental site**

**2. Soil cover rate capacity of GMCCS per district & per experimental site**

## **6. Biomass production capacity**

**Very highly significant differences observed between the GMCCs varieties**

**1. Summary of ANOVAs of leaves weight per District & per experimental site**

**2. Weight of leaves OF GMCCS per district & per experimental site**

## **7. Comparison of Black & Red Varieties of Lablab**

**A significantly different behavior on certain growth parameters was found between the black and red varieties of lablab**

**[Check all parameters](#)**

# Conclusion

For all parameters studied

- (i) Seed emergence rate per treatment and per block observed 2 weeks after sowing,
- (ii) The vigor of plants (stem girth) from the 3<sup>rd</sup> until the 12<sup>th</sup> week after plantation,
- (iii) Biomass production per variety and per week from 3 weeks after sowing
- (iv) Resistance to pests and diseases
- (v) Soil cover rate of GMCC

**We could note the coronation of Mucuna, followed by Lablab and Pigeon pea**

**Thank you**