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Effects of bio-slurry and inorganic fertilizers on soil properties and maize yield in Kicukiro district, Rwanda

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ABSTRACT

Objective: Continuous cropping without nutrient restitution under smallholder farms in Rwanda has led to serious nutrient depletion and reduced maize yields. This is further exacerbated by low soil organic matter and soil erosion. The smallholder farmers in Rwanda either do not obtain the necessary returns from fertilizer use to justify the costs or cannot afford to use inorganic fertilizers resulting in low inorganic fertilizer use. It is hypothesized that bio-slurry organic fertilizers are affordable, are of high quality and can be used to increase fertilizer use efficiency and crop yields for farming community in Rwanda. This study is being carried out to: (i) determine the nutrient contents of bio-slurry as an organic fertilizer; (ii) to determine the effect of bio-slurry on soil physical, biological and chemical properties; (iii) and to compare the effect of bio-slurry and inorganic fertilizers on maize yield.

*Methodology***:** A one year field study is being carried out in Rubilizi farm, Kicukiro District in Rwanda to test four levels of N fertilizers (0, 50, 100, 200 kg/ha) and three levels of bio-slurry (0, 5,10 tons/ha) and their interactions. This constitutes 12 treatment

combinations laid out as a factorial experiment and arranged as a randomized complete block design (RCBD) with 3 replications using maize crop (*Zea mays*) as the test crop. Slurry chemical analysis was done before planting to determine its nutrient content. Soil samples were taken before planting and will be taken afterwards to determine the following properties: organic carbon, total N, available N, available P, soil pH, CEC, soil texture, water retention, aggregate stability, and microbial biomass. Maize yield will be determined.

Application of expected results: It is expected that the results of this study will be used by extension staff and farmers to promote and implement interventions for improving soil fertility to increase production of maize to reduce food insecurity in Rwanda.