

## Measuring the effectiveness of Biochar on agricultural practices in Rwanda

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In sub-Saharan Africa poor land use practices have led to an increase in soil erosion, land degradation, loss of vegetation, and an overall decline in agricultural productivity. This loss in productivity threatens existing nations facing rapid population growth, climate change, and food insecurity.

Of the various strategies designed to sustainably improve agricultural productivity, the use of a carbon-dense soil amendment called biochar, is an innovative way to improve soil composition. Biochar is a charcoal based fertilizer made of compost materials which has been proven to show improvements in soil composition, agricultural productivity, water absorption, and carbon sequestration (Lehmann & Joseph 2009). However, biochar is primarily researched in tropical climates rather than the temperate climates found in sub-Saharan African and most specifically Rwanda (Ahmed & Schoenau, 2015).

Whereby the common farming practices in Rwanda have left farmers vulnerable to climate change such as unreliable rains causing crop failure, widespread soil erosion and a decrease in agricultural productivity (Clay & Lewis 1996, Kagabo & Stroosnijder 2013).

Through the development of a small-scale biochar production system this agricultural trial measured the sustainability and applicability of biochar use. This project tested biochar on the common small-scale rain fed agricultural systems, measuring: soil composition, crop yield, and soil moisture throughout the growing season.

Having completed the trial in January 2017 the agricultural yields revealed biochar indeed has a potentially to improve the growth and stability of plant seedling, however biochar does not necessarily serve as a feasible alternative for the average subsistence Rwandan farmer. The production of biochar can potentially compete with valuable energy source as well as cause deforestation if not produced appropriately to the ensure the sustainable practices of biochar production. However, given the effectiveness of biochar it could serve as an opportunity for improved agricultural productivity and food security if conducted responsibly.