



Application of Nutrient Enriched Biochar to Grow Bananas at the Plantation Scale

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The majority of soils in Cameroon consist of varying laterites derived from granites. The lateritic soils are generally depleted in nutrients. The most fertile soils in Cameroon are young soils that have formed from volcanic rocks of the Cameroon volcanic line (CVL). The richer volcanic soils which are found in the southwest region and the western regions are used to grow the major cash crops, including cocoa, coffee, rubber, banana, tea, and palm fruits. The government owned Cameroon Development Corporation (CDC) and private commercial farmers in the country have resorted to the heavy use of imported agrochemicals to mitigate the serious and persistent soil fertility challenges.

Cameroon is the third largest biomass producer in Africa. This means that Cameroon has a high biomass production potential. Among the many types of biomass available for biochar production in Cameroon, empty fruit bunches (EFB) from the many palm oil plantations offer one of the largest concentration of biomass. CDC alone produces over 200,000 tons of EFB biomass each year. The corporation uses less than half of the EFB it produces in its palm oil processing mills for mulching. The remaining EFB are disposed by open burning leading to significant air pollution.

In 2015, we entered into a collaborative understanding with CDC to dispose some of its EFB by pyrolysis to produce biochar. The produced biochar is enriched with natural plant nutrients obtained from animal waste (poultry chicken manure) and volcanic lava dust from the 2001 eruption of Mount Cameroon. The biochar, chicken litter and volcanic rock dust is aged for 14 - 21 days to produce a 100% natural soil enhancer commercialized under the name "QwikGro". The QwikGro is undergoing field evaluation on three hectares of banana plantation owned by CDC. The field trial began in June 2016. Of the three hectares, one hectare of the bananas was planted using 100% (only) QwikGro, the second hectare was planted with 50% QwikGro and received 50% of the dose of artificial fertilizer that CDC uses to grow its bananas. The control was planted and fertilized with artificial fertilizer only.

The banana growth parameters collected so far (24 weeks after the bananas were planted) have showed no statistical difference among the three fertigation regimes. The bananas grown with 100% QwikGro showed signs of nitrogen deficiency after three months and were provided with 50% of the mass of QwikGro used at planting. Specifically, the 100% QwikGro mats each received 8 kg of QwikGro at planting and 4 kg after three months. Meanwhile, the 50% QwikGro mats received 4 kg of QwikGro at planting and 2 kg after three months. Flowering and fruiting was observed after 20 weeks. Our presentation will include details on our nutrient enrichment methods, the banana bunch weight and the fruit physical and nutritional parameters at maturity.