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Black Earth Project Emphasizes Integrated Sustainable Development

Producing quality coffee in rural areas is challenging enough, let alone growing a consistent volume of it. Radio Lifeline's Black Earth Project is testing the viability of biochar as a soil supplement for coffee farmers in Rwanda.

Radio Lifeline's Black Earth Project tackles one of the coffee supply chain's most challenging tasks: growing a consistent volume of quality coffee from rural producing origins. The project aims to prevent future problems of soil degradation, decreases in yield and difficulty transporting agrochemicals due to exorbitant fuel costs before they have the chance to become pressing crises, and it approaches these challenges through a program designed to perpetuate itself.

Founded in 2004, the non-profit Radio Lifeline, Barneveld, Wisc., works to provide farmers across Rwanda with radios and farmer-generated, farmer-centric programming covering agronomy, climate change, public health, food security, and other relevant topics. In 2013, Radio Lifeline launched the Black Earth Project to assess the viability of biochar, which is created by burning dried biomass in a low-to-zero oxygen environment, as a soil amendment for coffee farmers in Rwanda.

Fertilizers give soil—and the crops feeding from that soil—an immediate nutritional boost. Soil amendments fundamentally alter the structure of soil, making nutrients more available by changing the way soil passes micronutrients and water along to plants. The creation of soil-amending biochar uses materials farmers have readily available.

“Rather than let corn stalks (and other biomass like dried grasses and coffee pulp) deteriorate back into the soil, we chop them up, put them into kilns, and light a match. It's not a typical combustion; we are burning the gasses coming off of that dried material. Within 10 minutes we have high quality charcoal,” said Radio Lifeline and Black Earth Project founder and director Peter Kettler in a presentation at the SCAA Expo in Seattle in April.

Fast-growing bush beans were used as



Biomass converted to soil-amending biochar.

a preliminary test crop for biochar made in kilns donated by the Austin, Texas-based company re:char, which operates out of Kenya. “In Phase One we have 18 test plots in six cooperatives. In each coop we have three different plots: one with biochar, one with typical a NPK (nitrogen, phosphorous, potassium) chemical fertilizer, and one with both biochar and NPK. With NPK and biochar together, across the board we had a 35 percent yield increase and a 50 percent decrease in input costs. This will compound over the years as microorganisms continue to grow in the soil,” explained Kettler.

Increasing soil quality over time versus decreasing it is a novel reversal in rural Rwandan coffee production. “One of the biggest challenges for farmers in terms of fertilizers is, because they're petrochemically based, the cost keeps rising. And you've got all these logistic problems. Fertilizers are never delivered on time, or they're never delivered in the right quantity. In this kind of soil, fertilizers actually compound the problem because they increase soil acidification,” said Kettler. “Biochar is a way to allow farmers to take charge of one important aspect of what they do

while lowering their costs. Biochar will stay in the ground for up to 1000 years. Once it is added to fields, farmers never have to do another application. It's not an annual like fertilizers,” he said.

Thanks to Radio Lifeline's existing low-cost, non literacy-dependent communication network, knowledge around creating and applying biochar can easily and affordably be shared. After making the initial rounds of biochar, kilns continue to contribute to community development without additional outside training or materials. “With every kiln we also distribute a briquette maker, so that farmers can use that exact same kiln technology to make cooking fuel. This will decrease deforestation and also increase another revenue stream.”

Biochar-as-soil-amendment is still in its development stages, and the Black Earth Project is researching its specific effects on yields and quality of coffee produced. Farmers, however, don't need any final data summary to be enthusiastic about the project's potential.

“The project ticks a lot of boxes in terms of things farmers are looking to achieve: mitigation of climate change, improvements in water quality, carbon sequestration, and reversing the trends of decreasing yields due to climate,” said Kettler. “If you can decrease inputs and increase yield, it's a win-win. This isn't something you can do overnight or even in one season. Producers create biochar as they can, and apply it to farms in sections. Maybe within three, four or five years, whole farms will be treated.” He noted that this project puts farmers more firmly in the driver's seat. Coop members are voluntarily training each other because they see it's a valuable tool beyond just for them as individuals.”

Keurig Green Mountain provided most of the funding for the project. “After they put out a press release,” said Kettler, “I was getting emails from people in Indonesia, Bolivia and Colombia all asking, ‘Can we do this here?’ It proves how hungry people are for innovative, low-tech solutions.”—*Rachel Northrop*