

**ECHO Asia Biochar Initiatives**  
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The [ECHO Asia Impact Center](#) in Chiang Mai, Thailand has been researching and promoting biochar since 2011 for its potential role in soil improvement. Biochar seems especially well-suited to offer positive soil building properties and climate change mitigation strategies for smallholder farmers in Asia.



*Char from **Dendrocalamus strictus***

In August of 2012, ECHO Asia began conducting a 3-year randomized complete block field experiment to test the effects of biochar on plant health and growth at the ECHO Asia Seed Bank in Mae Ai, Thailand. Four raised beds (8m X 90cm) made out of cement bricks and filled with local soil were utilized, and experimental units (four per bed, measuring 1.5m X 90cm with 50cm buffer space) were physically separated with plastic lined cement bricks to prevent migration of nutrients, biochar, and earthworms. Bamboo char was made from *Dendrocalamus strictus* using a TLUD



*Clockwise: char, biochar, and compost aging for 3 months before incorporation in plots*

made from a 55-gallon drum. Treatments were: 1) control soil without amendments, 2) soil with compost added; 3) soil with char added; and 4) soil with biochar added (equal parts

of char and hog manure compost left to age for 3 months). All additions to the experimental units were made on an equal weight basis of  $2\text{kg m}^{-2}$ .

Two cropping cycles per year will be utilized, with the first cycle comprised of 6 plants of direct-seeded grain amaranth and 6 transplants of 'Clemson Spinless' okra, and the second cycle comprised of 6 plants of direct-seeded foxtail millet and 6 transplants of yellow eggplant in every experimental unit. This cropping cycle



*Experimental units*

The office also has plans to start another experiment that will investigate the properties of different chars made from different feedstocks using different gasification stoves. The goal is to determine the boil time for a predetermined amount of water from a pre-determined amount of feedstock, the amount of resultant char, the temperatures achieved by feedstock and stove type, and the properties of the resulting char (pH, CEC, etc.).

arrangement will be followed for three years without additional fertility inputs. Dependent variables include soil testing of the experimental units, soil testing of the amendments, plant height, plant yield, % necrosis and chlorosis, and chlorophyll content (as a proxy for nitrogen deficiency) using an atLEAF+ meter (similar to a SPAD meter). The first year of cropping is finished, but results have yet to be analyzed.



*Plots with eggplant and foxtail millet*