



Project Details

Development of Biochar Production and Functionalization for Cocoa Cultivation

To produce biochar using unused biomass from cocoa pod husks, we established a biochar production site. We developed carbonization equipment made of metal and brick, featuring a smoke recovery system to collect wood vinegar. The facility includes a roofed workspace and a dedicated area for drying biomass.

To add functional properties to the biochar, we also investigated the processes for importing and registering additives and biostimulants from Japan and Europe that activate soil microorganisms. Functional biochar is expected to stimulate beneficial soil microbes (such as mycorrhizal fungi and Trichoderma), enabling better utilization of soil nutrients and suppressing diseases like Black Pod.

Currently, we have established a demonstration plot to verify the efficacy of functional biochar, collaborating with soil and microbiological researchers from a local cocoa research institute. Furthermore, we utilized this demonstration plot and the biochar production site to provide training for cocoa farmers on biochar production methods and its application effects.



Project outputs

Through this project, we successfully developed facilities for producing high-quality biochar and wood vinegar and established demonstration plots to verify their efficacy.

Development of Carbonization Systems:

We developed two types of carbonization systems: metal kilns that produce biochar with long-term soil stability through rapid, high-temperature carbonization (above 500° C)—despite a lower wood vinegar yield due to gas combustion—and brick kilns that, while slower at lower temperatures (200–300° C), can process various biomass sizes and recover large quantities of wood vinegar to produce nutrient-rich biochar for agricultural advantage; by utilizing both, we have established an efficient production model and a highly viable business for functional biochar.

Demonstration and Community Engagement: At the demonstration plots, functional biochar is applied to seedling production, transplanting, and mature trees to show cocoa farmers its short- and medium-term effects. Collaboration with soil and microbiological researchers from the local cocoa research institute has enhanced the credibility of the demonstration and increased interest among nearby farmers.

We also hosted a **Farmers Field Day**, where researchers explained the challenges of cocoa cultivation in Ghana and the expected benefits of functional biochar. The active Q&A session allowed us to better understand the issues farmers face and their expectations. Furthermore, this event served as a promotional opportunity and allowed us to gather information on competing products and acceptable price points.

Future Strategy and Roadmap

We will continue monitoring functional biochar's effects at our demonstration plots while aiming for the commercialization and registration of both biochar and biochar-compost (poultry manure) by 2026. To bypass the lengthy research and registration process required for cocoa applications, we will first market these products for vegetable and grain cultivation; this strategy allows us to gather direct user feedback and demonstrate immediate benefits to local farmers. In parallel, we will complete the registration of biostimulants to establish a comprehensive production and sales framework in Ghana. Furthermore, we plan to significantly increase our production capacity by adding more metal-based kilns and biomass transport vehicles to meet growing market demand.