

# Advantage/Expected Result

- Increased efficiency by producing two valuable products simultaneously.
- Reduced waste by utilizing both solid and liquid byproducts.
- Potential for increased income for smallscale farmers and producers.
- Environmental benefits through carbon sequestration and the use of natural agricultural inputs.

# **Points of Attention**

- Kiln Design and Construction
- Maintain a low-oxygen environment for pyrolysis, while ensure sufficient airflow to sustain the burning process.



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# **Our farmer's experience**



Mr. Krit, farmer from Teemoolay, Chiang Mai, Thailand

I am a farmer who used to struggle with soil degradation and pests, so I started looking for natural solutions. That's when I learned about biochar and wood vinegar.

After learning how to make biochar and wood vinegar at ECHO Asia, my soil improved, my plants grew stronger, and pest problems decreased. My crops became healthier without relying on chemicals, reducing costs while ensuring safer produce.

Now, I not only improve my own farm but also share this knowledge with fellow farmers, believing that sustainable agriculture starts with using natural resources wisely.

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## **ALiSEA Team**

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# Technical Leaflet: THE 'DO-ALL' BIOCHAR AND WOOD VINEGAR KILN



Location of implementation : ECHO Asia Impact Center, San sai, Chiang Mai, Thailand

## Agroecological system:

Zone	Main activities	Climate	Rainfalls	Temperature
Plain	rice/ vegetable	Seasonally tropical (rainy season: May to October)	~1,200 mm/year	Avg max: 36°C - Avg min: 23°C



# How to make Biochar and Wood Vinegar

The "Do-All" Biochar-Wood Vinegar Kiln refers to a type of kiln designed to produce both biochar and wood vinegar simultaneously. Understanding the steps requires looking at the general principles of pyrolysis and how these kilns are designed.

## **Step 01: Preparation and Loading**



- Gather the biomass such as residues, or other organic materials and place it inside the kiln.
- The loading method can vary depending on the kiln design. It is important to pack the biomass in a way that allows for even heating.

## **Step 02: Heating and Pyrolysis**



- Apply heat to the kiln. This initiates the pyrolysis process, where the biomass is heated in a low-oxygen environment.
- During pyrolysis, the biomass breaks down, releasing volatile gases and leaving behind solid biochar.

Step 03: Condensation (Wood Vinegar Collection)



- "Do-All" kilns are designed to capture the volatile gases. These gases are channeled through a cooling system, where they condense into liquid wood vinegar.
- This condensation process usually involves pipes and collection containers.

#### **Step 04: Biochar Collection**



- Once the pyrolysis process is complete, allow the kiln to cool down.
- Carefully remove the biochar from the kiln

# Step 05: Wood Vinegar Processing



• The collected wood vinegar may require further processing, such as settling or filtering, to remove impurities.

## Key Considerations for "Do-All" Kilns The design of the kiln is crucial for efficient wood vinegar collection. It must have a system for channeling and cooling the volatile gases.

