ONFARM CLIMATE ACTION FUND

BIOCHAR

BIOCHAR: A SIMPLE SOIL HEALTH BOOSTER

Biochar is a carbon-rich solid material produced when plant or organic waste is broken down at high temperatures with very little oxygen (a process called pyrolysis). When applied to soil, biochar adds stable carbon and can improve growing conditions for many crops. It may also help the environment by increasing carbon sequestration and reducing greenhouse gas (GHG) emissions.

WHY USE BIOCHAR?

Biochar is especially useful on lower-quality soils—for example, soils with low pH, low organic matter, or poor water infiltration. In these conditions, biochar can help boost crop productivity and support long-term soil health. Even on high-quality soils, biochar can offer environmental benefits, though yield gains are less likely.

WHAT WE KNOW

Biochar has been shown to increase soil carbon more effectively than burning residues or letting biomass decompose. When managed well, biochar applications have improved crop yields by an average of 11%. Biochar can also influence soil structure and chemistry, which may change nutrient cycling and GHG emissions.

RESEARCH FROM TEMPERATE REGIONS HAS SHOWN THAT BIOCHAR CAN:

- **Raise soil pH**
- **Improve nutrient availability**
- **Increase microbial activity**

All of these changes support healthier, more productive soils.

"TIE-UP" NUTRIENTS?

Some producers worry that biochar could temporarily "tie up" nutrients, reducing availability to crops. By charging or inoculating biochar with nutrients—such as fertilizer, manure, or compost—before it goes onto the field. This helps ensure that nutrients stay available to the crop.

PRACTICES FOR CHARGING (INOCULATING) AND APPLYING BIOCHAR

Charging (or inoculating) biochar means filling its pores with nutrients or microbially active materials.

Biochar can be charged using a range of materials—including liquid manure, fertilizer, solid manure, or compost—depending on what is available on the farm. There is no single "best" method, but the goal is simply to saturate the biochar so it's ready to support crop growth.

Biochar can be applied any time the soil is not frozen. Spring application is common, but adding biochar alongside fall cover crops may provide added benefits.

There is no single recommended application rate, but field studies typically use 1–10 tons per acre. Higher rates can bring bigger benefits, but even low-rate applications often improve soil health at a lower cost.

INOCULATING WITH LIQUID MANURE OR FERTILIZER

Biochar is highly porous and often floats when first mixed into a liquid.

To properly inoculate it:

- Mix the biochar into the liquid substrate.
- Keep it submerged until the pores fill and the biochar is saturated.
- Apply the resulting slurry at rates that match normal manure or fertilizer applications.

There is no set ratio of biochar to liquid; farms can calculate this based on their desired application rate.

PRE-WETTING

If constant agitation isn't practical, another option is to pre-wet the biochar and mix a liquid (i.e., water, liquid manure or liquid fertilizer until it absorbs all it can hold.

This pre-wetted biochar can then be:

- Mixed into liquid manure or fertilizer
- Combined with solid manure or compost

For solid mixtures, leaving the biochar and manure/compost together for 3–14 days in a moist environment allows nutrients and microbes to move into the biochar's pores.

SLOW CHARGING WITH SOLID MANURE OR COMPOST

Dried biochar can also be added directly to compost or manure piles for long-term charging. Periodically check the moisture level to ensure the environment stays damp enough for microbial activity.

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