June 7, 2024

RE: US Biochar Initiative Letter of Support for the Continued Inclusion of Conservation Practice Standard 336 in the CSAF Mitigation Activities List

Dear USDA NRCS Climate Office,

On behalf of the United States Biochar Initiative (USBI), I am writing to express our strong support for the ongoing inclusion of conservation practice standard 336 as a provisional conservation practice in the Climate-Smart Agriculture and Forestry (CSAF) Mitigation Activities List. Based on our understanding, permanent inclusion in this list requires that biochar as a soil amendment be included in the COMET greenhouse gas model. Efforts are underway at USDA and elsewhere to collect the data required to include biochar as a soil amendment in this model, but in the meantime, we strongly recommend that biochar remain a provisional activity until these efforts are completed and biochar is included in the COMET model.

USBI is a 501(c)(3) non-profit organization that has been at the forefront of promoting responsible biochar production and utilization since 2009. We represent a concerted effort by our network of scientists, researchers, educators, producers, and practitioners, to highlight the potential of biochar in addressing agricultural and environmental challenges while contributing to global efforts to combat climate change.

Biochar as a soil amendment is one of the best methods for sequestering carbon in soils and providing long-term improvements in soil health including improvements in soil organic matter, soil micro-organism habitat, and aggregate stability. These specific benefits are clearly delineated under NRCS conservation practice standard 336, though biochar provides additional soil health and climate benefits.

Biochar itself is much like charcoal, except that it is used as a soil amendment instead of for heat. The production of biochar from waste biomass converts relatively labile carbon into biochar, which has a chemical structure resistant to microbial degradation (Zimmerman, 2010). This material can then be used in a range of beneficial applications including as a climate smart soil amendment. Unlike other climate smart practices that boost soil health and soil carbon, biochar provides a semi-permanent improvement with multiple studies showing that the majority of biochar persists for at least 100 years in soil (Woolf et al., 2021), and likely much longer than that (Azzi et al., 2024). Indeed, in many soils, the oldest carbon is pyrogenic, derived from historic wildfires which were once much more common in many ecosystems which have since been converted to agriculture (Bird et al., 2015). Further, biochar as a soil amendment is one of the few soil health practices that is compatible with high disturbance cropping systems such as potatoes, onions, and sugar beets.

Beyond sequestration of the carbon in biochar to improve soil health and soil carbon, biochar as a soil amendment can provide additional productivity, soil health, and climate benefits including:

- Improving crop yields, by an average of just over 10% based on a recent meta-analysis (Schmidt et al., 2021) with larger benefits common in sandy soils (Ye et al., 2020);
- Increasing available water holding capacity by an average of 14%, 21% and 45% in fine, medium, and coarse textured soils, respectively, based on a recent meta-analysis (Razzaghi et al., 2020);
- Reducing nitrogen leaching and nitrous oxide emissions by an average of 15% and 38%, respectively, with the greatest benefits in sandy soils, based on a recent meta-analysis (Borchard et al., 2018); and,
- Increasing the accumulation of non-pyrogenic soil organic matter (i.e., typical soil organic matter), with a magnitude similar to the application rate of pyrogenic carbon (i.e., carbon in bicohar; Blanco-Canqui et al., 2019).

The range of benefits from biochar application clearly point to the fact that biochar is one of the best available climate-smart agricultural practices, should be encouraged by NRCS, and be included in the CSAF Mitigation Activities List.

Based on guidance from NRCS, permanent inclusion in the CSAF list requires that biochar as a soil amendment be included in the COMET model. While we believe that sufficient evidence currently exists for biochar's inclusion in the COMET model, we also recognize that updating this model can only be completed through a clearly defined process that may take several more years. We hope and anticipate that ongoing efforts at USDA, particularly as part of the Biochar Atlas project, and potentially other NRCS funded projects including Conservation Innovation Grants, will provide the evidence required to include biochar in the COMET model.

These analyses should clearly consider the impacts of shipping distances on the GHG benefits of biochar as a soil amendment, which may be a concern for NRCS. While we recognize this concern, the overall emissions associated with shipping biochar, even up to 1,000 miles by truck, are quite small compared to the climate benefit of biochar as a soil amendment, even when only considering the benefit associated with sequestration of carbon in biochar and ignoring all other climate benefits such as reduced nitrous oxide emissions and increased accumulation of non-pyrogenic carbon. The following table provides approximate values for the carbon emissions associated with shipping 120 cubic yards of biochar via semi-truck and walking floor trailers a range of distances.

Travel Distance (miles)	Trucking Emissions (ton CO_2 per truckload)	Net CO_2 sequestration (ton CO_2 per truckload)
100	0.14	40.7
500	0.70	40.1
1000	1.39	39.4

The following assumptions were made when calculating these values:

- The bulk density of biochar is 300 pounds per cubic yard, which is typical for wood biochar which commonly ranges from approximately 200 to 400 pounds per cubic yard.

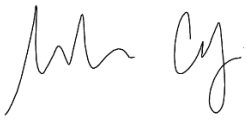
- Each ton of biochar sequesters 2.5 tons of carbon dioxide equivalent, which is a typical value for wood biochar under the most commonly used biochar carbon sequestration estimation algorithm (Woolf et al., 2019).
- Each truck can transport 120 cubic yards of biochar, or approximately 18 short tons, representing a carbon sequestration potential of approximately 41 metric tons of CO_2 per truck.
- Trucking emissions are equal to 1.387 kg CO_2 per mile based on US Environmental Protection Agency estimates for 2022 (US EPA, 2023).

These data suggest that the total emissions from biochar shipping are quite small, though we still believe these emissions should be considered in the COMET model for biochar and for other conservation practices, when applicable.

In closing, we want to reiterate our recommendation that biochar remain a provisional conservation practice in the Climate-Smart Agriculture and Forestry (CSAF) Mitigation Activities List until sufficient data exists for biochar as a soil amendment to be included in the COMET model. We also want to express our appreciation for the work that USDA has done to focus on climate smart agricultural practices, which we believe are among the most effective things that can be done to mitigate climate change while also supporting rural farming communities.

Thank you for your attention to this important issue.

Sincerely,



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