

EXPANSION OF THE PACIFIC NORTHWEST BIOCHAR ATLAS TO A NATION-WIDE DECISION SUPPORT TOOL: ONLINE RESOURCES BIOCHAR USERS AND PRODUCERS

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Biochar application to agricultural lands has the potential to reduce atmospheric C emissions, increase soil C storage, and improve plant productivity across soils, climates, and cropping systems. Although economic incentives to apply biochar are available to farmers in certain regions, barriers to the adoption of biochar-based practices in agriculture continue to impede implementation. These barriers include: the inability of planners and farmers to access site-specific guidance, decision support, and generalized recommendations; an inability to predict C capture at scale; and misinformation regarding the regional markets and performance characteristics of biochar products. The [PNW Biochar Atlas](http://PNWBiochar.org) (PNWBiochar.org) is the only publicly available tool that allows biochar users and producers to match soil deficiencies to biochar properties to increase productivity and decrease economic risk. This online tool is limited to soils and biochars specific to users in the Pacific Northwest region of the United States (Oregon, Washington, and Idaho). Other computational constraints limit the geographic relevance and function of the tool.

Recent incentives from government agencies has potentiated the need for nationwide-decision support tools. To address this need, we are expanding the geographic and functional range of the existing decision support tool to provide guidance across the United States. The existing biochar selection tool will be expanded by collecting ~150 biochars from producers located throughout the US. To represent variability within production processes, biochar will be collected over several months (four samples per year) and analyzed at different laboratories. The physicochemical characteristics of each biochar will be analyzed using IBI standards. The results of these analyses will be added to the existing database. To allow users to pair biochar properties with soil deficiencies, soil properties from the Soil Survey Geographic Database will be integrated into a map-based interface using a GIS platform. A stand-alone model that estimates a lifecycle analysis (LCA) of biochar application to soils will also be developed. The program, BGRAM v2.0, will be enabled for multiple feedstock classes, biochar production methods, soil types and alternative biomass management strategies, and be capable of operation by general and expert users while leaving room for further improvements, expansion, and eventual linkage with other relevant codes such as [GREET](#) and soil biogeochemical process models such as [DAYCENT](#). In collaboration with the American Farmland Trust, US Biochar Initiative, and others, the tool will be tested by farmers, conservation planners, technology translators, and biochar producers to improve both predictive value and user experience.

Here, we describe the tool and discuss how it can help expand biochar markets by pairing specific biochars with specific soil management goals to maximize agronomic and environmental goals.