

Abstract

Climate change poses increasing risks to the world's ecosystems and agricultural systems as greenhouse gas emissions are contributing to the unprecedented warming of the biosphere. One mechanism for capturing and storing carbon dioxide (CO₂), a primary greenhouse gas, is the production and application of *biochar*, or carbonized biomass created in an oxygen-limited environment. The United Nations Intergovernmental Panel on Climate Change (IPCC) identifies biochar as stable organic carbon that can increase soil carbon sequestration, resilience, and fertility. Biochar researchers and enthusiasts have worked to identify scenarios that are conducive to the application of biochar and maximize its potential benefits. Researchers have addressed biochar feedstock, production technologies, physical and chemical properties, and biochar's potential in energy generation, environmental remediation, resource management, land rehabilitation, and agricultural production. The Biochar for Agriculture Mapping Tool (BfAMT), which integrates Esri's Collector for ArcGIS mobile application with a stand-alone web application developed with Esri's Web App Builder (WAB), was designed to collect and display volunteered geographic information (VGI) about biochar agricultural sites on a global scale. With its editable feature services and map-driven forms, the BfAMT allows users to document their site-specific research and experimentation with biochar, thereby creating a geodatabase of biochar project locations, site attributes, and file attachments that facilitates research, coordination, and information sharing within the biochar community. Feedback from biochar users who beta-tested the BfAMT and completed an online survey questionnaire are presented and discussed. Recommended improvements offered by first-time users help guide the development and customization of the BfAMT as a workspace, spatial database, and promotional tool for local, regional, and global biochar activities.