Research at West Virginia State University seeks to understand and develop technologies to promote sustainable and environmentally sound use of soil, water and renewable resources in Appalachia. This project has led to the development of a value-added product for the bioenergy industry to help mitigate the impact of storm water runoff, improve soil fertility and make disturbed areas and reclaimed mine lands more productive.

Natural Resources Management

Who cares and why?

Some areas of Appalachia have soils with low fertility and agronomic value. In addition, urban development and extractive industry leave behind vulnerable and disturbed lands. If not properly managed, this activity leads to soil erosion, excess water runoff, decline in soil productivity and deterioration of freshwater quality. Moreover, the region's inherently acidic and nutrient-poor soils need improvement to increase agronomic productivity and better contribute to the agriculture of the local economy.

What has the project done so far?

Research at West Virginia State University seeks to understand underlying processes and develop technologies and management practices to promote local agricultural economics and to assure the sustainable and environmentally sound use of soil, water and renewable resources in Appalachia. Current activities are focused on identifying potential waste streams and impaired land-use and practices; evaluating the use of industrial, agricultural and municipal byproducts as soil amendments; developing management practices to improve soil function, and agronomic and economic value; and minimizing the adverse impact of anthropogenic activities on natural systems.

Biochar is a dusty, charcoal-like carbonaceous co-product of pyrolysis, the process of converting biomass into petroleum-replacement products. Its use as a soil amendment can improve soil fertility and offset carbon emission. WVSU is evaluating the environmental and agronomic impact of biochar as a soil amendment in typical Appalachian soils and developing processes to improve biochar's agronomic value.

Excess nutrients in wastewater are an environmental concern. Phosphorus removal from wastewater can be achieved by precipitation of the element in the form of struvite mineral. The

recovered mineral contains additional nutrients (nitrogen and magnesium) and can be a used as fertilizer. We are evaluating performances of plant response to struvite as a replacement for di-ammonium phosphate fertilizer.

Impact Statement

Research has led to the development of biochar as value-added product for the bioenergy industry, with the potential to mitigate the impact of storm water runoff on water quality, divert selected waste streams into valuable products to improve soil fertility, improve productivity of disturbed areas and reclaimed land, and evaluate selected native plants as bioenergy crops.

What research is needed?

Proper reclamation and management practices can improve soil fertility and function, increasing agronomic land inventory and local production capacities. WVSU is studying the effects of different management practices on soil fertility and selected soil properties and evaluating the use of reclaimed mine land for biomass crop production.

Want to know more?

Dr. Amir Hass, Research Scientist
(304) 720-1025
amirhass@wvstateu.edu

Additional links: http://www.umes.edu/ard/Default.aspx?id=46285

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