Biochar

A biofuel – and then some!

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Project in Eastern Cambodia;

Danish Organic Dairy supports farmers in

Doing climate mitigation

- through improved livelihoods, which is obtained
- through sustainable agriculture *and* social organizing

Which livelihoods problems?

- Lousy soil w. low fertility
- Water; either too much or too little
- Water needs pumping, pumps driven by gasoline, gasoline expensive, big expenses, livelihood problem

So people need

- improved soils and

- cheap fuel

Biochar comes to the rescue....

....and ***what*** is biochar....???

It is …

- When biomass is burnt in the absence of oxygen, pyrolysis occurs and the biomass can be turned into a liquid (‘bio-oil’), a gas and a high-carbon, fine-grained residue: *biochar*.

- Biochar is finely ground charcoal with some similarities to activated charcoal.

- Biochar offers an extremely high surface area to support microbiota that catalyse processes that, among other things, reduce nitrogen loss and increase nutrient availability for plants. (Winsley, 2007)

it does..

- The carbon in biochar improves soil structure and water retention, enhances nutrient availability, lowers acidity, and reduces the toxicity of aluminium to plant roots and soil microbiota. Biochar may help reduce the bioavailability of heavy metals and endocrine disruptors.

- Modern experimental research demonstrates that biochar application can substantially lift the productivity of crops such as soybeans, sorghum, potatoes, maize, wheat, peas, oats, rice and cowpeas.

it is made..

Biochar has been made from grasses, woody material, straw, corn stover, peanut shells, olive pits, bark, sorghum, and sewage.

Hot to use the bio-fuel from biochar?

Mobile pyrolysis plants have been designed that not only convert biomass into bio-oil, biochar, and gas, but also use the energy from the gas to power the process, with no other energy needed.

With existing technology, bio-oil is best used directly (or with minor modifications) as process heat (including greenhouse heating) and in stationary engines, although electricity generation may be the most promising option. (Wesley, 2007)

its potential...

Using published projections of the use of renewable fuels in the year 2100, bio-char sequestration could amount to 5.5–9.5 Pg C/ yr if this demand for energy was met through pyrolysis, which would exceed current emissions from fossil fuels (5.4 Pg C /yr). Bio-char soil management systems can deliver tradable C emissions reduction, and C sequestered is easily accountable, and verifiable. (Lehmann et al., 2006)

We conclude that black carbon can act as a significant carbon sink and is a key factor for sustainable and fertile soils, especially in the humid tropics. (Glaser et al., 2004)

And it is quickly becoming more than 'pie in the sky'

One example: Some large rice mills in Thailand have already perfected this approach. Using rice husks to produce energy and biochar simultaneously, these mills reduce their fossil fuel bill and carbon emissions, and sell the biochar by-product to producers of bio-fertilizers. (Rice today, April-June 2007)