

Linking invasive tree species management with biomass energy and biochar production to help small holder farmers restore soil fertility

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The Limpopo Province is the poorest region in South Africa. Effective strategies for poverty alleviation have done little to empower the majority of small, rural farmers. We propose a systems dynamics approach that combines invasive tree species management with integrated biochar systems to increase soil fertility, water and air quality, carbon sequestration, and the efficiency of resource use by small farmers. By incorporating biochar stoves with culturally sensitive designs, small holder farming systems can benefit from reduced emissions, less input dependency, and shared stewardship of fragile environments under agro-ecological principles to minimize impact and restore biodiversity. The biochar system discussed engages the root causes of poverty while at the same time being a cost effective strategy for helping to mitigate global climate change. Conservation through utilization in South Africa's northern province can prove to be a holistic answer to endemic malnourishment and rampant poverty.

A rational pricing mechanism for the creation of a world carbon neutral energy economy, and some implications

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The cycle governing carbon is in disequilibrium. Carbon is the element essential for the energy for life on earth. It is characterized by the short term carbon cycle. Photosynthesis converts solar energy to chemical energy which is then stored in green plants. Because it removes carbon from the atmosphere it is a carbon negative process (C-). Respiration/oxidation/combustion is the means by which this energy is released to non-herbaceous life. Because these processes emit carbon into the atmosphere they are carbon positive processes (C+).

Together, photosynthesis and oxidation create a carbon neutral (C=) equilibrium. When we superimpose fossil fuel combustion which is C+ the carbon cycle is no longer in equilibrium, resulting in increased atmospheric concentration of CO₂, and creating a significant environmental challenge.

Consumers of energy, acting in their own perceived self interest consume fossil fuel energy. The commodity market for carbon, the largest commodity market in the world has the perverse characteristic that energy consumers acting in their own perceived self interest are creating the most daunting problem facing mankind. This is a classic example of the tragedy of the commons.

Substituting a C= source for fossil fuels would decrease atmospheric CO₂, but could have serious negative repercussions for economic activity. Alternatively complementing C+ fossil fuel combustion with a C- process could balance the carbon equation. Economically, because C- is used to complement the C+ process it has many profound and virtuous repercussions.

The ability to mandate C= consumption with public policy could effectively mitigate fossil fuel consumption. It would create a market constraint that drives the largest commodity market in the world toward protection of the commons. It has the virtuous characteristic that consumers of energy, still acting in their own perceived self interest would develop solutions, growing a C- energy sector and creating trillions in new wealth and millions of jobs. Because low cost producers of C- are likely to be emerging economies, well managed, this sector could become a powerful equalizer of global wealth, resulting in immediate economic and financial benefits, and significant long term positive changes in agricultural, health, and social welfare.

Hands-On Biochar Education in Two Schools in the Pacific Northwest

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Report on biochar education programs at an elementary school in Oregon and a secondary school in Washington state. These multidisciplinary programs not only explore cultural and technical issues in the production and use of biochar, but they are building infrastructure at each school to process waste and grow food. Presentation of an article to be published in Green Teacher magazine.