Institute for Governance & Sustainable Development

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Biochar Is Key Strategy for Fast Climate Mitigation

Biochar and Other Carbon-Negative Strategies Necessary to Win Climate Battle

Washington, DC, August 18, 2010 – Biochar could solve a significant piece of the climate problem – 12 percent of CO_2 emissions – according to a study published last week in *Nature Communications*. The study estimated CO_2 mitigation potential from sustainably-produced biochar that would not endanger – and could actually enhance – food security, habitat and soil conservation. The authors conclude that turning biomass waste into biochar could be more effective in mitigating climate change than using it to produce biofuels, which could mitigate 10 percent of CO_2 emissions compared to biochar's 12 percent, although they note that the climate benefits of biofuel vs biochar can vary by region. It is also significant that the biochar production process allows the choice of diverting some of the syngas biomass carbon to biofuels, while sequestering the rest.

Biochar is produced through a process called pyrolysis: heating waste biomass at low temperatures with very little oxygen to produce a char. The biochar is a stable form of carbon that sequesters the CO_2 that plant biomass would normally release when decomposing. Besides helping fight climate change, biochar can also be used a soil amendment in programs to enrich soils lacking in nutrients for food production.

"Biochar is a winning climate strategy that policymakers need to start supporting now to start drawing down excess CO_2 that is on the verge of pushing the climate system past the tipping point for irreversible climate changes," said Durwood Zaelke, President of the Institute for Governance & Sustainable Development.

Recent impacts of extreme acts of nature around the world, from Pakistan's flooding and Moscow's heat wave and wildfires, to the large ice sheet that broke off of the Petermann Glacier in Greenland, are evidence of the climate system's fragility and make it clear that fast mitigation is urgently needed to avoid further disastrous climate-related events.

CO_2, unlike other well mixed greenhouse gases, does not break down in the atmosphere. Its natural removal depends upon the absorption and eventual sequestration in the oceans or land as part of the natural carbon cycle. Approximately 65% of emitted CO_2 is removed from the atmosphere within a hundred years through fast equalization with the oceans and biosphere. The remainder stays trapped until drawn down through much slower processes with an additional 15-30% being removed over the next 5,000 years, and the remaining ~10% after 400,000 to a million years. This very long lifetime makes it essential to develop and deploy "climate negative" technologies, starting with biochar, to draw down CO_2 on a timescale of decades to a

century or less, to prevent irreversible and catastrophic climate impacts.

"Time is short – unfortunately, even with aggressive cuts in CO_2 emissions, we will not see significant cooling for a very long time, likely centuries. To avoid rising temperatures pushing us beyond the tipping points for irreversible impacts, we need biochar and other carbon-negative strategies," added Zaelke.

Other carbon-negative measures include better management of forests and implementing sustainable practices in the agricultural sector, as well as perfecting new technologies such as air capture of CO_2 (capturing air and "scrubbing" out the CO_2) and Calera's process of capturing CO_2 from power plants and other sources and precipitating it out as solid calcium carbonate that may be able to replace part of the cement used in the production of concrete. (Subtracting the captured CO_2 emissions from power plants from the energy use and avoided emissions from the displaced cement can result in more than 100% reduction of CO_2 from the cement).

"Avoiding future emissions is absolutely crucial, both in terms of CO_2 and short-lived greenhouse gases and pollutants such as black carbon, HFCs, methane, and ground-level ozone. But we will still need carbon-negative strategies to get rid of the emissions that are already up there doing the damage today," said Zaelke.

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Sustainable biochar to mitigate global climate change, by Dominic Woolf, James E. Amonette, F. Alayne Street-Perrott, Johannes Lehmann & Stephen Joseph, *Nature Communications*, 2010. http://www.nature.com/ncomms/journal/v1/n5/abs/ncomms1053.html

See also:
Reducing abrupt climate change risk using the Montreal Protocol and other regulatory actions to complement cuts in CO2 emissions, by Mario Molina, Durwood Zaelke, K. Madhava Sarma, Stephen O. Andersen, Veerabhadran Ramanathan, and Donald Kaniaru. *Proceedings of the National Academy of Sciences*, 2009. http://www.pnas.org/content/early/2009/10/09/0902568106.full.pdf+html

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