



## May 2011 News from the International Biochar Initiative

27 May 2011

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### World Bank Study of Biochar Projects in Developing Countries Nearing Completion

IBI and Cornell University have been working since October 2010 on a study of developing country biochar projects for the World Bank. The IBI network has played a critical role in the study by providing information on projects in various stages of implementation through two surveys of IBI members and subscribers. IBI wishes to thank everyone who participated in the surveys and who submitted project information. Through these efforts we have learned a great deal of valuable information about biochar feedstocks, technologies, and applications. A follow-up survey helped identify potential barriers and incentives for implementing household and village scale biochar projects in the developing world.

The final report will include a Life Cycle Assessment of four biochar projects. The report is scheduled for completion by the end of June 2011 and the World Bank plans to make it available to the public. Earlier this month, IBI presented the survey results to the World Bank at a review meeting in Washington DC, where IBI board chair, Johannes Lehmann, also presented a current summary of biochar research that will be included in the final report. Thea Whitman, from Cornell University, presented a system dynamics model used to evaluate the climate change impact of biochar cook stoves in Western Kenya, and Kelli Roberts, also from Cornell, presented preliminary results from the Life Cycle Assessment case studies that will appear in the final report. The survey data from 150 biochar projects located in 38 developing countries is available now on the IBI website at: [http://www.biochar-international.org/sites/default/files/IBI\\_Survey\\_5-11-11\\_online.pdf](http://www.biochar-international.org/sites/default/files/IBI_Survey_5-11-11_online.pdf).

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### Update on IBI's Characterization Standards

IBI's initiative to create transparent, globally-developed and accepted standards for biochar characterization, production, and utilization has completed the most recent round of working group discussions focusing on testing and assessment methods. Participants highlighted that the first full version of the standard will need to exist as a living document and be updated as biochar science continues to develop over time.

In order to adhere to national and international standard-setting organizations and processes, and to prove biochar's efficacy as a soil amendment and agricultural product, the standard will need to meet commonly available standardized testing and assessment methods. Since no peer-reviewed, internationally-accepted standards currently exist for biochar—a function of the relative infancy, as an industry—we must work with the existing standards and tests to adapt them to the biochar industry. In the future, as published and standardized tests become available, the standards will evolve and be much more specific to biochar. Additionally, it is expected that this first set of standards will allow the biochar community to 'test drive' the standards and provide input and experience to IBI that will be invaluable to, and drive the development of further updates over time. The process will also create opportunities for and

allow the maturation and availability of peer-reviewed, industry-standard, directly biochar-relevant property tests to be developed, published, and become accessible to the community.

The end product of this effort is the establishment of biochar standards developed in a global, transparent, scientifically-based process. The goal in this particular phase of the work is to produce a universally developed characterization and standards document that any of the IBI members or member organizations can utilize as a basis for governmental and third-party certification agencies to develop national biochar standards. Ultimately, IBI will be developing its own biochar material certification program based on these standards. The second version of the standards draft and all other updates are available at:

<http://www.biochar-international.org/characterizationstandard>.

We welcome all comments and suggestions from the biochar community as we proceed with development of these critical standards.

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## Profile: The North Carolina Farm Center for Innovation and Sustainability: Setting up Large Scale Biochar Field Trials

The North Carolina Farm Center for Innovation and Sustainability (United States) is committed to proving the benefits of biochar in agriculture. The mission of the non-profit organization is to collaborate with farm owners and leaders to demonstrate innovative and promising technologies that are both economically and environmentally sustainable for local communities. A 2009 national Conservation Innovation Grant (CIG) award from USDA provided funding to enable adding biochar as one of these promising technologies. As a result, the Farm Center is now assessing biochar's potential for improving soil conditions and agricultural productivity in practical ways to reach the widest range of rural beneficiaries.



Although there are a number of current greenhouse trials and small scale biochar field trials, there have been many fewer large scale field application trials to demonstrate the use of biochar in agricultural systems. The Farm Center is working on this challenge by managing a large biochar assessment site, encompassing 16 acres on two farms in southeastern North Carolina. The purpose is to explore how applications of biochar can be integrated into a working farm's cultivation practices to improve crop output and growth, especially by incorporating the material as a soil amendment in North Carolina's poorer sandy soils. Richard Perritt, the Farm Center's director, believes that acceptance of biochar as a mainstream agronomic practice will be most encouraged by showing improvement in soils and persuading farmers to engage in efforts to combat climate change by sequestering carbon.

To read the remainder of this story, see:

<http://www.biochar-international.org/profiles/northcarolinafarmcenter>

Photo: Farm Center director Richard Perritt at one of the biochar test sites; courtesy of NC Farm Center.

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## Pacific Pyrolysis: Participating in the Australian Research Agenda while Pursuing Commercial Opportunities for Biochar Production

With the great interest in biochar's use for carbon sequestration and as a soil amendment, the demand for research biochar from specific feedstocks has grown significantly. Based on the New South Wales (NSW) Central Coast, Australia, Pacific Pyrolysis (PacPyro) is collaborating with research institutions and projects to supply a source of slow pyrolysis biochar from multiple feedstocks and at the same time designing and building slow pyrolysis units.



### *Tailoring the Product to Research Projects*

For more than ten years, BEST Energies Australia and PacPyro (formed to commercialize the technology) have worked on slow pyrolysis process development, engineering, and control systems to produce renewable energy and biochar, while reducing waste. Over the course of this development, they have designed, built, and operated a series of prototypes. The pilot facility based in Somersby, NSW, is currently producing tons of biochar for research programs and on-farm demonstrations out of multiple feedstocks such as municipal green waste, wood waste, bagasse (sugar cane trash), nut shells and husks, crop residue, animal bedding and manures, paper sludge, bio-solids (waste water sludge), and industrial organic waste. The material produced at the Somersby plant has been used in field trials since 2006 as part of an on-going research collaboration with the NSW Department of Primary Industries (DPI). A range of experimental programs have tested the performance characteristics of the product in different soil types, climates, crops and land management practices. Trials of various kinds have been established across Australia and international trials have been conducted in New Zealand, the Netherlands and the United States. Research collaborators on these trials include: CSIRO (the Commonwealth Science and Industrial Research Organisation of Australia), NSW Department of Industry and Investment, University of NSW, Sydney University, Cornell University and more.

To read the remainder of this article, please see:

<http://www.biochar-international.org/profiles/pacificpyrolysis>

Photo: PacPyro pilot facility to produce research grade biochar; courtesy of PacPyro.

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## Subscribe to Biochar News and Announcements through IBI RSS Feeds

As part of IBI's website upgrade, all news, blog postings, and industry press releases are available as RSS feeds to our network. Subscribers to RSS feeds automatically receive content as soon as it is uploaded—so you can get all the latest biochar news and blog postings delivered instantly to you.

RSS feeds are now available for [Biochar in the News](#) and [Biochar Updates/blog](#), with Industry Announcements coming soon. To subscribe, just click on the RSS icon (shown above) on the toolbar at the top right of the webpage.



For more information on RSS, please see the Wikipedia entry at:  
<http://en.wikipedia.org/wiki/RSS>.

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## Biochar Briefs - News Roundup for May 2011

We update the website daily with new articles on biochar. For more information, please see:  
<http://www.biochar-international.org/newsbriefs>

Doris Hamill, a physicist in business development at NASA Langley Research Center (US), is bringing biochar to local scout troops, garden clubs and homeowners. She has added biochar to the landscaping of a model home that uses high tech components like insulation developed for the space shuttle. "Everyone wants to talk about the big projects to address global warming," Hamill said. "I'm interested at starting at the bottom and building up from there."

IBI member Craig Sams and his company Carbon Gold are profiled in a Financial Times article about biochar. The article also quotes biochar researcher and active IBI participant and colleague Michael Hayes, director of the Carbolea Research Group at the University of Limerick.

Mother Earth News has reviewed the book, *The Biochar Solution: Carbon Farming And Climate Change* by IBI member Albert Bates, concluding: "Biochar is not without dangers if unregulated, and it is not a panacea, but if it fulfills its promise of taking us back from the brink of irreversible climate change, it may well be the most important discovery in human history."

Researchers at the University of Florida (US) have developed a method of removing phosphate from water using biochar. The phosphate-laden biochar can be applied directly to fields as fertilizer.

A biochar seminar in Italy titled: "Biochar as a tool for climate change mitigation in agriculture: prospects and developments in the Region of Tuscany," was presented on May 21 as part of a sustainability initiative.

Newspapers in Chile have featured a project led in part by IBI member Camilo Urbina to test biochar strategies for improving soils in arid regions of the country and to reduce CO<sub>2</sub> emissions.

Palaterra, a subsidiary of Wörrstadt Juwi group, will build the first plant for large-scale industrial production of Terra Preta (Germans tend to use the term "Terra Preta" rather than biochar) in Germany at the Morbach Energy Landscape, supported by the Morbach town council.

A story on clean cookstoves in Kenya profiled work by Cornell student Dorisel Torres to introduce the Anila biochar stove for improved indoor air quality and biochar production. "Introducing a biochar cook stove into a Western Kenyan farm household is predicted to result in a climate impact equivalent to removing 3.69-4.33 tonnes of CO<sub>2</sub> from the atmosphere per household per year," Torres told ABC News.

US Senators from the state of Montana announced a \$5,309,320 grant to Tricon Timber and the US Forest Service to develop a modular 20-dry ton per day, high-temperature gasification system to create heat, electricity and biochar at the Tricon timber mill.

Climate change will have a big impact on rice production. The International Rice Research Institute (IRRI) is exploring the use of biochar made from carbonized rice residue to reduce methane emissions and improve paddy soils.

Biochar is most often recommended for degraded soils, not the rich farmland soils of regions like Iowa state in the US, but as this New York Times article explains, Iowa has lost half its

topsoil in the past century: "Iowa's soil is washing away at rates far higher than anyone realized."

**Backyard Farmers has an interesting new business model.** The Pennsylvania (US) company creates organic garden bed systems for home gardeners, complete with a topsoil blend that includes biochar.

**The Center for Innovation and Entrepreneurship at the University of Washington** Foster School of Business (US) hosted the qualifying round of its annual business plan contest. One agribusiness entrant was a company called C6Systems, which has developed a unique system to help turn wood-waste from forestry operations into biochar.

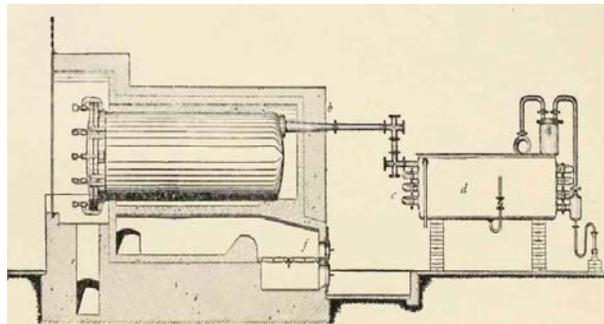
**Attendees at the Biomass Power & Thermal** and Biorefining Magazine's International Biomass Conference & Expo held on May 2-5 in St. Louis, Missouri (US), took a tour of three different biomass systems in the area. Innovative Energy Inc. showcased a 2 MW model of a modular, fuel-flexible gasification system that can produce biochar.

**The Australian company BiG Char (founded by IBI member James Joyce)** and its patented technology, a variation on the rotary hearth furnace, are profiled in this engineering magazine. The company will soon start manufacturing in India to bring unit production costs down.

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## Biochar Research in the State of Washington, USA

Since 2007, the Washington Department of Ecology and the Center for Sustaining Agriculture and Natural Resources (CSANR) at Washington State University have produced a series of in-depth reports on biochar production, use, and economics. The interest in biochar grew out of a state solid waste management plan called **Beyond Waste** that created the Organic Waste to Resources project, charged with examining ways to use nearly 17 million tons of organic waste identified in Washington State. A large portion of this waste is ligno-cellulosic waste from wood and straw, where pyrolysis is an attractive option for recovering energy and producing stable carbon that can benefit soils and climate.



The latest report in the series, by Dr. Manuel Perez-Garcia, is a literature review of historical biochar production methods titled: **Feasible Pyrolytic Methods for Producing Biochar and Advanced Biofuels in the State of Washington**. This 150-page report is well illustrated with historical photos and drawings of pyrolysis technologies going back to the 19th century, before fossil fuels dominated the industrial, chemical, and energy industries, along with examples of current biochar units. The next part of the project will be completing and publishing two more reports; one looking at systems and processes for feedstock preparation, and the other evaluating pyrolysis gas condensation and utilization and other system components (the final in a three part series). The intent of both reports is to inform upcoming "brainstorming sessions" between WSU researchers and the Department of Ecology to design technologies and research models for utilizing organic waste streams to make and use biochar.

Mark Fuchs, soil scientist and manager of the Department of Ecology's Waste to Resources research projects, is also the manager of the Biochar Research Program. The project is designed to lead to practical applications of biochar technology that can benefit people in the state of Washington. One of Fuchs' top concerns is to ensure that biochar production is clean and safe.

To read the remainder of this article, please see:

<http://www.biochar-international.org/biocharwashingtonstate>.

Image: Horizontal Steel Retort (Klark, 1925), Figure 48 from Feasible Pyrolytic Methods for Producing Biochar and Advanced Biofuels in the State of Washington, Part 1.

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## BIOCHARM Report: Findings from Biochar Research in South and Southeast Asia

The BIOCHARM project (Biochar for Carbon Reduction, Sustainable Agriculture and Soil Management) explored the production and use of biochar in India, Cambodia, and the Philippines, focusing on biochar's impact on crop yield and the energy/carbon abatement ability of utilizing carbonized rice husks (CRH). Carbonized rice husks are the by-product of small to medium sized gasifiers and were used as a biochar feedstock in this research. The team found that carbonizing the rice husks to utilize energy, while storing carbon, may reduce greenhouse gas emissions up to five times compared to adding the rice husks to irrigated fields. Pot trials using CRH biochar and biochar made from sugarcane trash and corn cobs showed mixed effectiveness in current agricultural practices—for example, the trials in Cambodia demonstrated a strongly positive affect on crop yield whereas the trials in India had less significant results. Overall, the findings showcase that CRH can be utilized for gasification and biochar production—especially in countries that produce large amounts of rice. The report noted that questions remain on the safety of CRH on human health as well as other pollution and contamination issues. With proper instruments and controls, carbonization may be a good option to deal with rice husk waste.

The research team was comprised of members from major international biochar research centers including the Appropriate Rural Technology Institute (ARTI), Pune, India; the UK Biochar Research Centre (UKBRC); the International Rice Research Institute (IRRI), the Philippines; SME Cambodia; and Colorado State University, United States. To read the full report, please see: <http://www.biochar.org.uk/abstract.php?id=37>.

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## Opportunities in Biochar

*Opportunities in Biochar* showcases announcements for the public to apply for funding, jobs, publications, conferences, etc. These announcements are also posted on the IBI website in two places: [Biochar Updates](#) and the [Member Bulletin Board](#).

*Grant Opportunity for US Projects:* The U.S. Department of Agriculture and the U.S. Department of Energy request proposals for the Biomass Research and Development Initiative. Projects must integrate the following technical areas: Feedstocks development; Biofuels and bio-based products development; and Biofuels and bio-based products development analysis. **Pre-applications are due May 31**; for more information see: <http://www.biochar-international.org/node/2441>.

*Submit abstract for conference:* The European Biochar Symposium 2011 will be held in Halle/Saale, Germany September 26 – 27th. **Abstracts in English are accepted through August 1, 2011** (with preference to early submissions). More information is available at: website: [www.landw.uni-halle.de/biochar2011](http://www.landw.uni-halle.de/biochar2011).

New job opportunities and PhD postings are updated at: <http://www.biochar-international.org/network/jobs>

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## Upcoming Calendar Events

June 6 – 10: 19th European Biomass Conference and Exhibition: From Research to Industry and Markets; Location Berlin, Germany; more information [www.conference-biomass.com](http://www.conference-biomass.com).

June 17 – 19: Gasification and Biochar Workshop at ALL Power Labs; Location Berkeley CA, US; more information <http://www.gekgasifier.com/about/workshop>.

June 23: Opportunities for Carbon Sequestration and Mine Site Rehabilitation in the Mining and Metals Industries Using Biochar; Location NSW, Australia; more information <http://www.biochar-international.org/node/2443>.

July 6 – 8: International Conference on Dryland ecosystem functioning and resilience: integrating biophysical assessment with socio-economic issues; Location Alghero, Italy; more information [www.uniss.it/nrd/drylandsconference](http://www.uniss.it/nrd/drylandsconference).

July 26 – 27: Biomass '11: Renewable Power, Fuels, and Chemicals Conference; Location Grand Forks, ND, United States; more information <http://www.undeerc.org/Biomass11>.

August 28 – September 1: 242nd ACS National Meeting and Exhibition (featuring session: Black Carbon and Biochar for Soil Fertility and Carbon Sequestration); Location Denver, CO, United States; more information <http://portal.acs.org>.

See the [IBI Calendar page](#) for more events. To add an event to the calendar, send the information to [info@biochar-international.org](mailto:info@biochar-international.org).

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## Regional Biochar Group Updates

To read more on regional and national biochar groups, please see IBI's website at: [www.biochar-international.org/network/communities](http://www.biochar-international.org/network/communities). This month highlights work in Southeast Asia; including a new group in the Philippines called the Mindanao Terra Preta-Biochar Initiative and the installation of the first Biochar Experimenter's Kit (BEK) in Malaysia.

### Mindanao Terra Preta-Biochar Initiative

The Mindanao Terra Preta-Biochar Initiative is focused on the development of a "designer compost" using biochar, lacto-bacilli, sawdust, river sand, feces, urine, and organic material present on the experimental farm in the Philippines. Dr. Elmer V. Sayre posts updates and progress on this work in a blog at: <http://mindaterrapretabiochar.blogspot.com>.

The work is being implemented through the Water, Agroforestry, Nutrition and Development (WAND) Foundation, which recently received a US \$100,000 Grand Challenges Explorations Grant from the Bill and Melinda Gates Foundation. The grant funds Dr. Elmer V. Sayre and his group to explore the viability of low-cost dry toilets using human waste in small-scale agri-silviculture by conducting crop trials, use of vermi-composting, and odor minimization. The work is aimed at helping the base of the pyramid (BoP) in terms of making needed fertilizer available and therefore improving nutrition, income and biodiversity; preventing the spread of diseases from open defecation; and preventing contamination of the water table and water sources.

### **South East Asia Biochar Interest Group Update: The First Biochar Experimenter's Kit (BEK) Installed in Malaysia**

As part of a research project by two postgraduate students, a BEK was installed at the Malaysia Palm Oil Board (MPOB). A representative from BEK traveled to Malaysia to assist with assembling the unit and conduct a simple trial run in March 2011.

The challenge for the team is finding a permanent location for the unit. It is now under a small roof, just large enough to accommodate the whole unit. This means that the unit cannot be run if there is rainy and windy weather.

The team will run the unit with an experimental variety of feedstocks including oil palm biomass wastes, and is still determining the optimal size and shape for the feedstock. For more information and photos on this project, please see: <http://www.biochar-international.org/regionalgroups/southeastasia>.



Photo: BEK parts ready to be assembled; courtesy of Kong Sieng Huat.

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## **Recently Published Biochar Research**

IBI tracks all published research on biochar and includes it in our online bibliography: [www.biochar-international.org/biblio](http://www.biochar-international.org/biblio). The following articles were added in the last month. Please visit the website bibliography for more information on any of these articles. Due to copyright, we cannot provide full copies of articles unless we have permission from the publisher. If you have published work that is not included, please email us at: [info@biochar-international.org](mailto:info@biochar-international.org).

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