



## January 2014 News from the International Biochar Initiative

### **IBI's State of the Biochar Industry Report to be Published in the Near Future**

IBI is in the final stages of compiling data and writing the first State of the Biochar Industry Report, scheduled to be published in the coming weeks. The report is based on information gathered in surveys on industry and project activities conducted by IBI during Summer 2013, as well as from web-based research of known biochar companies. It is intended to provide a broad overview of the current state of the biochar sector and to give biochar stakeholders a snapshot of commercial and non-commercial biochar activities, all within the context of larger forces that influence the biochar space, including agriculture, greenhouse gas markets, and public policies.

IBI will make an announcement when the full report is published and made available for download. IBI members (link to [www.biochar-international.org/join](http://www.biochar-international.org/join)) will have pre-access to the report in advance of the public.

### **Update on Proposed Policy Revisions to the IBI Biochar Standards**

IBI is progressing through a policy revision that will result in Version 2.0 of the *IBI Biochar Standards*. As part of the process, IBI conducted a 30-day public comment period aimed at gathering feedback from stakeholders on the four proposed policy revisions, as well as any other general comments. Nearly 80 responses were submitted from the biochar community and we are currently reviewing and compiling comments. IBI heartily thanks all of those who participated for helping to improve the *IBI Biochar Standards*.

As a reminder, the process that IBI is following for making policy revisions is outlined in Section 7.1 of the current Version 1.1 of the *IBI Biochar Standards*, available for download on our website here [hyperlink [http://www.biochar-international.org/sites/default/files/IBI\\_Biochar\\_Standards\\_V1.1.pdf](http://www.biochar-international.org/sites/default/files/IBI_Biochar_Standards_V1.1.pdf)].

The current proposed revisions are based on input received from a panel of expert reviewers. IBI is grateful for all the thoughtful comments and feedback provided to us during the public comment period, and in some cases we are reaching out to those who commented for clarification and to better understand the options for addressing concerns in order to ensure that the *IBI Biochar Standards* achieve their desired goal and purposes of certainty for producers, consumers, and the biochar marketplace. Because of considerable interest generated during the comment period, IBI is planning two or more webinars—dates to be announced soon—as a forum to discuss with all stakeholders the proposed revisions and responses to some of the comments.

The proposed revisions are available for review here [hyperlink [http://www.biochar-international.org/sites/default/files/Public\\_Comment\\_IBI\\_Biochar\\_Standards\\_V2.0.pdf](http://www.biochar-international.org/sites/default/files/Public_Comment_IBI_Biochar_Standards_V2.0.pdf)]. If you have any questions or would like to send comments please contact us at any time at [standards@biochar-international.org](mailto:standards@biochar-international.org). IBI thanks our members, stakeholders, and the biochar community for your contributions to this important effort to support the growing biochar industry.

## **Update on Review Process for American Carbon Registry's Methodology for Emissions Reductions from Biochar Projects**

The [voluntary carbon offset Methodology for Emissions Reductions from Biochar Projects](http://americancarbonregistry.org/carbon-accounting/methodology-for-biochar-projects) (link to <http://americancarbonregistry.org/carbon-accounting/methodology-for-biochar-projects>) developed by The Climate Trust, The Prasino Group, and IBI is progressing through the review process with Winrock International's American Carbon Registry (ACR). The open public comment period ended on November 22, 2013 and generated nearly 100 comments. We thank IBI members, stakeholders, and the global biochar community for taking the time to review and submit comments on the methodology, which is a critical tool for advancing the cost-effective deployment of biochar projects.

The methodology quantifies and credits both the avoided emissions from combustion or decomposition of biomass in the baseline scenario as well as enhanced carbon sequestration at sites where biochar is applied. Under the methodology, biochar may be produced from any biomass residues from forestry and agriculture, municipal solid wastes, and other biomass-based materials approved for use under the International Biochar Initiative's [IBI Biochar Standards](http://www.biochar-international.org/characterizationstandard) (2013) (link to <http://www.biochar-international.org/characterizationstandard>) provided such feedstocks also meet sustainability criteria specified in the methodology.

The next step for the methodology is for the development team to respond to public comments and make revisions to the methodology, as appropriate. The revised version will then undergo at least two rounds of comment-and-response by scientific peer review panels convened by ACR. Upon completion of the peer review process and ACR approval, the final methodology will be published on ACR's website and available for use by project proponents.

## **Women Innovate with Biochar in the Amazon Region of Peru**

By: Dr. Lukas van Zwieten, Dr. Stephen Joseph, Dr. Annette Cowie, Dr. Brenton Ladd and Stephen Kimber

In the Amazon city of Iquitos, Peru, a pilot study is being carried out to improve the lives of some of the poorest families and to take small steps to address climate change and reduce deforestation of the Amazon.

For centuries, farmers along the Amazon have made a living growing cassava, maize, rice, vegetables, and raising poultry. The burgeoning mining and petroleum industries, along with increased flooding have changed the face of their province, and caused a large-scale migration from the rural, forested areas to urban centers. Families have set up small settlements with makeshift houses on the outskirts of many of these urban areas, but many live in poverty. These peri-urban dwellers also often pay a very high price for fuel wood for heating and cooking.

A project led by Dr Lukas Van Zwieten from the New South Wales (Australia) Department of Primary Industries (NSW DPI) with funding from the Public Sector Linkage Program of the Australian Government is working closely with the Peruvian Ministry of the Environment (MINAM), Ms Nani Alegria of Instituto Tangarana (IT), and Dr Brenton Ladd of the Universidad Cientifica del Sur. In September 2013, the project organized a workshop at Instituto de Investigaciones de la Amazonia Peruana (IIAP) on the operation of cookstoves. Over 50 women attended from regional areas around Iquitos, some traveling over three hours to attend the workshop.

One workshop participant, Hilde, is a single mother with six children living in a two room thatched roof house. She has a small business cooking for people in her settlement and grows much of her own food in a relatively small plot. She uses a very simple indoor open fire which produces a

large amount of smoke in the family's bedroom. Hilde has embraced the idea of using an efficient biochar cookstove to reduce her reliance on purchased wood, while also reducing the risk of her children getting respiratory and eye diseases from the smoke in her home.



Figure 1; A and B Hilde's garden with Hilde left; C inside Hilde's kitchen showing her open fire

Hilde attended this demonstration and received one of the 30 stoves engineered by Professor Stephen Joseph and Mr D. D. Khoi of Population Environment and Development (PED) Vietnam and built locally in Peru. Professor Annette Cowie from the University of New England and Stephen Kimber (NSW DPI) worked closely with MINAM staff to demonstrate and operate these stoves. The participants were impressed that the stoves operated well on low grade biomass collected nearby, such as leaves, crop residues, and bamboo. The stove demonstration boiled water and cooked lunch for the day. All were excited by the stoves' performance, and interested in the idea of adding the biochar into their small farm plots. Hilde, in particular, understood the potential benefits of the biochar, having learned about traditional use of charcoal in soil from her grandparents.



Figure 2; A; Hilde with new stove B; Operating the biochar stove at the demonstration in Iquitos

The project has identified other prospects for the technology, including the development of a cookstove for large (10-20L) pots. Feedback on the women's perception of the cookstoves will be gathered by IT and Dr. Ladd, with performance evaluations conducted by the Australian team over the next few months.

For more information on this project, please contact Lukas van Zwieten at [lukas.van.zwieten@dpi.nsw.gov.au](mailto:lukas.van.zwieten@dpi.nsw.gov.au).

## **Presentations from the 2013 Conference: Biochars, Composts, and Digestates (IBI International 2013) Posted Online**

Thanks to the Bari conference organizers and Dr. Stephen Joseph, IBI has been able to post selected presentations from the October 2013 Conference on Biochars, Composts, and Digestates on our website at: [http://www.biochar-international.org/Bari\\_2013](http://www.biochar-international.org/Bari_2013). IBI will be adding more presentations as they are made available by the authors. Additionally, IBI has the full program of events from the conference available at: [http://www.biochar-international.org/sites/default/files/Bari\\_2013\\_final\\_program.pdf](http://www.biochar-international.org/sites/default/files/Bari_2013_final_program.pdf).

## **Biochar Briefs: News Roundup for January**

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

### **Australia**

The Australian government is investigating opportunities for job creating in the "Green Triangle Region" of the country. Located in Southwestern Australia, this region has more than 340,000 hectares of plantation forest (mainly pine and eucalyptus) and the sawmill industry provides work for approximately 35 percent of the population. One of the opportunities analyzed is to produce bio-oil by fast pyrolysis, and biochar, power, heat, and biofuels via gasification. (link to: <http://biomassmagazine.com/articles/9877/study-evaluates-biorefining-opportunities-in-south-australia/>)

### **Brazil**

Researchers working in the Amazon have built a predictive model that helps them locate signs of pre-Columbian agriculture based on *terra preta* soils to guide future archaeological work in the region. They are analyzing data from over 1,000 sites and comparing that information to locations of *terra preta* soils which they believe give archaeologists a "starting point" for future excavations of larger scale occupation in the area. (link to: <http://www.jb.com.br/ciencia-e-tecnologia/noticias/2014/01/08/evidencias-mostram-que-amazonia-ja-teve-ate-cidades>)

### **Germany**

William Hunter is a retiree who built a personal cogeneration plant run on wood chips. Taking ideas from old photos from the 1940s showing busses run on wood gas, Mr. Hunter now drives a truck using wood gas from his cogeneration plant. He is also producing a good deal of biochar which he markets as an additive for animal husbandry and soil conditioner. Says Mr. Hunter "Wood is far too important to simply burn it." (link to: <http://www.wn.de/Muensterland/Kreis-Coesfeld/Nottuln/Menschen-in-Nottuln-Tueftler-aus-Leidenschaft>)

In the agricultural colleges (LLA) of Upper Franconia in Bayreuth, researchers are closely studying the effects of biochar/compost blends in field trials. Since 2010, the colleges have been

conducting fairly large scale field trials using biochar/compost blends on light, sandy, and nutrient-poor soil in different ratios. Initial results show not only increased plant growth, but increased humus content and water storage capacity in the experimental plots compared to the controls. (link to: <http://www.wiesentbote.de/2014/01/07/landwirtschaftliche-lehranstalten-in-bayreuth-experimentieren-mit-terra-preta>)

### **The Philippines**

The GMA Network, a leading broadcasting company in the Philippines, recently signed a Memorandum of Agreement with Sagip Ilog Pilipinas Movement (SIPM), Philippine Biochar Association (PBiA), and Philippine Mine Safety and Environment Association (PMSEA) to undertake a water pollution reduction and livelihood program called the Clean River Zone Biochar Community Project. This project uses Bokashi balls to reduce water pollution in the target areas. (link to: [http://entertainment.tempo.com.ph/2014/01/gma-network-joins-water-pollution-reduction-program/#.UtVrxBS\\_qih](http://entertainment.tempo.com.ph/2014/01/gma-network-joins-water-pollution-reduction-program/#.UtVrxBS_qih))

### **United States**

The University of Nevada Cooperative Extension is working with partners on a three year project to test biochar mixtures at sites like old mines in Eureka County. The project is looking for more efficient ways to increase water conservation and plant growth, and decrease the release of fossil fuel in the Great Basin. Biochar for the project is produced by a mobile rotary pyrolysis reactor using woody debris left behind from harvest, logging, or mine site-clearing. Eureka County Extension Educator Fred Steinmann said "We want to use biochar as a soil amendment—something added to the soil that allows for microorganisms, and eventually plants, to grow." (link to: [http://elkodaily.com/news/cooperative-extension-to-test-large-scale-use-of-biochar/article\\_15a60b1c-6866-11e3-815c-001a4bcf887a.html](http://elkodaily.com/news/cooperative-extension-to-test-large-scale-use-of-biochar/article_15a60b1c-6866-11e3-815c-001a4bcf887a.html))

Researcher Andrew Crane-Droesch (from the University of California, Berkeley) and colleagues conducted a meta-analysis to assess the potential of biochar in soils by gathering and analyzing data from 84 biochar studies. Based on the data, the researchers could better see the impact of biochar on different soil types based on agricultural techniques and types of biochar. The team found that biochar produces the biggest yield increase on highly weathered soils, but less effective responses in nutrient-rich soils. "Our model implies positive yield response over much of Sub-Saharan Africa, parts of South America, Southeast Asia, and southeastern North America," said Crane-Droesch. The findings are published in Environmental Research Letters (ERL). (link to: <http://environmentalresearchweb.org/cws/article/news/55733>)

United States Department of Agriculture (USDA) Agricultural Research Service (ARS) researchers are looking at the potential of biochar for soil applications on farms in the Northwestern United States. A current project is using biochar made from gasified Kentucky bluegrass seed screenings on acidic soils in the area. The results to date show increased wheat yield from 26 bushels per acre on untreated soils to 67 bushels per acre using biochar. (link to: <http://www.capitalpress.com/article/20140108/ARTICLE/140109903>)

## **Report from the 2<sup>nd</sup> International Biochar Training Course and Announcement of a 3<sup>rd</sup> Course in 2014**

The Second International Biochar Training Course was held in October 2013 at the Zhejiang Agriculture and Forestry University (ZAFU), Linan, Hangzhou Province, China, organized by Nanjing Agricultural University in collaboration with the University of New South Wales and Newcastle University (Australia). At the week-long event, participants gained hands on knowledge around a range of biochar topics including kiln design and operation, use of biochar in soils, testing biochar for specific characteristics, and setting up a biochar project. To read the full report, please see: [http://www.biochar-international.org/sites/default/files/2nd International Biochar Training Report final.pdf](http://www.biochar-international.org/sites/default/files/2nd%20International%20Biochar%20Training%20Report%20final.pdf)

Following on the successes of the first two years, the organizers are pleased to announce a 3<sup>rd</sup> week-long training course planned for October 2014 to be held at Nanjing Agricultural University, Nanjing, Jiangsu, China (the location of the first training course). This will be an opportunity to not only meet some of China's leading experts but also to interact with biochar researchers and practitioners from other regions. Participants will be able to view commercial businesses producing biochar, energy, and biochar/NPK fertilizers as well as run a small- and medium-scale biochar plant at the university. For more information on this event as well as an application, please see: <http://www.biochar-international.org/node/4694>.

## **University of MASS Amherst Announces 4<sup>th</sup> Annual Biochar Seminar Series**

A seminar series on "*Climate, Energy, Biochar, and Agriculture*" will be presented weekly on Thursdays at 4 pm at the University of Massachusetts, Amherst (United States) in Chenoweth Laboratory, Room 113, starting January 23<sup>rd</sup>. This is the fourth year the series will be held with the purpose of further considering the role of climate, energy, and biochar as environmental factors in agriculture. This may be elected as a UMass course but is open to others at no charge. Continuing Education Credits are being offered to appropriate professional areas such as forestry, agriculture, pollution control, etc.

The weekly seminars will be taught by UMass professors and invited speakers. To see the complete schedule, please see:

<http://people.umass.edu/sherbert/Spring%20Biochar%20Seminar%20Series%202014.pdf>.

Further information may be obtained from Prof. Herbert at [sherbert@cns.umass.edu](mailto:sherbert@cns.umass.edu).

## **Opportunities in Biochar**

- Job postings can be accessed at: <http://www.biochar-international.org/network/jobs>.
- Looking for potential grant funding? Check out the Terra Viva Grants Directory which develops and manages information about grants for agriculture, energy, environment, and natural resources in the world's developing countries at: <http://www.terravivagrants.org/Home>.
- Washington State (United States) Department of Natural Resources (DNR) seeks mobile pyrolysis demonstration units. For more information, please see: <http://biomassmagazine.com/articles/9866/washington-dnr-seeks-mobile-pyrolysis-demonstration-units>.
- Submit an abstract to the Symposium on Thermal and Catalytic Sciences for Biofuels and Biobased Products, Denver, CO, USA (deadline March 14, 2014). For more information, please see: <http://www.tcs2014.org>.

## **Upcoming Calendar Events**

- February 18: BERCshop: Closing the Carbon Cycle - Scaling Up Carbon Removal Solutions. Location: CA, USA. For more information: <http://www.biochar-international.org/node/4675>.
- March 4 – 6: World Bio Markets 2014. Location: Amsterdam, the Netherlands. For more information: <http://www.biochar-international.org/node/4065>.
- March 24 – 26: International Biomass Conference & Expo (IBCE). Location: Orlando, FL, USA. For more information: <http://www.biochar-international.org/node/4600>.

- March 30 – April 2: The 29<sup>th</sup> International Conference on Solid Waste Technology and Management. Location: PA, USA. For more information: <http://www.biochar-international.org/node/4115>.
- April 9 – 11: Northeast Biomass Heating Expo 2014. Location: Portland, ME, USA. For more information: <http://www.biochar-international.org/node/4625>.
- April 27 – May 2, 2014: EGU 2014: "Strategies for effective soil carbon sequestration through synergies in pyrogenic carbon, charcoal and biochar research". Location: Vienna, Austria. For more information: <http://www.biochar-international.org/node/4612>.

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).

## **Recently Published Biochar Research**

IBI tracks all published research on biochar and includes it in our [online bibliography](#). 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 infringement laws, 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](#).

Abewa, Anteneh; Birru Yitafere; Yihenew G. Selassie; Tadele Amare (2014). The Role of Biochar on Acid Soil Reclamation and Yield of Teff (*Eragrostis tef* [Zucc] Trotter) in Northwestern Ethiopia. *Journal of Agricultural Science*; Vol. 6, No. 1.

Adegboye, Mary O. (2013). Continuous Segregation and Removal of Biochar from Bubbling Fluidized Bed. Thesis at University of Western Ontario. Paper 1826.

Ahmad, Mahtab; Anushka Upamali Rajapaksha; Jung Eun Lim; Ming Zhang; Nanthi Bolan; Dinesh Mohan; Meththika Vithanage; Sang Soo Lee; Yong Sik Ok (2014). Biochar as a sorbent for contaminant management in soil and water: A review. *Chemosphere*.

Beesley, Luke; Onyeka S. Inneh; Gareth J. Norton; Eduardo Moreno-Jimenez; Tania Pardo; Rafael Clemente; Julian J.C. Dawson (2014). Assessing the influence of compost and biochar amendments on the mobility and toxicity of metals and arsenic in a naturally contaminated mine soil. *Environmental Pollution*. Volume 186, Pages 195–202.

Bhandari, Pushpak N.; Ajay Kumar; Danielle D; Bellmer; Raymond L. Huhnke (2014). Synthesis and evaluation of biochar-derived catalysts for removal of toluene (model tar) from biomass-generated producer gas. *Renewable Energy*. Volume 66, Pages 346–353.

Bhandari, Pushpak N.; Ajay Kumar; Raymond L. Huhnke (2014). Simultaneous removal of toluene (model tar), NH<sub>3</sub>, and H<sub>2</sub>S, from biomass-generated producer gas using biochar-based and mixed-metal oxide catalysts. *Energy Fuels*.

Borsari, B. (2014). A Preliminary Study of the Effect of Biochar from Maple (*acer* spp.) on Root Growth of Selected Agronomic Crops. *ISHS Acta Horticulturae* 1013.

Chang, Meng-Shiuh; Chih-Chun Kung (2014). Nonparametric Forecasting for Biochar Utilization in Poyang Lake Eco-Economic Zone in China. *Sustainability* 6, 267-282.

Chen, Wei-Yin; Daniell L. Mattern; Eneruvie Okinedo; James Corbett Senter; Alec A. Mattei; Connor W. Redwine (2013). Photochemical and Acoustic Interactions of Biochar with CO<sub>2</sub> and H<sub>2</sub>O: Applications in Power. Generation and CO<sub>2</sub> Capture. *AIChE Journal*.

Coomer, Taylor Dayne (2014). Influence of Poultry-Litter Biochar on Early-Season Growth in Cotton. University of Arkansas Thesis.

Crane-Droesch, Andrew; Samuel Abiven; Simon Jeffery; Margaret S Torn (2013). Heterogeneous global crop yield response to biochar: a meta-regression analysis. IOP science; <http://iopscience.iop.org/1748-9326/8/4/044049/article>.

Dai, Zhongmin; Rongbin Li; Niaz Muhammad; Philip C. Brookes; Haizhen Wang; Xingmei Liu; Jianming Xu (2014). Principle Component and Hierarchical Cluster Analysis of Soil Properties following Biochar Incorporation. Soil Science Society of America Journal.

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Dong, Xiaoling; Lena Q. Ma; Julia Gress; Willie Harris; Li. Yuncong (2014). Enhanced Cr(VI) reduction and As(III) oxidation in ice phase: important role of dissolved organic matter from biochar. Journal of Hazardous Materials.

Fang, Guodong; Juan Gao; Cun Liu; Dionysios D Dionysiou; Yu Wang; and Dongmei Zhou (2014). Key Role of Persistent Free Radicals in Hydrogen Peroxide Activation by Biochar: Implications to Organic Contaminant Degradation. Environ. Sci. Technol.

Fungo, Bernard; David Guereña; Margaret Thiongo; Johannes Lehmann; Henry Neufeldt; Karsten Kalbitz (2014). N<sub>2</sub>O and CH<sub>4</sub> emission from soil amended with steam-activated biochar. Journal of Plant Nutrition and Soil Science.

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HaiNan, Lu; Hu XueYu; Liu HongWei (2013). Influence of pyrolysis conditions on stability of biochar. Environmental Science & Technology (China). Vol. 36 No. 8 pp. 11-14.

Hina, Kiran; Mike Hedley; Marta Camps-Arbestain; James Hanly (2014). Comparison of pine bark, biochar and zeolite as sorbents for NH<sub>4</sub><sup>+</sup>-N removal from water. CLEAN Soil Air Water.

Im, Jong-Kwon; Linkel K. Boateng; Joseph R.V. Flora; Namguk Her; Kyung-Duk Zoh; Ahjeong Son; Yeomin Yoon (2013). Enhanced ultrasonic degradation of acetaminophen and naproxen in the presence of powdered activated carbon and biochar adsorbents. Separation and Purification Technology.

Jamieson, Tyler; Eric Sager; Céline Guéguen (2014). Characterization of biochar-derived dissolved organic matter using UV–visible absorption and excitation–emission fluorescence spectroscopies. Chemosphere.

Kettunen, Riitta; Sanna Saarnio (2013). Book: Agriculture and Food Science. Chapter: Biochar can Restrict N<sub>2</sub>O emissions and the risk of nitrogen leaching from an agricultural soil during the freeze-thaw period.

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Liang, Yuan; Xinde Cao; Ling Zhao; Eduardo Arellano (2014). Biochar- and phosphate-induced immobilization of heavy metals in contaminated soil and water: implication on simultaneous

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Song, Zhengguo; Fei Lian; Zhihong Yu; Lingyan Zhu; Baoshan Xing; Weiwen Qiu (2014). Synthesis and characterization of a novel MnO<sub>x</sub>-loaded biochar and its adsorption properties for Cu<sup>2+</sup> in aqueous solution. *Chemical Engineering Journal*.

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Waqas, Muhammad; Sardar Khan; Huang Qing; Brian J. Reid; Cai Chao (2014). The effects of sewage sludge and sewage sludge biochar on PAHs and potentially toxic element bioaccumulation in *Cucumis sativa* L. *Chemosphere*.

Wei, Liu; Wang Shutao; Zhang Jin; Xu Tong (2014). Biochar influences the microbial community structure during tomato stalk composting with chicken manure. *Bioresource Technology*.

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Yao, Ying; Bin Gao; June Fang; Ming Zhang; Hao Chen; Yanmei Zhou; Anne Elise Creamer; Yining Sun; Liuyan Yang (2014). Characterization and environmental applications of clay-biochar composites *Chemical Engineering Journal*.

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