Recap of this Month’s News

In this month’s newsletter, there are many entries of news, ideas and trends that you won’t want to miss, including:

- Two new business members joining IBI
- The scope of China’s soil remediation plans
- The promise of including biochar in urban infrastructure
- A new world being created in Borneo
- A peek into some of the latest research

Biochar related jobs, scholarships, and volunteer opportunities

A landscaping and gardening company in the Hamptons (New York) seeks an experienced compost manager to develop organic matter and lead a team to do the same. Responsibilities include developing biochar from waste materials provided.

The Chicago Botanic Garden is looking for U.S. military veterans currently or recently in a college biology or environmental science program for a seasonal intern position involving field research projects that will evaluate usefulness of soil additives (biochar, mulch, etc.) in restoration. Applications are due March 16.

The University of Birmingham (U.K.) has an opening for a post-doctoral research fellow to assist in researching the catalytic effect of biochar in a new Thermo-Catalytic Reforming TCR process.

The Libera Università di Bolzano (Italy) seeks a researcher who will perform a Life Cycle Analysis (LCA) of a valorisation chain for wood biomass, which comprises extraction of food/pharmaceutical products, energy production, biochar production and application to agricultural soils. Applications accepted through March 14.

The South African Hops Growers Association (HGA) in association with the World Wide Fund for Nature (WWF-SA) is advertising a contract post for the Outeniqua Water Stewardship and Green Business Development Coordinator. Candidates must be fluent in Afrikaans and English. WWF-SA and SAB Ltd aim to explore the potential of proliferating their successful combined heat and biochar (CHAB) and other technologies as tools to assist in the battle against alien plant invasion. Closes March 15.
WANTED - STORYTELLER
Can you tell potential donors the IBI story to help grow the organization? IBI is looking to appoint an experienced Board Member (at large) that is interested in spearheading its fundraising efforts. For those interested in this volunteer position, please send a letter of interest as well as an outline of relevant experience to info@biochar-international.org.

Welcome to Our New Corporate Members
Note: bios below were provided by members (or from websites) and not authored by IBI

NEW BUSINESS MEMBER: MAKE IT GREEN SOLUTIONS AB

Make It Green is a company founded in Halmstad, Sweden. The company provides green solutions by producing and selling Biochar cook stoves; the clean cook stoves with ability to reduce the smoke up to 80% and generate rich-in-nutrient fertilizer for people who live in rural areas in developing countries, especially in Africa and Asia. The stove is of modern design and innovation which can be easily adapted to the needs of people and improving their quality of life.

Our missions:
- Providing greener-cleaner cook stoves and related products as the solutions for people in rural areas.
- Improving people’s health
- Increasing household economy
- Mitigating world climate change through deforestation reduction

Website: www.makeitgreen.net

NEW BUSINESS MEMBER: WEST BIOFUELS LLC

West Biofuels and its partners have a strong research and development program coupled with proven commercial success. R&D projects have advanced our technology to become cost competitive in North American markets, building up successful commercial applications in Europe.

For more information, visit their website at: www.westbiofuels.com.

BROADCAST YOUR BIOCHAR BUSINESS ON IBI'S NEW WEBSITE – (IN DEVELOPMENT!)

Have you been looking for a unique way to make people who are interested in biochar aware of your business and support the international organization that supports biochar development at the same time? IBI is rebuilding its website for a launch in mid-March and we've made some space available on the home page and throughout the site to feature your advertisement! Only a few spots are available, so sign up now for prime real estate on IBI's new website. Options from $300-$3,500 are available.

Find out more here and sign up by contacting Brian Schorr at bschorr@ttcorp.com.
Regional Briefs

People’s Republic of China

Behind much of the current biochar research and activity in China is the ambitious goal of remediating 3 million hectares of polluted farmland by 2020. Biochar will also help in improving drinking water quality and reducing air pollution, all part of the national three-year action plan.

Europe

Stockholm’s success in improving the vitality of urban trees using biochar could serve to magnify the many benefits of urban forestry in megacities around the world, where a recent award-winning study has shown there is potential for doubling the tree canopy.

South-Eastern Asia

In Taiwan, biochar could help manage stormwater as part of several innovations in road construction by Jui-Wen Chen, founder of JW Eco-Technology, who is marketing structural pervious pavement that incorporates biochar for specific applications. Albert Bates writes about Chen’s progress in “Breathing Highways and Sponge Cities.”

United States

In an article that applauds the wide-ranging team effort involved, the National High Magnetic Field Laboratory in Tallahassee, Florida celebrates last year’s eye-opening discovery of the 100-nanometer thin organic coating formed on biochar particles by interaction with compost.

Texas A&M University engineers claim to have increased methane production in anaerobic digesters by 40% using only 0.1 to 1% biochar additive. They also credit biochar with increasing the gas production rate by 50% and reducing lag time for gas generation to begin.

Middle East

A special issue of the Arabian Journal of Geosciences (AJGS) will be published about biochar. This issue will focus on implications of biochar application to soil under arid conditions. The special issue welcomes manuscripts under the voice “S. I. BIOCHAR” on the journal’s submission system before June 30, 2018, using the Journal’s online submission system.

Australia and The Pacific

Carbon Farming with biochar has received official sanction from the federal government in Australia. Biochar applied to farm land is now eligible for carbon credits under the new method.

by Trevor Richards

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1 Bates’ latest post “My Tesla Runs on Banana Peels” covers even more ground, offering a glimpse into his soon-to-be-published book co-authored by Kathleen Draper, IBI’s Information Hub Chair.
PFS Energy Malaysia has kicked off preliminary trials using empty fruit bunch (EFB) biochar as a controlled-release fertilizer carrier. Although initial results are promising, trials will continue for the remainder of this year with plans for field trials on bananas and palm trees.

The Warm Heart Biochar Project recently launched Year 2 of its 50 in 5 Program to remove fifty percent of the smoke shrouding Chiang Mai in five years. In 2017, the program established a base in Mae Chaem District, a critical smoke source, and convinced farmers to convert 750 tonnes of crop waste to more than 150 tonnes (15,000 bags) of biochar. Over the past several months, the Project has developed and begun to market a line of biochar-based products under the brand name “Rak Din” or “Restore the earth” in Thai. In 2018, the Project hopes to increase biochar production in Mae Chaem dramatically, but more importantly, to test a community-scale model social enterprise to make biochar and manufacture value-added Rak Din products. Warm Heart is now serving as biochar broker for the Ministry of Energy, buying all the biochar produced by the Ministry’s clients, and is partnered with the Office of Land Development to establish five community social enterprises producing biochar-based fertilizer.

Here is a story about environmental and community restoration from Tom Goreau, giving some perspective on how biochar can fit into the puzzle of natural climate solutions:

Dispatch from a Borneo Field Trip

by Dr. Thomas J.F. Goreau

In the heart of Kalimantan (Indonesian Borneo) I’ve just seen the finest project on regenerative development to reverse climate change in the world, surrounded by some of the worst deforestation in the world.

What follows is a brief description based on an intense one day field visit, focused on mangrove and coral regeneration, green and blue carbon sequestration, sustainable agriculture and forestry, and community development, with no time to look at their sustainable energy projects, or their rescue of thousands of orangutans, proboscis monkeys, and other wildlife, saved from deforested areas where their habitat has been destroyed and where they risk being killed as vermin.

Kalimantan (Borneo) is the second largest tropical island in the world, only slightly smaller than Papua (New Guinea), with exceptional biodiversity in vast tropical jungles, swamps, and mangroves that were practically untouched just a generation ago. Now they are subject to a wild land rush as speculators “buy” virgin jungle inhabited by orangutans and indigenous forest Dayak and Iban peoples, displace them, and destroy the jungle to plant monocultures of oil palms, or trees for plywood and pulp for paper mills. Vast areas that were recently high biomass virgin forest are being clearcut and replaced by single species plantations as far as the eye can see; West African oil palm (Elaeis guineensis), eucalyptus (Eucalyptus deglupta), or black wattle (Acacia mangium, a nitrogen fixing tree I got to grow more than 8 times faster in the worst soils in Panama using basalt powder alone). As in the vast areas of Brazil I saw 35 years ago where the Amazonian and Atlantic jungles had been clearcut for Eucalyptus deglupta pulpwood plantations, these areas have no wild animals, no birds, no insects. The richest biodiversity in the world has been turned into biological deserts in the service of human greed. And just as I saw in Brazil in the 1980s, in Borneo you can see massive erosion gullies growing, caused by bare soil exposure to pounding equatorial rain after clearcutting.
and planting to monocultures. These areas are sprayed with Roundup (glyphosate) to prevent regeneration of secondary forest from seeds in the soil or re-sprouting from the cut stumps, which accelerates erosion and loss of soil carbon and nutrients.

The massive deforestation of high carbon peat soils, and their drainage for oil palm plantations, has resulted in severe forest and peat soil fires that last year temporarily made Indonesia the world’s largest CO$_2$ source! These fires happen most during El Niños, which cause Indonesian waters to be much cooler than normal, lowering evaporation from the sea and therefore greatly reducing rainfall on the 17,000 islands of Indonesia, causing crippling droughts. When I first came to Indonesia during the 1997-1998 droughts not only did I see vast tracts of Clove agro-forests dead, but even the coconut palms had died from drought, something I’d never seen in my life and didn’t realize was even possible.

What is truly astonishing about this project (which I could see only a small part of) is the complexity, integration, and scale of what is being done, integrating every possible tool we know of, including biochar, rock powders, beneficial mycorrhizae and bacteria inoculation, green manure composts, banteng (Balinese dwarf cattle) manure, tissue culture to mass propagate special selected plant strains, beneficial plant introductions (many I’ve known all my life in my home countries in the Caribbean and Central America), agroforestry, and so many other methods of both modern scientific and traditional sustainable development.

Another major focus of this project, which I did not have any time to look at, is renewable energy. They are getting local farmers to switch from oil palm to sugar palms (Arenga pinnata) and of Nipa palm (Nypa fruticans which grows in salt water estuaries with mangroves) both of which can be sustainably tapped to produce copious amounts of sugar syrup that will be used as feedstock for the world’s largest ethanol plant for sustainable biofuel production and to produce the raw chemical materials to make an immense variety of bioplastics.

They also will build a small dam to create a lake, which will produce hydropower, but vastly more energy from floating solar panels. Unlike the dams in Brazil and Panama, which flooded and killed live forest, the vegetation will be removed and converted to biochar and biocoal (torrefaction) and not left to rot in the water. In the Amazon in the 1980s I measured methane emissions from such flooded forest dam lakes, and found that along with termite nests, they dominated methane fluxes to the atmosphere from the Amazon, not the cattle ranches.

Some of the projects my own Biorock Indonesia team is planning with them is to regenerate vast areas of mangrove that were illegally logged for oil palm plantations. We will restore the hydrology with the Mangrove Action Project team and use Biorock methods to greatly speed up mangrove growth, both above and below ground (as we do with sea grass and salt marsh), reverse the acidification of the soil caused by oxidation of peat and iron sulfides that prevents natural regeneration, and increase the carbon preservation and storage in peat. Since Indonesia has the world’s largest area of mangroves, our goal is to turn Indonesia into a major global carbon sink to
reverse climate change. We will also grow corals, which amazingly are found 23 kilometers up the estuary, in waters full of 5-meter man-eating crocodiles.

This project is run by Arsari Enviro Industri, a visionary Indonesian regeneration and sustainable development company whose Chief Science Officer, Dr. Willie Smits, is a global resource. This huge project is a model not just for Indonesia but the entire world and involves holistic action on the mega-scale essential for reversing global climate change that I’ve dreamed of for so long and never thought I would ever actually see! This is not geo-engineering, it’s Geotherapy, the use of the best science to regenerate our planet’s natural ability to heal itself and stabilize climate at safe CO₂ levels around 270 ppm.

You can see much more of AEI's amazing work at: https://www.youtube.com/watch?v=xtWp84htc18 (and the two videos that follow it), http://torrgas.nl/ (then click on video), http://www.raymondhartman.nl/gallery/arsari-enviro-industri-profitable-climate-solutions/

Biochar Webinar Series

The IBI Webinar planned for March has been postponed. IBI staff will distribute an announcement to IBI members and post the announcement on its website when the date and time of the webinar has been determined.

Previous webinars are accessible to IBI members for free via the Members Only page a few days after the Webinars take place. Non-members who would like access to previous webinars may pay a fee of $40 per webinar or can join IBI as a member and have full access to all historical webinars. Further information is available on our Webinars Series page.
Upcoming Calendar Events

3rd Gogreen Summit
https://bioleagues.com/conference/gogreensummit/

International Biomass Conference & Expo
April 16 – 18, Atlanta, Georgia. Billed as the World’s Largest Biomass Event, expected to draw nearly 1,200 attendees. IBI has collaborated with USBI and BBI International to present a Biomass Carbonization & Torrefaction Summit pre-conference on 16 April. IBI members and USBI sponsors will present information on biochar products and processes.
www.biomassconference.com

26th European Biomass Conference & Exhibition
EUBCE is a world leading event in the biomass sector, sharing the latest research results, latest developments and innovative bioenergy applications from industry and the policy context. 14 - 18 May 2018, Copenhagen, Denmark.
http://www.eubce.com

First International Conference on Negative CO2 Emissions
http://negativeco2emissions2018.com/

4th Korea Biochar Research Center International Biochar Conference
SMART Biochar Technology: A Shifting Paradigm Towards Advanced Materials and Healthcare Research – part of BEEM 2018, June 10 – 13, 2018
http://www.beem2018.org/sub03_04.php

Australia New Zealand Biochar Conference (ANZBC18)
14-16 August 2018. Southern Cross University Gold Coast Campus, Bilinga, Qld, Australia. An initiative of biochar producers & growers from Aust. & N.Z.
https://anzbc.org.au/

USBI Biochar 2018
August 20 – 23, 2018. Wilmington, Delaware. This year’s theme: "The Carbon Link in Watershed Ecosystem Services"
Presentations from the 2017 IBI Biochar Study Tour in Stockholm, Sweden are available on your IBI Member page. IBI is tentatively planning at least 3 new biochar study tours for 2018. Each of these study tours will be hosted in a different country and will focus on distinct aspects of biochar production and/or uses. Current times, locations and themes for the 2018 study tours are highlighted below.

- Week of June 18th: Keindorf Eco-Region, Austria – Biochar production, soil amendments, livestock feed additive, carbon farming
- October: Nanjing, China – Large scale biochar production & establishing biochar field trials (for commercial, not academic purposes)
- November: Nepal – Funding, planting & maintaining forest gardens with biochar

As agendas are planned and dates finalized, this information will be shared. Participation may be limited for some tours. If you would like to pre-register (no financial commitment required) to receive future updates, please contact Kathleen Draper at webinars@biochar-international.org.

Research News

A glimpse at some of the many interesting insights from recent papers

By Robert Gillett

Here are a few notes from some of the more noteworthy papers recently published regarding biochar. Most of these are from the list of 80 papers from last month which are available on your IBI Member page. Not an IBI member? Access to all the exclusive biochar research lists is just one more reason to join IBI and keep up with all the exciting developments.

- Hexavalent chromium can be removed efficiently from acidic solutions by certain unmodified biochars.


From the Abstract: “The highest Cr(VI) removal from solution occurred at low pH values (pH 2–5), and adsorption decreased approximately tenfold when the pH increased from 2 to 10. ... approximately 90% of the total Cr(VI) (962 μM) was reduced to Cr(III). ...Trivalent chromium is far less soluble than Cr(VI) and typically precipitates as amorphous Cr(III) solids.”

- In acid soils, the improved CEC from adding biochar also raises the pH buffering capacity of the soil, better than when Ca(OH)$_2$ alone is used to adjust pH. Al toxicity also becomes less likely:

**From the Abstract:** “When 5% biochar was incorporated, the [soil pH buffering capacity] was increased by 62, 27, 32, and 24% for the Ultisols derived from Tertiary red sandstone, Quaternary red earth, granite, and the Oxisol derived from basalt, respectively. ... The incorporation of the biochar also decreased the potentially reactive Al ... Therefore, the incorporation of corn straw biochar not only inhibited the re-acidification of amended acid soils through increasing their resistance to acidification but also decreased the potential of Al toxicity generated during re-acidification.”

- **Whether the measure is emergy, energy, or sustainability, biochar has resource intensive soil amendments beat (at least for those growing rice and wheat):**


**From the Abstract:** “The overall emergy efficiency of rice and wheat productions in biochar-amended system were higher by 11–28 and 15–47%, respectively, than that of unamended one of which the production being highly resource intensive. Moreover, [emergy sustainability index (ESI)] on average was 0.46 for rice and 0.63 for wheat in amended system, compared to 0.35 for rice and 0.39 for wheat in unamended one.”

- **Simulating four production pathways, analysts show good prospects of running a 20-year profitable business using surplus beetle-killed trees to produce bioenergy with biochar coproducts:**


**From the Abstract:** “Over a 20-year project period, results for base case scenarios reveal mean NPV ranging from a low of −$8.3 million for electric power production to a high of $76.0 million for liquid biofuel with a biochar co-product.”

- **Many in the biochar community have long supported the addition of trace minerals to biochar for supporting plant nutrition. Now we see that biochar and granulated basaltic rock soil amendments may also be complementary in drawing down atmospheric carbon and reducing the need for pesticides.**


**From the Abstract:** “Managed croplands worldwide are already equipped for frequent rock dust additions to soils, making rapid adoption at scale feasible, and the potential benefits could generate financial incentives for widespread adoption in the agricultural sector.”

[Here is an introductory article](#) and a video featuring many of the researchers from the Leverhulme Project.