

**WELCOME TO THE LATEST ISSUE OF G.A.I.A NEWS!**



**Fun facts:**

- Studies have shown that pyrolysed biomass (Biochar) can reduce N<sub>2</sub>O (Nitrous oxide) emissions by 50% compared to raw biomass application, with no yield penalty. (van Zwieten et al., 2013)
- Low-temperature biochar has been successfully used as a carrier for herbicides so that these are sustainably released; the leaching of herbicides was also decreased in the presence of biochar. (Yu et al., 2009)
- Biochar can be a negative emission technology used to influence global warming by delayed oxidation of biomass through Carbon stabilization in biochar.

**Notable Happenings at GAIA International**

Several new projects are currently being developed by GAIA, including one in Nepal and another one in Phoenix, Arizona. In addition, a new pyrolyzer is in it's Research and Development stages.

A hearty thank you goes out to all of our board members for their hard work and dedication to GAIA's Mission & Vision!

Board of Directors:  
Dr. Mark Henderson, Erin Schmal, Dr. Nathan Johnson, Karishma Thakkar and Kathleen Stefanik.  
Advisory Board Member:  
Tom Zender  
Thanks everyone!

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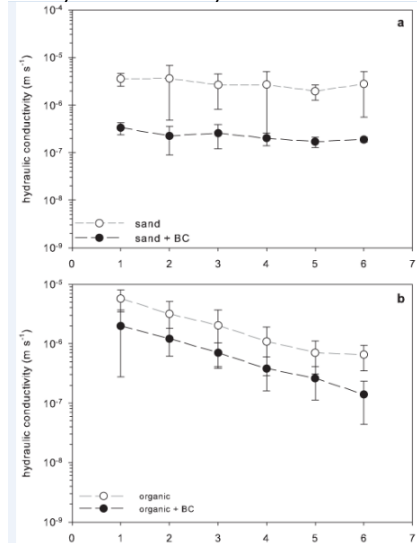
**GAIA participates in The New Arizona Prize Water Consciousness Challenge**

GAIA Researchers recently completed an analysis of three exemplary case studies, carried out in various corners of the world, that have all utilized Biochar for agricultural purposes. For example, in Belize, nursery trials testing various growing media combinations found that biochar blends showed the best results. TCGA's technical agronomist observed that seedlings planted with biochar and fertilizer were the fastest growing, with the largest, most vigorous and darkest green leaves. Biochar showed significant water retention capacity and when used in soil mixture in a nursery setting, water application can be reduced to 50%.

As per the Arizona Department of Water Resources, "irrigated agriculture is the largest use of water in Arizona, using about 68% of the available water supply." An immense amount of the available water resources are thrust into the farming industry each year: on average, about 1.6 trillion gallons of water and \$2 billion to sustain the crops. This one-sided utilization of water is painfully unsustainable and efficient water management is absolutely crucial.

Biochar is a porous substance that behaves like a sponge, absorbing and holding the water intake, drastically reducing the amount of run-off. "It is the porous quality of Biochar that helps it retain water in soils, making is a great tool for water conservation... Biochar in the soil can reduce water needs by up to 50 percent..." (Bluesky Press Release)

*Impact of Biochar addition to soils on saturated soil hydraulic conductivity*



The addition of biochar to coarser soils decreases *K* (the saturated hydraulic conductivity), indicating the potential to decrease crop water stress and reduce nutrient loss below the rooting zone. Conversely, biochar is able to increase porosity and permeability in fine-grained clay soils, making them more suitable for crop growth by increasing infiltration rates. The results, combined with those of other studies, strongly support the argument that biochar addition increases the water holding capacity (WHC) in coarse-grained soils, likely improving plant water availability.

**International Biochar Initiative (IBI) offers biochar training course**

GAIA is very excited that the IBI will now be offering an online course covering the same biochar training that our Director, Kathleen Stefanik, attended in Spain last year. "Biochar Training for Environmental Sustainability and Economic Development, is an intensive training series on all aspects of biochar, presented by leading biochar experts. Students have the opportunity to learn

about best-science updates on biochar to promote the uptake of biochar production and use, and actions necessary to overcome the barriers to commercialization of the biochar industry. Participants will study biochar production technologies; physicochemical properties; standards, classification and certification; biochar effects when used as a

soil amendment; biochar carbon persistence in soils, carbon accounting and climate change; and commercialization of the biochar industry." ([www.biochar-international.org/](http://www.biochar-international.org/))

