Cariboo Bio-char Initiative™

The Cariboo in the interior of British Columbia, Canada, is the ideal place to start bio-char operations. There is an unlimited supply of fuel to make the bio-char with all of the standing dead pine. It is also a farming and ranching community with abundant manure and other farm waste. There are many farmers and gardeners who wish to produce food that is better nutritionally for their customers and families. This blog is for them.

WEDNESDAY, NOVEMBER 9, 2011

BIO-CHAR retains water in agricultural soil.

This link will take you to an article about the use of bio-char to retain soil moisture.

http://www.sciencecodex.com/read/using_biochar_to_boost_soil_moisture-81119

Of course this is true! But there are so many more benefits of bio-char that I had to write a comment! Here is what I wrote---

The fact that bio-char helps
Ken Bourne (not verified) | November 9, 2011 - 7:15pm

The fact that bio-char helps to retain moisture in a known fact! The benefits of bio-char as an agricultural amendment are ancient history,e.g. terra preta. What we need is for some brave scientist, who is not funded by international chemical companies,to start telling the truth.
The world is inundated with problems that politicians are reluctant to cure. Waste, pollution, water shortage, food shortage, diseases and other chronic health problems, and worldwide unemployment.Power is also a massive problem especially where nuclear energy is concerned. Most of these have been caused, in my opinion, by over application of chemicals which reduces the amount of nutrients in food, and the products obtained from oil.
All of these problems can be reduced, if not eliminated by bio-char and organic food production. All organic waste can be turned into bio-char. So can sewage, farm manure, waste from sawmills and farms, forestry waste(slash piles) and the millions of trees that dead from pine beetle. Sewage would not pollute the oceans and our water would be filtered by the charcoal in agricultural and forestry soil. Chemical farmers must change over to organic farming and the large monoculture farms split up and returned back to family intensive farms. This

would eliminate the food shortages as the food produced would be nutrient rich so that the consumption would be reduced considerably as, for example, one apple would contain the same nutrients as 5 of today's!(This would be the same as the nutrient value of food 60 years ago.) There would be far more available jobs, power would be created from the heat of creating the bio-char, and the resulting bio-oils and gases can be used for vehicular power instead of oil and natural gas. the actual process of creating bio-char creates more power than is used. Organic food production results in more food per acre than chemical farming and restores the top soil that farmers have nearly eliminated. This would also reduce the amount of diseases that are caused by our immune systems being compromised, and the associated health problems of obesity. (Good food would taste so good that children would eat it!) Bill Gates and Sir Richard Branson realize the potential, lets hope that the people we elect and those that we pay to research come to the same conclusion soon.
Ken Bourne. BC. Canada

Posted by KenB at 1:00 PM 0 comments

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FRIDAY, OCTOBER 21, 2011

Bio-char company in BC gets awards

At last BC is beginning to acknowledge companies that are pioneering the production of bio-char from waste.

Here is the link to an article in Burnaby Now.

http://www.burnabynow.com/business/Diacarbon+double+winner/5585551/story.html

Ken Bourne.
BC. Canada

Posted by KenB at 12:45 PM 0 comments

NUTRITIOUS PEAS

Peas grown with Bio-char

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SATURDAY, OCTOBER 15, 2011

Bio-char Kiln in the Cariboo(Probably the first)

Bio-char Kiln using waste wood and horse manure.

Here is a series of photos of my efforts to make and use a simple bio-char kiln or stove, It is made from used steel barrels.The design is called a TLUD--a Top Lit Up Draft very similar to that of a rocket stove. The stove takes about 100lbs of waste wood fuel and some horse manure (I cut it up into kindling size pieces and added some small branches) and the result is about one third in weight of bio-char- about 35lbs. The operation took 45 minutes. It was easy to tell when the bio-char was finished as during the process the heat produced gases which were completely burned off. No smoke , no pollution! When the flames from the burning gases stopped that indicated the process was complete. You have to be fairly quick to tip out the bio-char and immediately douse it with water. It was formed by the top lit, up draft (TLUD) process so when exposed to oxygen there is a chance that it could ignite and burn to ashes. soaking it prevents this. it is also a good idea to spray water on the pieces of the stove to cool them down. It only took me about 3 hours to make the stove. I used an angle grinder to do all the cutting and used 3 cutting discs. I put three pieces of steel bars under the bottom barrel to allow passage of air through the forty drilled holes in the bottom of the barrel. Everything worked perfectly and I will make another 3 kilns so that I can make much more bio-char. Most for my raised beds and the remainder for my forge, where I teach the art of blacksmithing to young students who want to learn the basics of a dying art, before I am not able to! The charcoal produced this way is ideal for forge work as it is so clean and is what the blacksmiths used during the gold rush to the Cariboo as coal was not then available.Having done so well with the mixture of waste and manure, I believe that used in a bigger commercial sized kiln this process could easily use sewage and garbage, not only to get rid of the pollution but to create electricity from the heat produced and if the gases were captured as well then there would be additional power produced. Bio-char is one product that could help reduce global warming , stop pollution of the water table and reduce the waste going into landfills. That is on top of its benefits to agriculture and forestry, and as an amendment to the soil instead of chemical fertilizers

The 40 holes were quite tedious to drill but it was necessary for the Up draft effect.

This is the afterburner/ adapter that connects the bottom barrel to the narrower chimney.

This is the kiln completed and ready to be filled with wood waste, manure, hay, or anything organic that will convert into bio-char. The metal rods under the bottom barrel allow air to enter the holes for the up draft effect.

Here is the result after 45 minutes! Perfect bio-char the first time. It is very important to spray water on the hot bio-char immediately as it could burst into flames and end up as ash. Now to make more as I have lots of friends who will want some!

Ken Bourne.

Posted by KenB at 12:13 AM 0 comments

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WEDNESDAY, OCTOBER 12, 2011

Bio-char from Cariboo waste

This week the Cariboo Regional District is holding a series of local meetings to discuss waste disposal in the Cariboo area. Here is some information on the benefits of bio-char that I will present at the meeting in Forest Grove tonight. It is also a good description of Bio-char for all those who are interested in doing their bit to offset global warming and who might want to join this initiative. I am sure there are many gardeners, farmers and concerned people in the Cariboo who know of , or can see the benefits of this natural answer to many of our problems. If so, then post on this blog and we can set up meetings locally so we can discuss it.

BIO-CHAR

Bio-char--- an explanation of what it is.

Sustainable biochar is a powerfully simple tool to fight global warming. This 2,000 year-old practice converts agricultural waste into a soil enhancer that can hold carbon, boost food security, and discourage deforestation. Sustainable biochar is one of the few technologies that is relatively inexpensive, widely applicable, and quickly scalable. An ideal answer to the problems we have in the Cariboo. Biochar, when added to the soil in gardens and farms, also improves water quality and quantity by increasing soil retention of nutrients and agrochemicals for plant and crop utilization. More nutrients stay in the soil instead of leaching into groundwater and causing pollution.
Biochar is a solid material obtained from the carbonisation of biomass.

Biochar may be added to soils with the intention to improve soil functions and to reduce emissions from biomass that would otherwise naturally degrade to greenhouse gases. Biochar also has appreciable carbon sequestration value. These properties are measurable and verifiable in a carbon emission offset protocol.

This 2,000 year-old practice converts agricultural waste into a soil enhancer that can hold carbon, boost food security and discourage deforestation. The process creates a fine-grained, highly porous charcoal that helps soils retain nutrients and water.

Biochar is found in soils around the world as a result of vegetation fires and historic soil management practices. Intensive study of biochar-rich dark earths in the Amazon (terra preta), has led to a wider appreciation of biochar's unique properties as a soil enhancer.

Biochar can be an important tool to increase food security and cropland diversity in areas with severely depleted soils, scarce organic resources, and inadequate water and chemical fertilizer supplies.

The carbon in biochar resists degradation and can hold carbon in soils for hundreds to thousands of years. Biochar is produced through pyrolysis or gasification — processes that heat biomass in the absence (or under reduction) of oxygen.

In addition to creating a soil enhancer, sustainable biochar practices can produce oil and gas byproducts that can be used as fuel, providing clean, renewable energy. When the biochar is buried in the ground as a soil enhancer, the system can become "carbon negative." This will offset the carbon tax the CRD has to pay, and produce enough carbon credits to make a profit.

Biochar and bioenergy co-production can help combat global climate change by displacing fossil fuel use and by sequestering carbon in stable soil carbon pools. It may also reduce emissions of nitrous oxide. It's one of the few technologies that is relatively inexpensive, widely applicable, and quickly scalable. We really can't afford not to pursue it.

There are many different ways to make biochar, but all of them involve heating biomass

with little or no oxygen to drive off volatile gasses, leaving carbon behind. This simple process is called thermal decomposition usually from pyrolysis or gasification. These methods can produce clean energy in the form of gas or oil along with the biochar. This energy may be recoverable for another use, or it may simply be burned and released as heat. It's one of the few technologies that is relatively inexpensive, widely applicable and carbon negative. It also produces more power than that used to produce it. The potential for cleaning up water ways, ground water and reducing the amount of garbage in landfills is enormous. When the bio-char made from bio-solids (dried sewage) is used on non- food crops it still does the same job of sequestering carbon-dioxide, improving the nutrient capacity of the soil and retains moisture. It also holds the heavy metals and stops their pollution of the environment.

Biochar Use in Soils

Biochar enhances soils. By converting agricultural waste into a powerful soil enhancer that holds carbon and makes soils more fertile, we can boost food security, discourage deforestation and preserve cropland diversity. Research is now confirming benefits that include:

- Reduced leaching of nitrogen into ground water
- Possible reduced emissions of nitrous oxide

- Increased cation-exchange capacity resulting in improved soil fertility
- Moderating of soil acidity
- Increased water retention
- Increased number of beneficial soil microbes

Biochar can improve almost any soil. Areas with low rainfall or nutrient-poor soils will most likely see the largest impact from addition of biochar, as long as the bio-char is inoculated with compost tea or mixed with organic compost so that the beneficial micro-organisms are added to the soil to multiply.

BIOCHAR AND TERRA PRETA SOILS

Biochar production is modeled after a process begun thousands of years ago in the Amazon Basin, where islands of rich, fertile soils called terra preta ("dark earth") were created by indigenous people. Anthropologists speculate that cooking fires and kitchen middens along with deliberate placing of charcoal in soil resulted in soils with high fertility and carbon content, often containing shards of broken pottery. These soils continue to "hold" carbon today and remain so nutrient rich that they have been dug up and sold as potting soil in Brazilian markets.

RURAL AND DEVELOPING COUNTRY APPLICATIONS OF BIOCHAR SYSTEMS

Biochar systems can reverse soil degradation and create sustainable food and fuel production in areas with severely depleted soils, scarce organic resources, and inadequate water and chemical fertilizer supplies. By making croplands more fertile for longer periods of time, biochar discourages deforestation. Low-cost, small-scale biochar production units can produce biochar to build garden, agricultural and forest productivity, and provide thermal energy for cooking and drying grain. With the addition of an engine or turbine, these systems can produce kinetic energy for grinding grain or making electricity. In colder areas like the Cariboo the excess heat can be used to heat greenhouses, schools , community certres etc. The electricity produced could be used for the benefit of taxpayers or put into the power grid to earn even more income.

HOW CAN BIOCHAR BE CARBON-NEGATIVE?

Fossil fuels are carbon-positive -- they add more carbon to the air. Ordinary biomass fuels are carbon neutral -- the carbon captured in the biomass by photosynthesis would have eventually returned to the atmosphere through natural processes -- burning plants for energy just speeds it up. Sustainable biochar systems can be carbon negative because they hold a substantial portion of the carbon in soil. The result is a net reduction of carbon dioxide in the atmosphere, so in areas where there is a carbon tax there will be carbon negative units to sell!

Biochar can hold carbon in the soil for hundreds and even thousands of years. Biochar also improves soil fertility, stimulating plant growth, which then consumes more CO_2 in a feedback effect. And the energy generated as part of biochar production can displace carbonpositive energy from fossil fuels. Additional effects from adding biochar to soil can further reduce greenhouse gas emissions and enhance carbon storage in soil. These include:

- Biochar reduces the need for fertilizer, resulting in reduced emissions from fertilizer production.
- Biochar increases soil microbial life, resulting in more carbon storage

in soil.

- Because biochar retains nitrogen, emissions of nitrous oxide (a potent greenhouse gas) may be reduced.
- Turning agricultural waste into biochar reduces methane (another potent greenhouse gas) generated by the natural decomposition of the waste.

Plants take carbon dioxide out of the atmosphere and change it into plant matter. But when the plant dies, it is eventually broken back down to carbon dioxide. If that plant matter is converted into biochar, the carbon in it doesn't break down any further. Biochar's big benefit is its longevity -- it can last for thousands of years, said Hamill, who is working with local municipal officials to encourage use of the material in Virginia's Hampton Roads region.

"The best thing to do with biochar is put it into the soil, and it's very happy to be there. And when it's in the soil, it does a lot of good things," said Hamill (from NASA). "It stays there for a long time, and provides a home for soil bacteria and other microbes that improve soil. Even small amounts of biochar are very, very good for the soil."
In the Cariboo we have an abundance of bio-char fuel with the dead trees from pine beetle, mill waste, farm manure and other waste, and of course sewage. Forests and farm land would be vastly improved, there would be much less pollution, less damage to the water table, use of water would be reduced. The heat, gases and oils produced could be used for powering the vehicles and machines that are used to create the bio-char, heat buildings and greenhouses and create a vast number of meaningful jobs. **T**he electricity produced could be used for the benefit of taxpayers or put into the power grid to earn even more income.
The whole process has been tested for some years, in various parts of the world and proven to work there is no need for tests. The National Geographic magazine has recently funded companies to to continue their work and will have an upcomong issue on bio-char. Branson and other world leaders have recognised the potential and are funding development. There are now available mobile machines that convert farm and other waste into bio-char, these are manufactured in the US, and cost $100,000 for a machine that converts at the rate of about 1 ton per hour. However as the process is not patentable making a machine locally is a relatively simple process. I have been making bio-char (charcoal) on my nursery for over 20 years. Making bio-char is a very clean way of converting waste as all the gases are saved or completely burnt off during the process.

Ken Bourne.

Posted by KenB at 2:18 PM 0 comments

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