‘Biochar’, a new big threat to people, land, and ecosystems

Keep ‘biochar’ and soils out of carbon trading

Caution urged against proposals for large scale use of charcoal in soils for climate change mitigation and soil reclamation

Adding charcoal (‘biochar’) to the soil has been proposed as a ‘climate change mitigation’ strategy and as a means of regenerating degraded land. Some even claim that this could sequester so much carbon that the Earth could return to pre-industrial carbon dioxide levels, i.e. that all the global warming caused by fossil fuel burning and ecosystem destruction could be reversed. Such large-scale production of charcoal would require many hundreds of millions of hectares of land for biomass production (primarily tree plantations). This is an attempt to manipulate the biosphere and land use on a vast scale in order to alter the global climate, which makes it a form of ‘geo-engineering’.

As the unfolding disaster of agrofuels clearly demonstrates, such major land-conversion poses a major threat to biodiversity and ecosystems that play an essential role in stabilising and regulating the climate and are necessary to ensure food and water security. It threatens the livelihoods of many communities, including indigenous peoples.

‘Biochar’ and agrofuels are closely linked: Charcoal is a byproduct from a type of bioenergy production which can also be used to make second-generation agrofuels, i.e. liquid agrofuels from wood, straw, bagasse, palm kernel residues and other types of solid biomass.

Eleven African governments have called for agricultural soils in general and ‘biochar’ in particular to be included into carbon trading. Their submission indicates that they seek to increase “private sector financing” (and by implication corporate control) over rural areas in the South, and to link this to proposals for including forests in carbon trading (i.e. the mechanisms for Reducing Emissions from Deforestation and Degradation or REDD being negotiated at present). Those REDD proposals have met with opposition on the basis that they commodify forest ecosystems with dire implications for indigenous peoples and biodiversity. The inclusion of soils into those mechanisms would further extend such serious impacts.

Proposals for ‘climate change mitigation’ through large-scale adoption of ‘biochar’ are a dangerous form of geo-engineering based on unfounded claims.

A lobby group (the International Biochar Initiative) made up largely of startup ‘biochar’ and agrofuel companies and academics, many of them with related commercial interests, are behind the push for ‘biochar’. Their extremely bold claims are not founded in scientific understanding.

+ It is not yet known whether charcoal in soil represents a ‘carbon sink’ at all. Industrial charcoal is very different from Terra Preta, the highly fertile and carbon-rich soils found in Central Amazonia which were created by indigenous peoples hundreds and even thousands of years ago. ‘Biochar’ companies and researchers have not been able to recreate Terra Preta.

+ ‘Biochar’ advocates are promoting ‘targets’ which would require the use of 500 million hectares or more of land to be used for producing charcoal plus energy. Industrial monocultures of fast growing trees and other feedstocks for the pulp and paper industry and for agrofuels are already creating severe social and environmental impacts which worsen climate change. This very large new demand for ‘biochar’ would greatly exacerbate these problems.

+ There is a risk that ‘biochar’ could in future be used to promote the development of genetically engineered (GE) tree varieties specifically engineered for ‘biochar’ production or to try and extend the range of fast-growing trees, both of which could have very serious ecological impacts.

+ There is no consistent evidence that charcoal can be relied upon to make soil more fertile. Industrial charcoal production at the expense of organic matter needed for making humus could have the opposite results.

+ Combinations of charcoal with fossil fuel-based fertilisers made from scrubbing coal power plant flue gases are being promoted as 'biochar', and those will help to perpetuate fossil fuel burning as well as emissions of nitrous oxide, a powerful greenhouse gas.

+ The process for making charcoal and energy (pyrolysis) can result in dangerous soil and air pollution.

Turning soils into a commodity is profitable to industry but disastrous for the poor.
Several patent applications have been made for charcoal use in soil and for pyrolysis with charcoal production. If granted, those will ensure that any future profits from the technology will go to companies, not communities. Given that successful strategies for combining charcoal with diverse biomass in soils were developed by indigenous peoples, 'biochar' patenting raises serious concerns over biopiracy. The inclusion of soils in carbon markets, just like the inclusion forests in carbon trading will increase corporate control over vital resources and the exclusion of smallholder farmers, rural communities and indigenous peoples.

The Clean Development Mechanism (CDM) has perpetuated, rather than reduced fossil fuel burning by permitting industries to purchase "rights to pollute" and further delaying the social and economic changes which are essential for addressing climate change. The climate impacts of fossil fuel burning are irreversible, yet so-called 'soil carbon sinks' are highly uncertain and temporary.

We strongly oppose the inclusion of soils in carbon trade and offset mechanisms, including in the Clean Development Mechanism.

The 'biochar' initiative fails to address the root causes of climate change: Fossil fuel burning and ecosystem destruction, including deforestation and the destruction of healthy soils through industrial agriculture.

Small-scale agro-ecological farming and protection of natural ecosystem are effective ways to mitigate the impacts of climate change. These proven alternatives should be fully supported, not risky, unfounded technologies promoted by vested commercial interests. Indigenous and peasant communities have developed many diverse means of caring for soils and biodiversity, and living sustainably. Those locally and culturally adapted methods depend on regional climate, soils, crops and biodiversity. Attempts to commodify soils and impose a "one-size-fits all" approach to soils and farming risks appropriating, undermining and destroying this knowledge and diversity just when it is most critically needed.

If your organization wishes to support this declaration, or for questions or comments please send an e-mail containing the name of your organization and country to biochar_concerns@yahoo.co.uk

Signatures:

Biofuelwatch (UK)
CENSAT Agua Viva (Friends of the Earth Colombia)
Down to Earth (UK)
EcoNexus (UK)
Energy Justice Network (US)
ETC Group
Food First (US)
Friends of the Siberian Forest (Russia)
Global Justice Ecology Project (US)
Grupo de Reflexion Rural (Argentina)

NOAH (Friends of the Earth Denmark)
PIPEC
Rettet den Regenwald e.V. (Germany)
Salva la Selva
World Rainforest Movement

BACKGROUND NOTES

'Biochar' is a term used to describe charcoal (generally fine-grained charcoal) when it is applied to soils). It is produced through a process called biomass pyrolysis. This involves exposing biomass to high temperatures in the absence of oxygen. It produces two types of fuel (syngas and bio-oil) as well as charcoal as a byproduct.

'Biochar' proponents claim that the biomass which they use is carbon neutral – a claim which ignores the fact that it will primarily come from industrial agriculture and tree plantations, which are associated with very high greenhouse gas emissions from organic soil carbon losses, destruction of natural vegetation, energy and synthetic fertiliser use. They further claim that the carbon retained in the charcoal (usually 20-50% of the original carbon in the biomass) will, if the charcoal is added to soil, permanently remain there and that this makes the process 'carbon negative', allowing it to reduce concentrations of carbon dioxide in the atmosphere. They also claim that adding charcoal will make soils permanently more fertile. Each of these claims is highly questionable and none of them is scientifically proven.

1) Does charcoal represent a 'carbon sink'?

'Biochar' proponents are suggesting that industrial charcoal can be compared with Terra Preta, highly fertile and carbon-rich soils found in Central Amazonia which were created by indigenous peoples hundreds and even thousands of years ago, through the use of charcoal combined with highly diverse biomass. The success of Terra Preta has not been replicated. Modern 'biochar' is highly variable and results vary greatly depending upon the type of soil, the type of material used for making charcoal, and other factors. In some cases, charcoal addition has been shown to increase soil carbon losses by stimulating microbial breakdown of non-charcoal organic matter. Some microbes also can breakdown charcoal. While some charcoal does remain in soil for long periods, this is not always the case. No (even remotely) long term studies of modern 'biochar' exist. The impacts of tilling large areas of soil in order to incorporate 'biochar' are not known either. 'Biochar' at or near the surface may increase 'black soot' in the atmosphere, which is a major contributor to global warming. To avoid this, the charcoal would need to be tilled deep into the soil. Yet this tilling would disrupt and alter soil structure and cause significant releases of CO2 into the atmosphere. Claims that 'biochar' in soils provide a "permanent carbon sink" are false.

2) What would the likely impacts be of growing sufficient quantities of feedstock for 'biochar' as a climate geoengineering strategy?

Advocates of 'biochar' suggest growing vast tree and crop plantations, (on the order of at least 500 million hectares) for conversion to charcoal. As the disastrous impacts of industrial plantations for pulp and paper and for agrofuels have already shown, land-conversion on this scale poses a major threat to biodiversity and ecosystems, displaces communities, interferes with food production and degrades soil and freshwater resources. The proposed use of 'agricultural and forestry residues' is based on unrealistic assessments of the availability of such materials, the removal of which deprives soils of nutrients and organic matter, encourages erosion, and reduces critical habitat for biodiversity.

3) What will the effects of charcoal addition be on soil?

Advocates for 'biochar' claim that it improves soil fertility, reducing the need for chemical fertilizers and improves water retention. Yet the small number of studies that have been done show varying

results, including, in some cases the exact reverse, i.e. declines in productivity. Again, no long term studies exist. In fact, much of the 'biochar' research and development focuses on charcoal combined with synthetic fertilizer, and charcoal 'enhanced' with flue gases 'scrubbed' from coal power plants (ammonium bicarbonate). The impact of large-scale biochar application and the mechanical disturbances involved in tilling it into soils on soil microbial diversity are unknown, but are deeply concerning on such a massive scale.

4) What other impacts need to be considered?
Pyrolysis can result in air pollution and particulate emissions known to have serious impacts on human health. As with conventional incineration, toxins contained within feedstocks are emitted into the air or retained in ash or and charcoal Some biochar companies are already using a wide variety of "wastes" which can include treated wood, crop residues that have been sprayed with agrichemicals, plastics, used tyres or coal mixed with other biomass. The impact of adding large quantities of potentially toxin-laden charcoal into soils must be assessed, along with air emissions from pyrolysis.

Summary:

In the face of such major scientific uncertainties, policy support for commercialising and scaling up this technology is extremely risky and not justified. The risk of severely worsening rather than mitigating climate change exists if emissions from land use change, from soil disruption, or from unanticipated soil carbon or 'biochar' carbon losses occur.

For further information and references see "Biochar for Climate Change Mitigation: Fact of Fiction?", Almuth Ernsting and Rachel Smolker, www.biofuelwatch.org.uk/docs/biocharbriefing.pdf