Dear Sir/Madam, 28/09/09

Re: Defra Review on Biochar

We write to express our concerns about the Defra Review on Biochar and in particular about the fact that the UK Biochar Research Centre (UKBRC) has been commissioned to carry it out.

Biochar is being increasingly promoted, first and foremost through the International Biochar Initiative which primarily represents industry interests and some researchers, many of them with industry links. Reviewing the evidence and studying the impact of charcoal on soils does make sense – commissioning a centre with the remit of supporting biochar deployment, however, prejudices the outcome and the objectivity of the study. Below are the reasons why we question the choice to commission the UKBRC with this research.

We hope that Defra will apply the precautionary principle to biochar. Our concerns over large-scale commercialisation of biochar and about the inclusion of biochar and soils in general into carbon trading are shared by 156 organisations which signed a declaration on biochar earlier this year: www.rainforest-rescue.org/news.php?id=1226

We believe that the following issues must be addressed in any discussion about biochar:

1) *Impacts of creating a new demand for biomass, including competition with other growing demands:*

Biochar will put a significant new demand on land and biomass. It will add to new/increasing demands for biofuels and bioenergy or bioplastics which are already resulting in greatly increased deforestation, biodiversity losses, hunger and communities being displaced or evicted from their land. If biochar was used with a view to have a measurable impact on global warming, hundreds of millions of hectares of plantations would be required, dwarfing the deforestation and land-grabbing caused by biofuels so far. Evidence about biofuel impacts shows that indirect impacts are particularly serious. No mechanisms currently exist for addressing those. A recent study by M Wise et al[1] warns that a large-bioenergy scenario could result in the complete destruction of natural forests and savannahs by 2065. Yet biodiverse ecosystems play an essential role in climate regulation – destroying them removes a key element for climate stabilisation.

2) *Evidence that charcoal additions lead to the degradation of existing soil organic carbon*:

Evidence of this has been published in a peer reviewed study[2] and is also shown in other non-published studies. There is an ongoing Danish study looking amongst other issues into biochar impacts on soil organic carbon[3]. This alone could lead to biochar accelerating climate change, particularly if it is used in carbon-rich soils, which most UK soils are.

3) *Concerns about potential reductions of albedo and about charcoal dust which could lead to increased warming:*:

Soil with charcoal additions is darker and will thus absorb more solar radiation and become warmer. The impacts which this would have on plants during heatwaves and droughts have not been studied.

There are further concerns about the impacts of possible biochar/black carbon dust. One recent preliminary study of biochar shows 30% of the biochar being blown away as it is applied [4]. Dust already contributes to increased ice melt and warming – black charcoal dust would exacerbate those impacts. A

recent CSIRO report states that biochar particles can very quickly break down to a size of less than 5 micrometres – similar to that of soot which has a very high global warming potential.[5] Such small particles could be released through soil erosion.

4) *Limited knowledge on the retention of biochar carbon in soils.*

Some carbon in charcoal clearly remains in soil or sediments for very long periods of time, but this does not mean that all such carbon will be equally stable. It is generally accepted that up to 20% of carbon in charcoal quickly turns into carbon dioxide[6], there is evidence that soil microbes exist which can metabolise charcoal and thus emit carbon dioxide[7]. And there is evidence that more charcoal is being produced by wildfires every year than remains in soils or sediments, suggesting mechanisms for black carbon losses which are not properly understood.

5) *Limited knowledge of biochar impacts on soil fertility:*

There are no long-term peer-reviewed field studies to show what effects different biochars have on plant growth on different soils. Existing evidence is very mixed and by no means always positive – and all of it is short term evidence. Terra preta involved additions of highly diverse organic residues to soil, as well as charcoal, over long periods. For biochar, conversion of organic residues to charcoal is being advocated. The effects of this on long-term soil fertility and soil microbes are not known. In addition, it is clear that residues are not sufficient for the huge-scale projects being promoted by many biochar proponents. Massive plantations will be required in addition.

6) *Pollution issues:*

According to soil scientist Philippe Baveye, "Charcoal-amended soils may…be washed or blown away easily, charcoal first (Rumberl et al. 2006) with potentially negative consequences in terms of global warming. Since charcoal is a documented cause of pneumoconiosis, and often life-threatening lung disease (Huber et al. 2006; De Capitani et al. 2007), such erosion may result in dramatic health effects if charcoal ends up in house dust or in aerosols."[8]

Any toxins contained in biomass tend to accumulate in charcoal and would thus go into the soil – those would include agro-chemical residues, chemicals in treated wood but also heavy metals and other toxins from air pollution which accumulate in trees.

Not enough is known about the possibility of carcinogenic polycyclic aromatic hydrocarbons (PAH) accumulating in biochar and this could be of particular concern with small-scale untested biochar use.

We would certainly welcome research which looks closely at all the issues listed above, without in any way being prejudiced in favour of biochar deployment. However, for the following reasons, we do not believe that policies should be based on a UKBRC report:

1) It is clear from the UKBRC website and their previous submissions that they support large-scale deployment of biochar. This is reflected in their newsfeed and also in their submission to the Royal Society geo-engineering consultation in which they put forward biochar and stated: "A conservative estimate is that 1 gigatonne of carbon per year can be stored in biochar by 2050 and probably by 2030"[9].

2) Part of UKBRC's remit is to "address the key research and development challenges involved in the deployment of biochar in the UK, and in partner countries in Asia-Pacific, Africa, Europe and the

Americas"[10]. Deployment is supported by UKBRC even though, as discussed above, there are major uncertainties over the impact of biochar on soil and climate.

3) One of the members of UKBRC is Saran Sohi who is also lead author of a recent biochar review published by CSIRO. Following that report, CSIRO made it clear that they expect to promote biochar commercialisation within 3-5 years, despite the fact that the review itself highlighted major uncertainties in the most important areas. The report also makes it clear that pyrolysis with biochar production is seen as competing with organic residues and composting

We therefore believe that any policies based on a UKBRC report would almost inevitably be biased. In examining such important questions, the government must ensure those who are producing studies for policy development face no conflict of interest and hold no vested interests (including ones linked to their wider mandate).

Yours faithfully,

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Helena Paul, Econexus (UK)
MELCA Mahiber (Ethiopia)
Angie Zelter, Reforest the Earth (UK)

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[5] Biochar,Climate Change and Soil: A Review to Guide Further Research, CSIRO, 2009
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[8] Soils and runaway global warming: Terra incognita, Philippe Baveye, Journal of Soil and Water Conservation, Nov/Dec 2007
[9] www.geos.ed.ac.uk/sccs/biochar/documents/Biochar-RoyalSoc.pdf
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