

## **Can biochar achieve faster and larger accumulation of standing biomass for CDR purposes?**

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Major differences have been expressed about Biochar being a significant contributor to the CDR (Carbon Dioxide Removal) portion of Geoengineering. Insufficient land availability is often cited. There are also statements that a large CDR contribution from Biochar will necessarily cause removal of much standing biomass. In May, Dr. Jame Hansen (NASA) recommended a global goal of an additional 100 GtC (gigatonnes of carbon) as a way to move rapidly towards net carbon negativity. This paper will discuss the relationship of Biochar to this new important CDR goal. Emphasis will be on sustainable forest management using Biochar - an approach that necessarily requires periodic removal of standing biomass. The possibility of accelerating the 100 GtC goal arises because Biochar (charcoal placed in soil) can augment, possibly significantly, the annual growth of many plants. The problem of emphasizing standing biomass over some harvesting is further complicated by the capability of Biochar to also provide carbon neutral energy. If the 100 GtC were achieved a little later than the earliest possible date but was supplying significant carbon neutral energy as well - how should that advantage be factored in? Also to be discussed are - whether it is important that Biochar can 1) supply rather than require energy, and 2) provide out-year continuing benefits. (the only Geoengineering approach that can do either?) - whether non-climate benefits (jobs, nutrients, etc) should also be used in future funding decisions. - where the required land might best be obtained. This is closely associated with the issue of soil productivity (units of tonnes C/ha-yr or kg/m<sup>2</sup>-yr.) - how to move more rapidly under the UN's REDD framework on afforestation and reforestation - which world regions and biomes are likely to benefit most?. - how will the costs and magnitudes of these other Biochar feedstock options be impacted by the Hansen proposal? Besides the new proposed standing biomass, other already existing biomass can supply considerable annual feedstock, both from waste resources and other options such as from fire prevention, energy plantations, the marine environment, etc. - what are the impacts on biodiversity, indigenous populations, corporate or governmental malfeasance, etc, - are the existing rules for REDD (also opposed by anti-Biochar groups) going to be impacted by a large new global goal? - can other forms of CDR be hybridized with Biochar? Is there a connection with BECCS? With AWL? - how will the requirement for more standing biomass impact the conflicting desire for more biofuels? - how ready is the infant Biochar industry - and does it matter, if the early emphasis is only on increasing standing biomass? These are all example topics that should be explored if and when the new aggressive Hansen proposal is taken seriously.