

Maximising yield effects while minimising trade-offs following biochar application to soil.

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There are now several meta-analyses in the published literature aimed at quantifying the yield effects following biochar application to soil. In general the results are positive, showing a grand mean increase of between 10% and 20% across the meta-analyses. However, the actual yield response is highly dependent on biochar feedstock, soil, and crop type, and the interactions between these factors. Further to yield effects, biochar application to soil can have other benefits such as carbon sequestration and reduction of greenhouse gas emissions from soils. However, none of the potential benefits of biochar application to soil functions in isolation; rather trade-offs between them are inevitable. We will show an updated meta-analysis of the crop yield effects of biochar application to soil. By combining this with the interactions with other potential benefits, we will attempt to get a handle on “The Biochar Effect”. This will be done through utilising the observed differences in efficacy of different biochars when applied to different soil/crop combinations to elucidate potential mechanisms behind observed effects. By tying in such data with meta-analyses of other factors, such as greenhouse gas emission effects, we will show how maximising one potential benefit on the soil, plant, atmosphere continuum can lead to trade-offs in other parts of the continuum. Only through identification and quantification of such trade-offs we can work towards maximising the benefits and minimising the risks associated with biochar application to soil.