**Proposed Avocado Trial**

Since the application was submitted there has been ongoing discussion between Doug Pow and a major poultry breeder regarding the restrictions on disposal of chicken litter on the Swan coastal plain. He has been acquiring this chicken waste and composting it on farm in Manjimup and discussions ensued re the Central Queensland study into biochar use in chicken sheds. The plan now would be to pass the biochar through the gut of chickens as well as mix it in the litter layer so that it will be a nutrient sponge as well as microbially activated. After a trip to volcanic regions of Italy, Doug has also been inspired with the concept of replicating andisol soils so we will manipulate the original plan (so long as it is sanctioned by South West Catchments Council, the funding body).

We need to really think through the variable control aspect. This is the point we are at: nailing the hypotheses we really need to demonstrate for the benefit of the burgeoning avocado industry in the district as well as trying to generate data that can be reliably extrapolated to other contexts. Ideally, if hardwood biochar (our experimental source is Simcoa jarrah) can be demonstrated to be beneficial – environmentally, productively and profitably – then it will provide incentive for a new local industry.

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| **4. What are the projects’ main aims and objectives, and how do these address the funding priorities identified above?** |
| “Productivity gains from biologically active soil initiated through biochar-activated compost in an avocado orchard” seeks to assess the effects of a range of soil amendments extended over 4 years on:1. Plant growth and vigour
2. Plant uptake of nutrients
3. Plant nutrients
4. Soil health (physical, chemical, biological including mycorrhizal fungi)
5. Moisture retention
6. Nutrient retention
7. Soil pH
8. Disease and pest protection

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| **5. What is the history behind the innovative practice that you are wanting to trial? Give a brief overview of past trial work on the practice, current adoption rates, and what your trial will add to the existing body of knowledge.** |
|  **“Experiments in Delinat vineyard” [Delinat Institute – Switzerland]**[**http://www.ithaka-journal.net/pflanzenkohle-im-europaischen-weinbau-ergebnisse-2011?lang=en**](http://www.ithaka-journal.net/pflanzenkohle-im-europaischen-weinbau-ergebnisse-2011?lang=en)Experiments will be modeled on those conducted under the auspices of Delinat Institute, though applied to avocados rather than vines, to determine the comparative nutrient availability variations between substrate applications. It will also test whether similar results will occur given that the pH in these European experiments was around 8 and the Middlesex property has a pH of 5.Metanalyse-Trauben-Pflanzenkohle-Weinberge-2011-300x202Metanalyse-Blatt-Pflanzenkohle-Weinberge-20114-300x202Fig.15. Meta-analysis of grapes (red color) and macronutrients in leaves (green color) based on different biochar experiments in Europe (data for leaves are based on: 6 experiments, 3 sites; data for grapes are based on: 4 experiments, 2 sites).“The charging of biochar through its addition to selected biomass for composting increased the C- and N-efficiency of composting (Publication of Data: Spring 2012). The resulting biochar substrates differed in the first year only slightly from the control composts which were composted without biochar addition. However, the differences almost always showed a tendency for an improved effect for the biochar-compost over the pure compost.The efficiency of biochar in the soil matrix can only be properly assessed over a longer period. Aside from increasing water storage capacity, the adsorption capacity of biochar has to be taken into consideration. If biochar develops a strong fixation pool for soil organic molecules, as can be expected, it will not only slow down the leaching of nutrients but also encourage the development of humus by allowing the formation of clay-biochar-humus complexes with high microbial activity. These soil formation processes may take place, however, on time scales of several years…”Doug Pow, the trial proponent, is an enthusiastic and innovative farmer who has undertaken significant research on the multiple applications of biochar, including the considerable work undertaken by the NSW DPI into biochar’s horticultural effectiveness that shows promising results. |

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| **6. What are the planned on-ground activities required to set up the trial? Please include an approximate timeline for undertaking these activities (*note all projects MUST be completed by 31st December 2017*).** |
| Establish three replicates of application of biochar, biochar-activated compost, compost and control to avocado orchardCompost and biochar-activated compost production (early 2014)Modify spreader to distribute composts/biochar (early 2014)Establish photopoints for quarterly recording (pre-application)Benchmark testing and treatment testing (pre-application)Apply treatments (early 2014)Annual testing as described in monitoring plan – comparable timing (2015, 2016, 2017)Monitoring and recording pest/disease/moisture/anecdotal observations (on-going)Field Day (spring 2016) |