Soil Carbon Masterclass

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On a hopeful spring day in a draughty barn, farmers, scientists and advisors gathered together to discuss soil carbon; what it means, how it can be managed and its' localised and global significance. The event, held at Martin Howard's organic mixed farm near Launceston, was organised by the Farm Carbon Cutting Toolkit, an organisation established by farmers in 2009 to work with farmers to improve their energy resilience and reduce their greenhouse gas emissions. The formation of FCCT was driven by the need to help businesses succeed in the context of climate change, energy security and future market changes.

The day was directed by Adam Twine (pictured left), a dairy and arable farmer and one of the directors of FCCT, the other being Jonathan Smith, who runs Scilly Organics and gave attendees towards the end of the day a brief introduction to the carbon footprint of his own organic veg business and the FCCT carbon calculator, a free on-line tool that can be downloaded from the FCCT website.

Dr Jenni Dungait, a senior soil scientist at Rothamsted Research North Wyke, spoke about the current scientific evidence pointing towards the benefits of soil carbon and increasing it; the most obvious correlation being that if you increase your soil organic carbon (SOC) stocks, you increase your soil quality, its' structure, porosity, infiltration rates and nutrient use efficiency. She outlined the various options available to farmers, including use of perennial cropping systems, no or reduced tillage, changing how the land is used, early crop establishment, tram line management, and adding organic amendments such as FYM, digested sludge, paper crumble and compost, and touched on some more contentious considerations such as using biochar. Dr Dungait was keen to stress that "not all biochar is inert", and that the addition of biochar to the soil can in fact cause losses of existing SOC. She emphasised the value of having a diverse sward both above and below ground and mentioned the SUREROOT project which is breeding new grasses that enable grassland soils to capture increasing volumes of rainfall, reducing the risk of flooding, but is also examining whether or not the grasses increase the SOC stocks.

Rob Richmond, who practices mob grazing on his dairy farm in the Cotswolds and manages what is largely a brash, free-draining soil, put across his understanding of soil carbon and how he manages it. He set it first against the global backdrop of issues faced; that of providing a reliable supply of clean water and quality food. He suggested that the main aim of managing soil carbon is for production purposes; we need to ensure we maintain and build soil fertility and thereby also address important environmental issues affecting water and nutrient management and greenhouse gasses and our carbon footprint. He outlined the factors affecting crop production, stressing "if you don't get the soil water, soil air and nutrient cycling right there is no point on focussing on a fertility plan." He referred to soil humus as being the soil's "fly wheel," helping to open up the soil, improving the soil crumb structure and nutrient and water retention capacity.

Similarly to Martin Howard, who conducted a short farm walk during the day (see left), he outlined actions he has been taking on his farm to increase soil carbon. Mr Richmond pointed towards the benefits of increasing the number amount of soil microbes, which recycle and release locked-up nutrients, build humus, improve the nutrient uptake by plants, and produce vitamins, hormones and anti-biotics. He pointed towards compost as being a great way of getting carbon back into the soil, and cited examples from his farm of using biodiverse pastures, which achieve, in his eyes, production whilst building soils and achieving environmental goals.

Julian Gold, an arable farm manager in Oxfordshire, who typically has very moisture retentive silty clay loam on his farm, gave his thoughts on soil carbon management within the context of combinable cropping rotations. He referred to the 'chicken and egg' scenario, questioning which comes first; believing that the soil ecosystem is the chicken, and the crop is the bi-product of the soil ecosystem, and almost secondary. He explained

that he visualises the soil ecosystem as being the "Engine of the Planet", with the carbon (or organic matter) being the fuel needed to keep the engine going, saying "forget about N P and K and the trace elements, the first thing I think about is the soil carbon." Similarly to Martin Howard, Mr Gold views mycorrhizal fungi as being vital to helping increase SOC, referring to them as being "the most amazing things." He recommended considering different ways of incorporating crop residues into the soil, and carrying out actions such as adding compost and FYM, and not re-oxidising old root systems through excessive cultivation, citing examples of practices on his farm such as growing spring barley as a cover crop before spring beans and having a stubble turnip cover crop which are direct drilled into chopped wheat straw and will be grazed by sheep prior to spring beans. Mr Gold concluded by touching on agroforestry as being what he referred to as the "ultimate soil carbon management system" stating that he firmly believed it to be "an answer globally in the future if you are thinking about soil carbon management" due to the more efficient use of sunshine, CO_2 and water.

Luppo Diepenbrook, who facilitates the farmer-led Tamar Valley Organic Group, addressed the contentious issue of investing financially in carbon sequestration, which raised some heated discussions amongst the attendees. For those of us wanting to increase our understanding and actively contribute towards having a positive impact on SOC we could do worse than Luppo's suggestion of looking at local solutions, building relationships and trust, and moving away from focussing on carbon mitigation (using wind turbines, solar panels, biofuels and AD) to carbon sequestration, which the farmers gathered at this event were evidently trying to do.