

CLIMATE CHANGE AND THE COUNTRYSIDE

How do we respond?



Permaculture Design course participants and staff with the Sector39 team at Kamuli, Uganda in May 2016

Climate change is a problem that will not go away, we must all rise to the challenge.

Farmers, small holders and landowners will be at the forefront of the new carbon economy. Burning fossil fuels, felling forests and ploughing soils has pumped vast quantities of carbon dioxide into the atmosphere. What we are facing is a 'carbon in the wrong place' problem: the carbon in the air needs to go back into the soils where it belongs. Achieving this will revitalise our countryside like never before.

Describing climate change as a 'huge problem' conjures up the wrong image in people's minds, because huge problems require huge solutions. I recently read an article that encourages us to visualise this problem not as a juggernaut, dwarfing us in scale, but rather as a murmuration of starlings - something substantial enough to darken the skies but made of many individual parts, small and insignificant, but collectively very powerful. The response to this problem calls for millions of small responses which in combination will affect the changes required of us by the scientific reality of the current situation.

If you are still uncertain about climate science and the extent of the challenge we face, then look no further than the Paris Climate Agreement, signed and ratified by 195 countries, which spells it out in no uncertain terms. The debate really is over (Trump rhetoric aside). All that is left to discuss is how bad and how urgent the consequences are and to realise how hard we will have to work to stay under the agreed 2 degree target. Allowing ourselves to go beyond it really is not an option.

I do want to offer some positives though. With change comes opportunity. Responding to the climate challenge is a chance to redefine our economy. To avoid catastrophe we have to

fundamentally alter the way we think and act. The future is all about carbon sequestration. With atmospheric CO₂ at 400ppm for the first time in about 2-million years we must realise we cannot survive at this level. We have to bring it back down to 350ppm to have a chance of stopping the planet overheating, and, if we take the advice of NASA scientist James Hansen, we must do this by the end of the century.

How can we possibly manage this when emissions are still rocketing? We have to do more than put the brakes on, we have to reverse the trend! The oil industry is doomed: shale oil and tar sands, as well deep sea reserves, are not comparable to what we built the global economy on. The net energy return of these marginal reserves is a fraction of what Saudi and Texan oil once was. High prices and short supply cripple the economy. Meanwhile, investment in solar and wind energy, and other renewables, is accelerating at unprecedented speeds. Good news, but these only yield electricity - responsible for about 30% of our emissions. Food production and transport are also addicted to oil - jet fuel, petrochemicals, diesel. Even if we cover every surface in solar panels we cannot replace oil with electricity. The fleet, the roads, the pumps, the chemicals are all derived from and powered by the black stuff.

So here's my prediction. A low carbon economy will drive us to re-localise much of our economic activities. Food production for example, especially fruit and vegetables, chickens and eggs, fish and fungi, will all come back home. We will have to reinvent our food economy to run largely outside of the monetary economy, at least that which we can produce locally and organically. Another





Martin Wigley from Garden Planet Biochar demonstrating his home made charocal retort kiln, at Cultivate Newtown.



Helen, a team leader with Ngora orphans project in Eastern Uganda presenting her ideas for Kamuli permaculture training centre, as part of the PDC studies.

key change is that we will all travel a lot less, and in different ways. We will still move around, but the 40 mile daily commute is over. Transport is more likely to be big and slow in our low carbon future; think sailing, airships, trains and busses, horses and carts even. All that sounds a bit retrograde, but innovation really is a big part of the solution.

Here are some energy ideas that most people are not thinking about yet. Did you know that if you compost wood-chip you get more energy in the form of heat than if you were to efficiently burn it? Heat is great, but the resulting compost is also a high carbon soil booster that lasts decades, unlike the soluble nitrates that we currently use in agriculture.

Actually, we shouldn't be burning wood at all - we should be pyrolysing it to produce heat and charcoal. We call this by-product of pyrolysis 'biochar'. When produced at 550°C all volatile and potentially toxic tars and oils are driven off and combusted, or can be stored and compressed for later use. Some carbon is emitted of course, but the resulting gasses are clean, smoke and particulate free. It is clean combustion, and the resulting residue is carbon in a pure and stable form. This is how we sequester carbon back to

soils where it belongs, by using plants to trap it, almost any type of plant (they are all made of carbon).

Half of domestic energy consumption is in the form of heat. We are obsessed with electricity when in many cases there are other options. We can make biochar and wood gas from straw, rice hulls, hedge trimmings, whatever, and agriculture is full of these residues which are usually burnt or left to biodegrade for lack of alternatives. We need to be imaginative! People are discovering that biochar, crushed to powder, is an excellent soil additive, as it creates habitat for soil microbes and biota, much like a coral reef does for fish. Productivity can be boosted many times over, and water filtration and retention is also greatly enhanced. Fed to animals it improves digestion, reducing methane emissions. Cows, pigs, fish and shrimp all gain weight by improved energy conversion of their feeds. To work as a soil conditioner it can be inoculated with nutrients and microbes, so when fed to animals it lands on the field or barn floor ready to be used as a soil enhancer.

Look, there is no magic bullet. I am not saying this one technology will solve our ills, but it points us in a whole new economic direction. You can build a house from straw bales and coppice poles, insulate with sheep's wool and paper pulp fluffed up like cotton. All these are renewable, carbon rich materials. The main activities of the economy must be drivers of carbon sequestration, while also contributing to productivity. Think of the impact on the countryside if the main fuel was sticks, not whole trees. Regrowing the forests and re-wilding the landscapes in uplands and non-farming areas would allow nature to draw down giga-tonnes of carbon while also rebuilding wildlife habitats and water catchments. We are experiencing flooding because of intensified weather, but also because the mountains are bare and the soils compacted and low in carbon. Indeed, many of our modern problems stem from our destructive relationship with the biosphere. The landscape is our partner, our home, it purifies water and generates the clean air we breath. The war on 'pests,' 'weeds,' woodlands and scrub has to stop. We can channel these natural resources to meet our needs, as well as nature's.

We call this change in thinking 'permaculture.' It is more than agro-ecology, agro-forestry, or 'going green,' because it embraces the human and economic decisions that drive us all. Permaculture design is ecology, economics and personal action all rolled into one. Essentially it offers a new operating system for humanity, one that works because it obeys the laws of nature.

I am writing this in the Sector39 office in Llanrhaedr-ym-Mochnant, a permaculture teaching practice of 11 years, built on 25 years of experience. We have recently won a three year bid to bring permaculture to our community. We are doing it by challenging the local High School of 1000 students to come up with a design pathway to a community owned vision for 2045, when we should be carbon negative. We need to embrace this future and shape it for our own needs, rather than have it imposed on us by desperate circumstances or authoritarian governments.

Our project is called 'saving the planet one school at a time.' Our aim is to create a model that everyone can follow. Governments and businesses alone really cannot fix this, it is up to us, and especially the emerging generation. This problem will not go away until we have beaten it. It defines young people's lives for at least the rest of this century. We have to reach out to every one of those billion starlings and steer each one on a new course. It is not a juggernaut, it is our chance to embrace and shape a whole new way of being. 🌱

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