

Permaculture and climate change

Monoculture farming causes carbon emissions

One of the many big changes that humanity is going to have to make if climate change is to be reversed is to severely reduce, ideally even eliminate, industrialised monoculture farming. The uprooting of hedgerows and destruction of natural landscapes has been considered necessary in order to effectively feed our massive urban populations, but fresh thinking is questioning this approach.

With an industrial scale monoculture of wheat, for example, yields are high but only because there is a massive input of energy involved in ploughing, drilling, protection from weeds and pests, harvesting and finally clearing the site in preparation for the next crop. The actual biological material of the crop (biomass) including the roots is probably less than a meter deep and lasts just a few weeks. This practice represents a very high level of carbon emissions compared with say woodland or an orchard.

Biomass is “built up” using carbon dioxide in the process of photosynthesis, thus it follows that the more vegetation there is the more carbon is captured. Tropical forests with huge trees and deep roots contain the most carbon. In a natural environment the soil itself holds considerable levels of carbon, but bare and tilled soils lose it very rapidly. This is because mycorrhizal fungi in the soil are critical in storing carbon in soils and cultivation kills them. When you stop digging and grow perennial crops that cover and protect the soil its structure is maintained, humus level builds up, nutrients wash out less easily and water is retained in drought and yet drains in very wet weather.



Permaculture captures carbon

Permaculture is a system which maximises yield and minimises input. The layering of crops provides a dense biomass, increases bio-diversity and revitalises soils. Careful choice of plants ensures that plants at every level, tall trees, shrubs, ground level plants, roots and tubers will be useful. Most will be food crops, many will be wind breaks or pest repellents and yet others may be providing yarns or building materials. Exhausted agricultural land can be and is being revitalised and rejuvenated in different locations across the globe.

The American Drawdown project which researches and lists “Solutions for reversing climate change”, features several regenerative agriculture methods such as silvo-pasture, intercropping and multistrata agroforestry. These are all variations on the theme and have

been shown to capture carbon and reduce emissions to a very significant extent. The book and a website, both called "Drawdown", are very interesting and informative.

The pioneers of permaculture

In 1974-75 in Tasmania, Bill Mollison and David Holmgren "jointly evolved a framework for a sustainable agricultural system based on a multi-crop of perennial trees, shrubs, herbs (vegetables and weeds), fungi, and root systems" for which they coined the word "permaculture" and in 1978 they published their book "Permaculture One", which introduced this design system to the general public.

British Patrick Whitefield, recently deceased, was another early pioneer of permaculture. He adapted Bill Mollison's teachings to suit a cooler, maritime climate such as the British Isles. He wrote a short book called "Permaculture in a Nutshell" in 2000 and then the much larger "The Earth Care Manual: A Permaculture Handbook for Britain and Other Temperate Climates" in 2004. A website bears his name.

The essentials of permaculture

The word 'Permaculture' is a contraction of **permanent agriculture**. It is based on three ethics: Earth care, People care, Fair share. It focuses on fostering the natural world so that all systems work together – sustainably and abundantly.

A permaculture site can be several hectares or just a small urban garden. It will contain a planned mix of food producing plants at varying levels and where possible they will be perennials. Fruit trees, rhubarb, strawberries, asparagus and Jerusalem artichokes perhaps. Annuals will be grown with suitable selections of fast growing early croppers mixed in with taller longer lasting plants such as beans.

Soil is never left uncovered and always has a crop, such as a green manure crop that fixes nitrogen and protects soil from erosion. Permaculture is an organic, no dig method. Composting and the recycling of waste is important. Permaculture recognises that waste is needed to build up soils. ("Try to put every leaf back" as the saying goes). So composting and indeed the use of any manure from organically kept animals or poultry is a vital part of the process.

Find out more

The **British website permaculture.co.uk** has a huge amount of information and a magazine also called "Permaculture" edited by Maddy Harland. Maddy and her husband practice permaculture in Hampshire and have produced numerous YouTube videos and other resources easily found online.

What permaculture is taking place worldwide? Internet research will reveal projects across the world such as in the American film "Inhabited" and the Gumbi Education Project in Malawi.

What perennial vegetables can be grown in a small British garden? See How to Grow Perennial Vegetables – Martin Crawford – Green Books Devon UK – 2012

Can perennial grains be grown? Can permaculture feed a city? Can desert be reclaimed? The answer to these questions is tentatively "Yes". Active research worldwide brings these aims closer to being viable realities and the prospect of reversing climate change that little bit nearer.