



# Is organic farming better for the environment and climate?

Alex Edwards MSc



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Organic farming describes a specific agricultural system which uses natural-based pest controls and biological fertilisers, rather than the chemical pesticides and synthetic fertilisers that dominate in conventional farming. On the surface, organic farming seems like a win-win for the environment and people but dig a little deeper and the picture becomes a bit more complex.

Firstly however, I will examine where organic farming can have significant benefits – primarily as a result of not using chemical pesticides. Each year in the UK some 16.9 thousand tons of pesticides are sprayed over our countryside, not to mention what we also apply in our cities and gardens. This reduction in pesticides is posited to increase human health and biodiversity. Firstly, it is often suggested that organic foods have greater health benefits than their conventional counterparts. An [analysis](#) looking at the results of 343 studies found that organic foods contained significantly lower traces of heavy metals, such as cadmium, and were four times less likely to have traces of pesticide residues on them. Furthermore, the same study found that on average, organic food had 60% more antioxidants, which the authors claim has the same benefit as eating an extra one or two portions of fruit or veg a day. However, another [study](#) found that increased consumption of antioxidants can actually have the reverse effect, increasing mortality. This study suggests that antioxidants are only beneficial in lower quantities and harmful at higher levels.

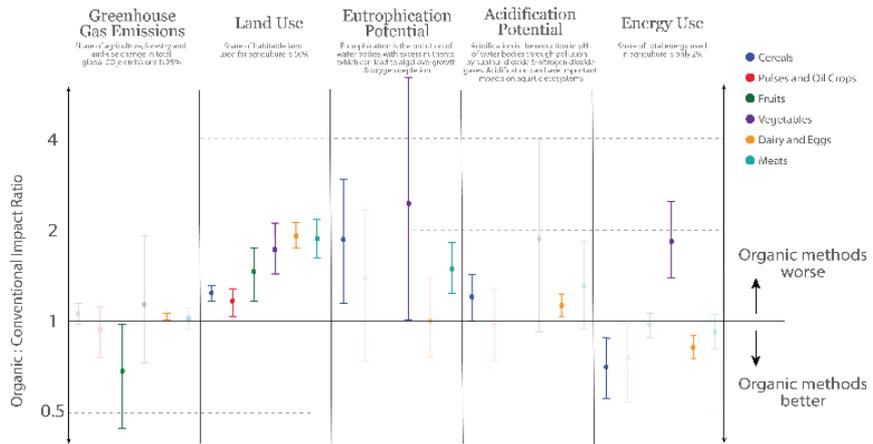
There is no question that increased reliance on pesticides is having devastating impacts on Britain's wildlife as demonstrated by two recent reports by [The Wildlife Trust](#) and [RSPB](#). These reports highlighted how the intensification of agriculture over the last few decades and the increasing reliance on chemical pesticides has led to precipitous declines of insects and farmland wildlife along across the UK. Organic farming offers one potential solution to buck these trends. [A study](#) conducted by researchers at the University of Oxford found that overall organic farms supported 34% more animal, plant, and insect species than conventional farms – a figure that was stable over 30 years. The numbers were even higher for important pollinators such as bees, with 50% more species on organic farms. This clearly shows organic farming can have significant benefits for wildlife, but despite these successes, which should be celebrated, organic farming often leads to a reduction in yields - meaning even more land is required to produce the same amount of food as conventional methods.

One [study](#) which looked at the climate impacts of shifting to 100% organic in the UK, found that such a move would cause large reductions in domestic emissions of 20% and 4% for crops and livestock respectively, but there was a catch – it would lead to a 40% reduction in production. This shortfall would therefore have to be made up by imports. Some of this increase in demand for imports will inevitably result in land-use changes overseas, leading to increased emissions. The authors therefore conclude that a switch to 100% organic would actually lead to an increase in greenhouse gas emissions of around 21%. Such an increase would be incompatible with our climate targets. [Another study](#) which looked at the environmental impacts of different food groups grown under conventional or organic

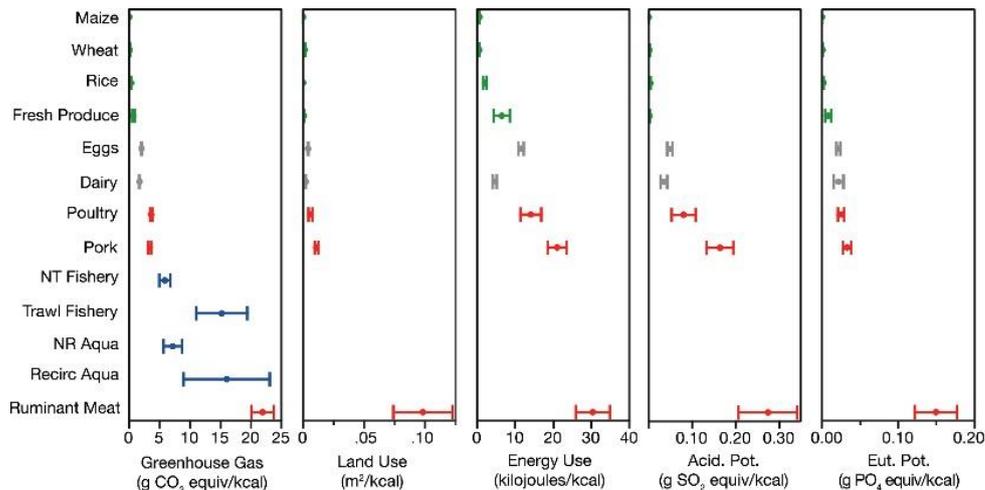
systems found similar results. Organic foods consistently required greater areas of land – 25% more for pulses and oil crops and a staggering 110% more for meat and dairy. They also found that organic systems had greater levels of eutrophication, than conventional farms. This is because, rather than relying on synthetic fertilizer, organic farming is dependent upon manure for nitrogen – the runoff of which can often find its way into lakes, rivers, and the ocean. Across all food types, there was also no clear differentiation in greenhouse gas emissions, although organic fruits and pulses tended to have lower emissions. However, the main conclusions of the study was that the impacts between foods was far greater than the impacts between different production systems. Animal-based foods had significantly higher impacts across all environmental indicators, with beef, goat and lamb having the largest impact; 20 – 100 times greater than plant-based foods. So, if you are looking for the most environmentally friendly diet, a predominantly plant-based diet is the way to go.

### Environmental impacts of organic vs. conventional agriculture OurWorld in Data

Shown is the relative environmental impact of organic and conventional agriculture across various ecological and resource indicators based on a meta-analysis of 164 published life-cycle analyses (LCAs) across 742 agricultural systems. Organic agriculture refers to the farming of crops or livestock without the use of synthetic inputs, including synthetic fertilizers, pesticides, plant growth regulators, manure materials and genetically-modified organisms (GMOs). Metrics are presented as the ratio of impacts from organic methods to conventional farming methods. Impact ratios higher than 1 indicate larger environmental impacts from organic methods, and <1 indicate smaller impacts. Each metric is shown with standard error bars (±) across individual food groups. Lines are greyed out (—) when differences are not significantly different from 1.



Data source: Clark & Tilman (2012). Comparative analysis of environmental impacts of agricultural production systems, agricultural input efficiency, and food choices. Environmental Research Letters. This data visualization is available at OurWorldInData.org. There you find research and more visualizations on this topic. Licensed under CC-BY-SA by the authors Hannah Ritchie and Max Roser.



Environmental impacts of broad groups of food per kilocalorie. Environmental indicators examined included greenhouse gas emissions, land use, energy use, acidification potential (Acid Pot.) and eutrophication potential (Eut. Pot.)

Furthermore, as more and more large corporations try and cash in on [the rising demand for organic produce](#), we may see a [blurring of the lines between organic and conventional farming systems](#). As organic farming has grown more mainstream in places such as the US, large scale organic farms are increasingly resembling conventional farming modes – vast monocultures, an excessive reliance on inputs (e.g., [sulfur](#)) and a disregard for nature and wildlife. But this is not to say that all organic is or has to be bad. There are examples from all around the world where organic farming has led to [increases in yields](#), [improved soil carbon sequestration](#) (the removal of carbon from the atmosphere) whilst simultaneously [improving biodiversity](#). Such systems, often called [regenerative farming](#) or [agroecology](#), aim to work with nature, not against it, to produce a net positive impact on the environment and secure food security.

So, should we abandon organic farming and continue with conventional agriculture? Not at all. It is clear that conventional farming is leading us down a path of ecological destruction. It is at war with the natural world and needs a radical transformation. But despite organic farming having a myriad of environmental benefits, it is not itself a panacea to the crisis facing the natural world. Where the issue lies is if organic farming tries to replicate many of the mistakes made by conventional farming methods, mainly monocultures and excessive reliance on inputs. What we need is to reimagine how we produce food and how we relate to the environment and there are pioneering projects we can draw inspiration from including agroecology and regenerative farming. Those systems will take time to become the predominant form of food production, however. In the meantime, what we need to focus on is what we eat rather than how our food is produced. Plant-based foods have significantly lower impacts than animal-based alternatives, whether produced by organic or conventional methods.