

# The Environmental Impact of Diet

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## THE ENVIRONMENTAL IMPACT OF DIET

→ When people think of their carbon footprint the first things that usually come to mind are their electricity and heating, followed by their car and air travel. People also realize that their consumption of various goods and services, and some of their leisure or hobby activities, result in carbon emissions as well. But until they input the details of their diet into a carbon calculator, few realize just how much the food they eat contributes to their environmental impact.

The fact is that your diet can affect your carbon footprint more than your driving habits or the temperature of your home thermostat. And if water is factored into the calculation, then diet plays a very significant role in your overall ecological footprint.

Producing food requires an enormous amount of resources. Digging, planting, tending and harvesting crops takes energy, as anyone who has grown their own vegetables knows only too well. When these processes are mechanized, as on modern industrial farms, the energy usually comes from fossil fuels. Add the energy used in cleaning, transporting, packaging and cooling, again mostly fossil fuel based, and it is not surprising then that the end-to-end food production process in the US uses 19 percent of the country's total energy supply. Meanwhile, globally, 95 percent of all food products are dependent on oil in one way or another.

With the world's population growing at around 80 million people a year, more and more of the world's resources are being taken to produce our food. In the last 40 years, an area of forest and other natural land over half the size of the United States has been turned over to agriculture. This deforestation and ploughing of the soil releases huge amounts of carbon into the atmosphere. But it can't go on indefinitely as the population grows. Best estimates suggest that we could convert another 12 percent of land at most to agriculture and remain within the limits of sustainability.

Meanwhile, agriculture is also the primary consumer of the world's fresh water, using 70 percent compared with industry's 20 percent and households' 10 percent. Like land, water is a finite resource, and there is less of it than we might think. Water supplies in a number of parts of the world are already under stress, and this will only accelerate with population growth and climate change. Furthermore, collecting, treating, pumping and distributing water all take energy, so water use has a carbon footprint too.

## NOT ALL FOOD IS EQUAL

→ Producing food consumes resources, and we consume food. That's the chain of life. But not all food is equal when it comes to required resources, and this is where our choice of diet begins to have an impact. Let's look at water again. One kilogram of potatoes requires 250 litres of water to produce, compared with 1kg of maize, which requires 900 litres, and 1kg of rice, 3,000 litres. Compare that with 1kg of beef, which requires 16,000 litres – more than five times as much as rice.

There are differences in water consumption in the production of drinks as well. For example, a cup of coffee takes 140 litres to produce – eight times as much as a cup of tea. Wine requires more water than beer to produce – 120 litres for a glass of wine compared with 75 litres for a glass of beer. Most bizarrely of all, a litre of bottled water takes at least 3 litres to produce.

So our choice of diet affects our water footprint. And if you remember that water entails carbon, then you can see that it affects our carbon footprint too. This is just one part of the picture.

Farming is a major producer of greenhouse gas (GHG) emissions, with different sectors contributing significantly different amounts. In Britain, for example, fruit and vegetables account for just 2.5 percent of the country's total emissions, while meat and dairy production account for 8 percent. The UN Food and Agriculture Organization (FAO) says that, globally, livestock generates 18 percent of total GHG emissions. That's more than transport, including aviation (which accounts for 14 percent).

Livestock has such a big impact on global warming because animal digestive processes, manure and the fertilizers used to grow their feed crops all produce methane and nitrous oxide – both of which are more potent greenhouse gases than carbon dioxide.

At present, there are around 60 billion animals globally producing meat, milk and eggs. Most of these are factory farmed, with little consideration for the animals' welfare. At the current rate of growth, the number of food-producing animals will reach 120 billion animals by 2050, which is simply unsustainable. Our fishing is equally unsustainable. The FAO estimates that 70 percent of the world's fisheries are either fished to their limits or overexploited. We have reduced most fish populations by 70-90 percent. In the UK, despite the use of the most sophisticated location technology and huge trawl nets that could accommodate several aircraft carriers, they are landing only one twentieth of the fish they did over 100 years ago.

**EAT LESS MEAT** → Given livestock's rate of emissions, the most effective way to reduce our diet's contribution to our carbon footprint is to eat more cereals, vegetable and fruit and to eat less meat and dairy. If the average household halved its meat consumption it would reduce its carbon emissions more than if it halved its car usage. Even modest reduction would have a significant impact. If everyone in the UK abstained from eating meat for just one day a week it would save 13 million tonnes of carbon – a greater saving than taking 5 million cars off the road, or replacing 1 billion light bulbs with low-energy ones.

The proportion of meat, fish and dairy in our diets has grown over the years with increasing wealth. As countries develop, their meat consumption increases too. Over the past 40 years, meat consumption per person in the US has grown 40 percent to 124 kilograms a year on average. For Europe, the growth has been 58 percent to 119kg per person a year. The picture is far more dramatic in rapidly developing countries like China, where growth in meat consumption over the same period has been 1,250 percent (although the average consumption there is still only 54kg a year).

These growth levels are unsustainable given population increase and the ecological impact of livestock production. Meat eating is like carbon in that we can't expect the developed world to compensate for our excesses. Jonathon Porritt, chair of the UK's Sustainable Development Commission, says: "Some of the gravest threats to the long term sustainability of humankind remain all but ignored. I would put the excessive consumption of meat right up there in that category."

Diet is something that is within our power to change. It will bring more immediate and achievable carbon reductions than changing our power generation or transport systems, says Dr. Rajendra Pachauri, chair of the United Nations Intergovernmental Panel on Climate Change. He recommends that we make a start by having one meat-free day a week.

Eating less meat can have health benefits too. Excessive meat eating is associated with heart disease, some types of cancer and type 2 diabetes. The increase in meat eating in developed countries has been accompanied by the consumption of more sugars, soft drinks, dairy products and other fatty foods. This has led to an epidemic in obesity, which is not only bad for the individuals concerned but the planet in general. Research by the London School of Hygiene and Tropical Medicine concluded that an obese population requires nearly 20 percent more energy for its food production and transport (fatter people tend to drive more and their cars have to use more fuel) than a lean population. Over 1 billion people in

the world today are overweight, and around 300 million are clinically obese.

**THE HEALTH LINK** → There is also a direct link between health and carbon. An increase in energy requirement means an increase in power generation, which not only puts greenhouse gases into the atmosphere but also particulates that affect respiratory health. The same goes for car exhaust fumes. The end result is smog, and the Ontario Medical Association in Canada estimates that the healthcare and lost productivity consequences of smog cost the province \$860 million in 2005. A diet that is leaner in carbon makes for cleaner air and better health.

The same argument goes for local and organic food. Food items in America clock up an average of 1,500 miles before they are eaten if you add in all the transport of the raw ingredients, processing, packaging and re-shipping. Buying locally from sustainable farms avoids these food miles, and buying organic avoids the carbon and other ecological impacts of the heavy use of fertilizers and pesticides of factory farms. Organic, local and smaller scale farms usually have better animal welfare standards too.

We could also learn to be more frugal and efficient in our use of foods. Households in the US and UK end up throwing away around one third of the food they buy. That's money and energy in the trash can, water down the drain, and unnecessary carbon in the atmosphere.

**CONCLUSION** → As scientists begin to model climate change, water resources and food production into the future, and examine their inter-relationship, they see a perfect storm looming unless we make a dramatic change of course. Many things need to happen, from international agreements on carbon emissions, to national policies to promote low carbon economies, to radical shifts in individual behavior. Diet is one area where we can personally take immediate and effective action, by being aware of the ecological impact of what we eat and making choices in the long-term interests of our own health and that of the planet.

**ABOUT ZEROFOOTPRINT** → Zerofootprint is a socially responsible enterprise whose mission is to apply technology, design and risk management to the massive reduction of our environmental footprint. We operate both in the for-profit and charitable domains through two entities, Zerofootprint Software and Zerofootprint Foundation using shared technology.