An Appetite for Life: How a global food revolution could help save the planet, farmed animals, and us.

To feed a rising global population and fight against climate change, scientists are calling for a ‘great food transformation,’ one which would require drastically reducing our consumption of meat and dairy, and making a cultural shift towards a largely plant-based diet.

Whether through media coverage, environmental campaigns, outspoken celebrities or influential documentaries such as Cowspiracy and Netflix’s Our Planet, the idea that food production is unsustainable from a planetary perspective has been around for a long time. A succession of high-profile reports, as well as increasing public awareness, have recently brought the issue under renewed focus.

In January 2019, a group of international experts proposed a “planetary health diet” which would minimise climate change and rainforest destruction, while preventing millions of premature human deaths each year. The landmark report, published in The Lancet medical journal, claims that in order to feed an expected population of 10 billion people by 2050, we will need to adopt a largely plant-based diet with modest allowances for meat, dairy and sugar. Under its recommendations, red meat consumption would need to halve across the world and fall by more than 80% in developed countries, while the proportion of nuts, fruit, vegetables and legumes (such as lentils and chickpeas) should be doubled.

This may sound like a radical overhaul, but scientists are convinced it will take nothing less if we are going to address the needs of an ever-growing population, and a planet in crisis. The report – which took three years to compile and brought together 37 experts from 16 countries specialising in health, nutrition, environmental sustainability, economics and politics – is not the first of its kind. A major study by the University of Oxford, published in October 2018, delivered equally strong recommendations. Scientific consensus has now consolidated around the idea that meat and dairy have dire consequences for the planet. Avoiding them, scientists say, is the biggest single way to reduce our environmental impact.
Over the last 50 years, global meat production has increased nearly five times, from 70 million tonnes in the early 1960s to more than 330 million tonnes in 2017 - an increase driven by a rising population and higher incomes. While we shake our heads at deforestation, species extinction and an ever-warming climate, many of us don’t realise that we are actually eating our way towards these very same outcomes. The food system is arguably the largest driver of environmental degradation: climate change, biodiversity loss, depletion of freshwater resources, soil infertility, pollution from nitrogen and phosphorus fertilisers and changes in land use are all symptoms of the food industry. Without action, scientists forecast these environmental impacts could worsen by up to 90% by 2050. Continuing at this trajectory, they argue, will push us past critical environmental limits, beyond which humanity will struggle to survive.

At the same time, the World Resources Institute says that food production will have to grow by 50 percent by 2050 in order to feed the growing population.

So how do we reconcile these two conflicting outcomes?

On an increasingly overpopulated planet, making sure that there is enough food to feed everyone is a question of efficiency...

If the world’s cattle formed their own nation, it would have the third-highest emissions on Earth, behind only China and the United States.

The Environment
The vast majority of global farmland - more than 80% - is currently used for livestock which produces just 18% of food calories consumed. The huge amounts of land, grain and water required to produce this animal protein is seen by many as dramatically wasteful, especially considering that same land could instead be repurposed to produce more food. One study in the U.S. has shown that, by switching meat and dairy for plant crops that have equivalent nutritional content, between two and 20 times more food could be generated on the same amount of land. Bringing more land under livestock production is therefore not the answer, and it would also spell disaster for the earth's remaining forests and peat lands. Already, in areas such as the Amazon and eastern Australia, deforestation is taking place at alarming rates in order to make way for more cattle farms. Not only does deforestation accelerate climate change by releasing greenhouse gases into the atmosphere, it also reduces the natural carbon sinks the forests provide. While some kinds of meat and dairy production are more damaging than others, all are more harmful to the living world than growing plant protein. A 2018 study published in the journal Science suggested that if we were to abolish meat and dairy consumption, we could reduce global farmland use by more than 75% - an area equivalent to the US, China, the EU and Australia combined - and still feed the world. Beef requires 160 times more land than potatoes, wheat or rice - and it produces 11 times more greenhouse gas emissions. Likewise, producing a glass of cow's milk results in almost three times the greenhouse gas emissions of dairy-free alternatives. Agricultural emissions are on track to contribute around 70% of the total allowable greenhouse gas emissions by 2050. According to the UN, livestock farming currently accounts for over 14% of all greenhouse gases, mostly in the form of methane. Produced in animals’ digestive systems, methane is 30 times more potent as a greenhouse gas than carbon dioxide. The environmental impact of meat (and especially beef) is so high that experts have suggested cutting it out would be a better way for consumers to reduce their emissions than giving up their car. The evidence is clear: agriculture is a major (though often overlooked) cog in the climate change machine, and we can’t afford to keep feeding the expanding population on meat. Taken alongside the 2018 UN report, in which the world’s leading scientists warned there are just 12 years in which to keep global warming under 1.5°C, it seems that food choices have an increasingly important role to play in countering climate change.
The world loves eating meat, but that love puts pressure on the world. Red meats - and especially beef - are the worst offenders, having a greater impact on the climate than any other food.

According to a report by the World Resources Institute (WRI), demand for animal-based foods is on track to rise more than two-thirds by 2050. The WRI has also warned that the resulting expansion of animal agriculture could produce enough emissions to exceed the Paris climate agreement’s targets for catastrophic warming (even if the world completely stops using fossil fuels).

Unless consumers cut down on their meat consumption, by 2050 the world will have to deforest a land mass nearly twice the size of India (releasing much of its sequestered carbon in the process) just to keep up with the additional demand. At a time when concerns are also growing about the effect of meat on human health and animal welfare, such stark warnings should be taken seriously.
Research published in 2014 showed that the greenhouse gas emissions of a vegan diet are half that of a meat-eating diet, and the benefits of plant-based eating extend beyond climate change. Whereas buying an electric car or turning down your heating will simply lower your greenhouse gas emissions, choosing a vegan lifestyle also alleviates a multitude of other environmental ills - such as global acidification, eutrophication, land use and freshwater impacts. That is not to say that vegetable and cereal crops have zero impact, but - according to research by the University of Oxford - even the least sustainable plant crops are far less damaging than the most sustainable livestock farming. Eating less meat would free up billions of hectares of farmland, and while not all of this pastureland is suitable for growing crops, it could be returned to nature, allowing the recovery of ecosystems destroyed by livestock farming. Of course, such a move would meet strong opposition from the farming community, and there would need to be sound economic incentives for reducing meat and dairy farming. One study has shown that, in the US alone, switching to a plant-heavy diet could save the country up to $80 billion dollars, by averting greenhouse gas emissions and the national cost of health problems that stem from unhealthy diets.

The World Resources Institute estimates that peas and lentils produce 20 times less greenhouse gas emissions than beef. Even small changes to our diets could lead to massive environmental gains.
Unhealthy diets are the largest global burden of disease, and pose a greater risk to morbidity and mortality than unsafe sex, alcohol, drug, and tobacco use combined. Meat, dairy and eggs all contain cholesterol and saturated fats, which are the main culprits in the rise of obesity. Eating more than the recommended amount of red and processed meats has been linked to increased risk of heart disease, strokes, diabetes and certain types of cancer. Indeed, in 2015, the World Health Organization declared processed red meat to be carcinogenic (cancer-causing), and unprocessed red meat, such as steaks and chops, to be a probable carcinogen.

Cooking meat at high temperatures (such as pan frying or grilling) also produces harmful chemicals including heterocyclic amines (HCAs) and polycyclic aromatic hydrocarbons (PAHs), the latter of which are also found in cigarette smoke and car exhaust fumes. In laboratory experiments, both HCAs and PAHs have been found to be mutagenic—that is, they cause changes in our DNA that may increase the risk of cancer. It would be spurious to claim that meat and dairy didn’t contain some nutritional value. This can vary depending on rearing methods. For example, in contrast to grain-fed meat from intensive systems, wholly pasture-fed meat is high in beta carotene, omega-3 fatty acids, calcium, selenium, magnesium and potassium as

Eating red and processed meats increases your risk of heart disease, type 2 diabetes, obesity, food poisoning and cancers.
well as vitamins E and B. However, a person who chooses to cut out meat and dairy can still obtain these nutrients from plant-based sources. Additionally, the key claim that dairy is integral for bone strength is often not borne out in large studies (American women, who consume tremendous amounts of calcium, have one of the highest rates of osteoporosis in the world).

Another major public health concern associated with meat and dairy is the risk of disease. In intensive farming systems, cramming thousands of animals together into filthy, overstocked sheds creates stressful, unsanitary conditions - the ideal breeding ground for dangerous bacteria and viruses. The U.S. Department of Agriculture (USDA) reports that one in six cows in U.S. dairies is infected with mastitis (an inflammation of the mammary glands and udders). Not only can mastitis prove fatal to the cow, but the infection generates pus, which gets into the milk. The average teaspoon of U.S. milk contains over a million pus cells. Eating meat contaminated with bacteria can also cause food poisoning. In the U.S. alone, there are 75 million cases of food poisoning annually - 5,000 of which prove fatal. According to the U.S. Department of Agriculture (USDA), 70 percent of this food poisoning is caused by contaminated animal flesh. Salmonella is one of the biggest culprits, killing more Americans than any other food-borne pathogen. As recently as November 2018, a deadly outbreak resulted in the USDA having to recall over 140,000 pounds of raw ground turkey products. Meanwhile, the presence of Salmonella in eggs causes over 100,000 cases in the U.S. annually. To make matters worse, a major 2008 study published in the journal Nature reported that a substance found in meat and milk (but not naturally found in the human body) causes us to become more susceptible to dangerous E. coli infections. Therefore, not only does meat have the potential to carry dangerous bacteria, but it makes us more likely to become infected by those bacteria. Poor hygiene in the meat supply chain exacerbates the problem. A 2018 joint investigation by the Bureau of Investigative Journalism and the Guardian uncovered hygiene failings in some of the U.S.'s biggest meat plants, including filthy factory conditions, condemned meat being stored in containers for edible food, and meat destined for the supply chain being contaminated with faecal matter and pus-filled abscesses.

**Eating meat, eggs or dairy carries the risk of ingesting harmful pathogens, such as those that cause food poisoning [1] bird flu [2] and swine flu [3]: All food-borne diseases originate from eating animals.**
Disability or paralysis. According to tests carried out in 2008 by the Food Standards Agency, Campylobacter is present in approximately 65% of raw chicken for sale in UK supermarkets and butchers, infecting about 280,000 people a year, with an annual death toll of around 100.

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Likewise, the 2009 swine flu pandemic - responsible for more than 17,000 deaths worldwide, originated in pigs from central Mexico. Elsewhere, pig factories in Malaysia birthed the Nipah virus: a contagious respiratory disease, causing relapsing brain infections and killing 40% of people infected. Its emergence has been blamed squarely on factory farming. During the late 1980s an infectious agent known as a prion was responsible for an epidemic of BSE (otherwise known as ‘mad cow disease’) which affected an estimated 180,000 British cattle. The disease, which affects the nervous system, can also be fatal to humans, who contract it through the consumption of contaminated meat. Despite the slaughter of 4.4 million cattle during the outbreak, new human deaths were still being recorded as recently as 2016.

With a list of pathogens this long, it’s easy to see that livestock disease is a big problem. As a result, factory-farmed animals are routinely fed a steady diet of antibiotics to promote growth and stave off infections. Such overprescribing of antibiotics has serious implications for human medicine because it increases the chance that drug-resistant ‘superbugs’ will develop. If people eat meat tainted with these drug-resistant germs and subsequently become ill, there is a risk that the antibiotics we rely on to treat infections will become useless. As the UK’s chief medical officer put it in his 2009 annual report: “every inappropriate use of antibiotics in agriculture is a potential death warrant for a future patient.”

Microbial or antibiotic contamination are not the only factors that impact on both public and animal health. Hormones used to promote growth in some factory-farmed cattle are present in their meat and milk, leading to concerns about an increased risk of disrupted development and cancer.

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Microbial or antibiotic contamination are not the only factors that impact on both public and animal health. Hormones used to promote growth in some factory-farmed cattle are present in their meat and milk, leading to concerns about an increased risk of disrupted development and cancer. Of course, pesticides are also present in plant foods, but research has shown that roughly 80 percent of our dietary exposure comes from animals that are reared on pesticide-treated grain.

Intensive farming of pigs has given rise to swine flu and Nipah virus, both of which are transmissible to humans through the consumption of contaminated meat.

Mastitis (udder infections in cows) means pus gets into the milk we drink.

Farmed animals are dosed with antibiotics, increasing the risk of superbugs.
The numerous health risks associated with meat and dairy consumption have led to an increasing number of nutritionists and medical practitioners championing plant-based diets. A well-planned vegetarian or vegan diet contains all the nutrients our bodies need, while also being low in saturated fats. Research has linked vegan diets with lower blood pressure and cholesterol, and lower rates of heart disease, type 2 diabetes and some types of cancer.

Another major advantage is that human beings cannot catch plant diseases. All the food-borne pathogens that affect us come from animals (some pathogens such as E. coli can still be found on vegetables if the water used to irrigate them becomes contaminated by animal faeces).

Given all the evidence, it seems that leaning towards a plant-based diet will lead to a healthier population and a lower global burden of disease.

“I’ve been vegetarian for most of my life and - given my concerns over the environment and animal welfare - becoming vegan seemed like the natural next step. I tried veganuary in 2018 but couldn’t quite give up the cheese and eggs! I was determined to try again in 2019 and have focussed much more on all the food and ingredients there are to discover, rather than those I’m giving up. I haven’t gone back yet!”

Sophie, Solicitor
A common argument some vegetarians or vegans give for not eating meat is an ethical one. Is it moral to incarcerate billions of animals so that humans can consume their flesh, milk, and eggs? Some would say yes: human beings are the more intelligent, superior species. Others find that argument to be fatally flawed.

There are now over 2,000 peer-reviewed studies into animal sentience that have shown mammals and birds experience the same complex emotions as we do: jealousy, rage, empathy, fear and distress, to name a few. Scientists have found that pigs are smarter than dogs, and can solve puzzles just as well as chimpanzees. This highlights an inherent hypocrisy in the intelligence argument: if pigs are smarter than dogs, and just as capable of suffering, then why don’t we treat them the same way we treat our pets?

“You can’t teach children to be kind to a puppy or to love a kitten while simultaneously feeding them the meat of another animal,’ says wildlife photographer Andy Parkinson. “Under that logic, the life of one animal has value and the life of another has none.” Writing for The Guardian, environmental activist George Monbiot echoes these sentiments, arguing that future generations will look back on our treatment of animals as a “madness of our times” - in the same way that we now condemn slavery, world wars and the subjugation of women.
On many industrial farms, animals are kept in cramped sheds and will never have the freedom to express their natural behaviours. Pigs and cows will spend weeks in stalls that prevent them from turning around or taking more than a few steps forward or back. Many won’t ever feel the warmth of the sun on their backs or breathe fresh air until the day they are loaded onto lorries headed for the abattoir. Broiler chickens (farmed for meat rather than eggs) have been bred to grow bigger and faster so they can be slaughtered before they reach six weeks old. But their bones, hearts and lungs can’t keep up. Many suffer from lameness, respiratory infections, or heart attacks.

A November 2018 report by the European Court of Auditors (ECA) revealed that farm animal abuse - especially in intensive farms - is rife across Europe. The report highlighted the painful physical alterations made to livestock kept in unnaturally high numbers. For example, the stress of extreme confinement can drive pigs, chickens and calves to engage in aggressive behaviours. Pigs express frustration by tail-biting, so some farmers routinely cut off (or ‘dock’) their tails and clip or grind down their sensitive teeth, often without painkillers. Hens peck each other, so their beaks (their primary sense organs) are clipped using hot knives or lasers. The ECA report also highlighted inadequacies in live export conditions, where animals being transported for slaughter are forced to endure long, stressful journeys, often in extreme temperatures and without access to food, water, or veterinary care. Many of the animals become critically ill or die en route. In April 2018, footage of sheep being exported from Australia to the middle east sparked an international outcry and showed the problem was not just confined to Europe. The exposé, which revealed images of distressed, faeces-covered sheep struggling for air, as well as piles of dead and rotting bodies, resulted in the license of the exporter being revoked. Part of the problem is that animals in the farming industry are kept for profit, and economic incentives can sometimes trump animal welfare concerns. For the six billion laying hens hatched every year worldwide, a similar number of male chicks are gassed or thrown into macerator machines to be minced alive. Why? Because they’ll never lay eggs and they don’t grow fast enough to be used for meat.
Animals raised for food typically lead short, miserable lives in highly unnatural conditions before they’re slaughtered at the abattoir.

An estimated 97% of the US’s 73 million hogs are raised in closed barns or confined feeding operations. In these systems, sows often live the majority of their lives in gestation or farrowing crates that don’t allow them to get up or turn around.
Live animals, including calves, cattle, sheep, pigs, goats and horses are routinely transported by road, rail, sea or air across continents. This causes enormous suffering, which increases with the distance travelled. Overcrowding leads to animals being injured or trampled to death, while lack of food, water and rest can lead to exhaustion, stress and dehydration. Moving livestock long distances to markets and slaughter houses can also exacerbate the spread of infectious diseases.

The global live export trade is valued at over $18 billion per annum.

An activist holds a calf in distress at the Turkish border. Animals transported for slaughter can suffer from heat exhaustion, dehydration, injuries and, at times, death.

One of the ways live transport ships dispose of dead and dying animals is to throw them overboard. In Israel, it’s not uncommon to see animals like this decomposing calf washed up on public beaches.
Perhaps the most emotive animal welfare issue in the farming system is the slaughter process itself. European and UK law stipulates that, before slaughter, animals must be effectively stunned (the part of the process that renders them insensible to pain). Sheep and cattle are mostly stunned using a captive-bolt pistol, which strikes a forceful blow to the forehead. However, there is always a risk of human error, and incomplete stunning.

Chickens are usually hung upside down on a production line where their heads are dipped in water charged with an electric current. Not only is the process distressing, there is also the risk they will flap a wing and suffer a minor shock, or twist and escape the shocking altogether. According to USDA records, millions of chickens in the U.S. every year are completely conscious when their throats are cut, and even when they are dunked into the scalding-hot water of the defeathering tanks.

In the UK, pigs are lowered into gas chambers, where they are suffocated by high concentrations of carbon dioxide. In the 30 or so seconds it takes for them to lose consciousness, they panic, scream and try to escape, leading animal rights campaigners to argue that the stunning process is far from humane.

Every time we buy meat, we are helping to fund the slaughter of 70 billion farmed animals a year. Photographer Andy Parkinson argues that consumers should be aware of what they are paying for when buying animal products: “People should make educated choices. If you’re going to eat meat and dairy, have the courage to make an informed decision. Be fully versed in what happens.”
A trillion chicken eggs are eaten annually around the world. There are more chickens in the US than people, many of which are confined to the area of a piece of paper and never see daylight.
“One of the life events that swept me up in my journey as an animal advocate and photojournalist happened when my mum moved to the countryside and bought ten hens to have around the yard. I had never had the opportunity to get to know farmed animals before, and I never gave much thought to eating them - until I got to know those chickens.

Wow! How complex they were, just like the cats and dogs I loved. Friendly, curious, jealous, scared, silly; these were all emotions that I witnessed in them. I felt foolish for not having known... if my dogs and cat would not want to be eaten, then nor, I realised, would the chickens. I felt uncomfortable. I loved eating animals, but once I delved into reading about them - how they’re raised, treated and killed - that was that. There was no way I could support the cruelties of the industry, no way I could continue eating animals that I now knew to be sentient and dynamic - just like us, really.

And so I stopped. It seemed like a huge deal at first, but the benefits – for both me and the animals – far outweighed any remaining cravings. I felt better about myself, that I was living aligned with my values, causing less harm in the world. I was also eating tasty and more diverse new foods, and I loved the journey.

I became so interested in advocating on behalf of farmed animals, that I applied to Farm Sanctuary for a month-long internship. One of the requisites of the internship was to be vegan on the premises out of respect for the rescued animals living there. This seemed extreme! No eggs and dairy? But no one was killed for those products, I thought. My stay at the Farm opened my eyes. I learned that layer hens and dairy cows – and the dairy industry’s resulting “veal” – were indeed harmed and killed. I have been vegan ever since. I feel good knowing that my eating habits cause less suffering in the world than they did before.

As a photojournalist, and the founder of We Animals Media, my team and I help shine a light on the cruelty inherent in animal industries, and share stories about solutions and ways forward.

Reducing our consumption of animals, being vegetarian, being vegan, is a positive and peaceful way of being in the world. It’s better for the environment, for our health, and certainly for the animals. Speaking for myself, though I know that many other vegans feel the same, it’s also a spiritually and emotionally peaceful place to be.”

“Photographer Spotlight: Jo-Anne McArthur

“My dad’s BBQ chicken recipe used to be my favourite dish. Which is why I really felt challenged when I got to know some chickens...”
footage of a slaughterhouse in Poland caused outrage when it revealed the smuggling of sick cows into the food chain. Workers dragged the cows, which were too sick to walk, out of trucks using a winch, and removed evidence of pressure sores and tumours which indicated the cows had been lying on their sides for days on end. The EU commissioner responsible for food safety, said in a statement that such incidents, which are feared to be more widespread in Poland, ‘could pose a risk to public health and portrays an unacceptable treatment of animals.’

There are signs that awareness, both amongst consumers and in the industry, is on the rise. In 2015, McDonalds announced that its US and Canada locations would be going cage-free, impacting 2 billion eggs a year. Several U.S. supermarkets have since made similar pledges and Massachusetts made history with the first sales ban on products from confined animals. In November 2018, California passed a ground-breaking new law that will ban the sale of all eggs, poultry, pork or veal from a caged animal. In September 2018, P&O Ferries announced it would stop shipping calves from Scotland to Spain and Italy due to welfare concerns. And in February 2019, secret

“We don’t need to eat animals to survive: They deserve respect and compassion – I think we all know this in our hearts, and we just have to make compassionate choices'"

- Evanna Lynch, actress
It’s easy to think that one person changing their diet will make little or no difference to the bigger picture, but as with any mass lifestyle change - including smoking and drinking - it has to begin with a shift in the social norm. One person going vegan will not solve the planet’s environmental problems, but it can make the issue more tangible to others. Changing a habit takes effort, and making a personal sacrifice helps to convince others that there might be an important reason for doing so. The more people who give up meat and dairy, the more the momentum builds. Recent evidence suggests this is already happening in some parts of the world. In November 2018, a survey across all British supermarket chains revealed that one in eight people identify as vegetarian or vegan, and one third of British people are trying to reduce their meat consumption, or cut it out entirely. A 2016 study by market research firm NPD Group found that 70 percent of American meat eaters are substituting non-animal proteins at least once a week. And in 2018, retail sales of plant-based food in the U.S. increased by 24% on the previous year - quadruple the growth of meat sales. In some middle-income countries, such as China and Brazil, the reverse is true. In these emerging economies, meat consumption is on the rise. The driving force behind such trends is the consumer. In countries where meat and dairy consumption is going down, there is also an increasing...
recognition of the health, sustainability and animal welfare benefits of eating plant-based alternatives. Veganism - in the UK and U.S. at least - has gone mainstream, with many more restaurants and cafes offering plant-based options. Inversely, for some cultures, meat may be the only viable source of protein. For the millions of people in poorer nations, who are undernourished or have less varied diets, an increase in meat and dairy intake may be warranted. Identifying diets that will nurture human health and support environmental sustainability will mean permitting variations based on local needs. Currently, the highest levels of meat consumption (up to 125kg per person per year) are seen in the West, with the world’s poorest regions, such as some African countries, eating less than 10kg by comparison. India has the lowest level of consumption, at less than 4kg per person per year, possibly due to cultural and religious factors that discourage meat eating.

Out with the old and in with the new...
A growing number of nutritionists and medical practitioners have begun championing plant-based diets, and a reduction in meat-eating.

Food choices are clearly very personal, and behaviour change can therefore be difficult to encourage. Every time environmentalists call for reduced consumption of animal protein, it leads to controversy and backlash (for example, the argument that soya production drives the destruction of forests and other habitats, and is therefore no better for the environment than meat). While the first part of this argument has merit (nearly 25% of native Argentinean forests have been cleared since 1996 to make way for soya crops) the reality is that most of this soya - a staggering 97% - is actually fed to livestock, and much of its nutritional value is lost in the process. Cattle in US feedlots consume 7 kilograms of grain to produce just 1 kilogram of meat. For pork, the figure is close to 4 kilograms of grain per kilogram of meat. These numbers highlight an undeniable truth: meat production is wildly inefficient and if we ate the grain ourselves, we could feed more people. It has been estimated that 40 million tons of grain would be enough to eliminate the most extreme cases of world hunger - an amount 20 times less than we are currently feeding to livestock each year. In a world where an estimated 850 million people do not have enough to eat, such a waste of perfectly edible food in order to produce burgers, chicken nuggets and bacon could be considered criminal. The message is abundantly clear: avoiding excessive meat consumption (especially beef) is better for the population, and planet. The fact that eating more plant-based food will also make us healthier and improve animal welfare makes it a no-brainer.
been argued that free-grazing livestock can play an important role in such depleted systems by returning soil nutrients lost to continual cropping, and re-enriching pastures with their dung and urine. Some have gone so far as to claim that livestock grazing can capture carbon in the atmosphere and store it in the soil. However, this has not been borne out in studies.

Clearly, the situation is not black-and-white. Perhaps it’s less about whether you eat meat or not, and more a question of how much. The UN have suggested that if Europeans were to cut their meat and dairy consumption by half, we could reduce nitrogen-based greenhouse gases from agriculture by 25-40%. There would also be 40% less saturated fat in their diet, bringing levels within the range recommended by the World Health Organisation. Research in the U.S. has shown that, for every two Americans who choose to substitute beef with a nutritionally equivalent combination of plant-based food, enough resources would be saved to fully feed an additional third person.

Even consumers who are not motivated by environmental, health or welfare concerns may eventually find their consumption patterns affected by less voluntary incentives. Discussion around a meat tax - in the UK at least - has been gaining traction for several years, and the proposal has the support of a growing number of academics and policy makers. Governments already tax unhealthy products like sugar, alcohol and tobacco, and according to research published in November 2018, doing the same for processed meat such as bacon and sausages could save billions of lives, as well as raise money for healthcare.

Still, not all experts are convinced that plant-based diets are the solution, and some question the ethics of driving up demand for crops that require high inputs of fertiliser, fungicides, pesticides and herbicides. There is also the question of whether a large-scale shift to plant-based eating would see us relying more heavily on imported produce with increased transport emissions. Similarly, ploughing cropland releases carbon from the soil and degrades soil species - such as beetles and earthworms - which, in turn, support mammals and birds. It has
If you’re thinking about joining the millions of people in the world who eat only plants, here are some tips to help you along the way...

**Experiment with new recipes**

There are many books and online resources dedicated to a vegan diet. Try some new recipes before taking the plunge. Knowing how to make delicious vegan meals you love will give you more confidence in your decision and help you discover new flavours.

**Don’t be afraid of eating out**

Many places have a vegan option, if not an entire menu. Even if they don’t, chefs often enjoy the challenge of inventing a plant-based meal especially for you.

**Get to know food labels**

Eggs and dairy are always highlighted in bold. Most supermarkets make it easy for you by having dedicated vegan / vegetarian sections.

**Try not to feel restricted**

A huge range of everyday foods are vegan - and more are becoming available all the time. Every nutrient you need can be found in a vegan diet. Vitamin B12 - which is found naturally in animal products, can instead be obtained from fortified milks, supplements, or yeast extracts.

**Temptation is normal**

Luckily, there are vegan alternatives for all your favourite foods: meat, cheese, chocolate, milk, ice cream, you name it! Cheese is often the hardest for new vegans to live without - and with good reason. Scientists have found that the casein it contains triggers the brain’s opioid receptors, linking it to addiction. If you find yourself missing meat or dairy, treat it as an opportunity to remind yourself why you went vegan in the first place, and congratulate yourself for the effort you’ve already put in. Temptation is likely to lessen over time.

**Prepare for questions**

Some meat eaters struggle to understand the decision to become vegan. Treat this as an opportunity to explain the benefits. Perhaps they will sympathise with your point of view. Try not to get upset about the occasional angry reaction - this is sometimes a meat-eater’s defence mechanism.

**Baby steps**

You could start with one vegan day a week and gradually increase it. Or you could try cutting things out one at a time: whether its eggs, dairy products, or meat.

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‘’The majority of medicine comes from plants. So if we have plants in the form of food, why do we choose to eat meat? Gorillas, rhinos and elephants eat no flesh and they are healthy and strong. We don’t need meat, plant based power is the key.‘’

Sammy, Personal Trainer
"Before turning vegan I had been vegetarian for 12 years. Then, in 2013, I went to stay with some vegan friends in Bangkok & my diet and attitude changed dramatically. I was generously looked after, with a huge variety of delicious home-cooked and healthy food. From sausages made with beans and cranberries to waffles and ice cream and colourful, healthy salads. It seemed that being vegan was not boring or limited at all.

I had previously never given a second thought to how milk, cheese and eggs are produced and never considered that any harm was being done to animals. I used to think that cows just 'produced' milk. After looking a little further into the various industries I realised that animals are the victims of an inherently violent system that puts profit over their welfare, the environment and our health. This applies to all animals in the system, not just the ones which are used to produce meat. In my opinion, the dairy industry is worse for animal welfare as the dairy cow's average life span is just four years (their ancestors could live up to 20 years in the wild). During that time they are forced to bear calves, which are promptly removed so that humans can drink the milk instead. This is one of many realities of the meat and dairy industry that are kept largely out of our view (it would much rather have us believe that all animals are leading happy, healthy lives and roaming free in green fields). This is increasingly not the case as the UK continues to construct mega dairies/farms with a reported 26% rise since 2012.

After I made the decision to go vegan there was no going back - I started listening to podcasts by Rich Roll and Colleen Patrick-Goudreau - two great resources for evidenced-based information about health, activism and support for those in the early stages of transitioning to a vegan diet. I read books such as the China Study by T. Colin Campbell and Why We Love Dogs, Eat Pigs and Wear Cows by Melanie Joy. I watched documentary films including Forks Over Knives and Cowspiracy. There are plenty of good resources out there that helped me along on the journey.

I have been vegan for 6 years and my confidence and knowledge has grown. There are endless recipes online and alternative food choices have increased tenfold. The options for vegans eating out in the last 2 years have exploded and many people are taking note of the myriad benefits to going vegan. It wasn’t so easy in the beginning and does require some effort but it’s worth it when you know what you’re contributing to. It’s also an exciting challenge and whilst many choose to focus on what they’re eliminating I prefer to focus on what I’ve gained. My own diet is more varied and creative since going vegan. Physically, I feel great and in the past few years have completed a Half Ironman, a marathon and countless 5 and 10K races all fuelled from eating plants.

Vegans have a reputation for being sanctimonious and self-righteous but the stigma is fading as more people get on board. I think the important thing is not to look for perfection because it doesn’t exist. Colleen Patrick-Goudreau sums it up perfectly with her phrase “just because you can’t do everything, doesn’t mean you should do nothing.” With greater awareness and a willingness to face some of the realities around health, the environment and animal welfare, positive change can be achieved. There are many wildlife photographers doing great work to promote the benefits of intact ecosystems and highlighting the plight of species. More are switching towards the vegan diet, which for me is a great thing. Why should a wild animal be considered more important than one that is farmed? To me they are all one and the same and it’s great being part of a movement that has, and continues to gather momentum. Despite the dire situation we currently face, I do remain hopeful.
Feeding a world population of 10 billion by 2050 is not impossible, as long as we change the way we eat and produce food. Reducing meat consumption might be achieved by a mix of education, taxes, subsidies for plant-based foods and changes to school and workplace menus – as well as technological innovation. For example, lab-grown meat (muscle tissue artificially grown inside a bioreactor) is currently being developed by a number of firms as a cleaner, greener alternative – and one which is also free of the pathogens that can infect slaughtered meat. According to research led by Oxford University, lab-cultured meat would reduce greenhouse gases by 96% compared to slaughtering animals. It would also require between 7% - 45% less energy and use up only 1% of the land and 4% of the water needed for conventional meat production. As well as the environmental and health benefits, there are also clear advantages for animal welfare. The major obstacle to lab-grown meat is cost, but it’s an area that could be cost-competitive within a decade and it’s already attracting high-profile investors including Richard Branson and Bill Gates. “There’s no way to produce enough meat for 9 billion people,” Gates wrote on his personal blog. “Yet we can’t ask everyone to become vegetarians. That’s why we need more options for producing meat without depleting our resources.”

Companies like Beyond Meat and Impossible Foods sell plant-based burgers that taste, look and feel remarkably similar to conventional meat; you can help save the planet and prevent animal abuse without sacrificing the pleasure of eating meat.
technologies could spell the beginning of the end for intensive livestock farming. Dietary and technological change are the two essential things, and hopefully they can be complemented by reduction in food waste. About a third of food produced today never reaches the table - which amounts to about 1.6 billion tonnes globally, or 3,000 tonnes every minute. Much of it spoils before it ever reaches the consumer, whereas some is wasted as a result of over-purchasing (or is discarded while still edible). Industry change will be needed too. To halt deforestation, water shortages and pollution from overuse of fertiliser, profound changes in farming practices are needed. These include increasing crop yields in poorer nations, more universal water storage and far more careful use of fertilisers. A move away from intensive systems towards agro-ecological methods (sowing crops such as clover to suppress weeds and returning organic matter to the soil by rotating nitrogen-fixing vegetables and legumes) could make us less reliant on pesticides, which have helped boost cereal and fruit production, but also killed bees and other insect species in alarming numbers. Agro-forestry could help remove carbon from the atmosphere, reduce flooding and increase biodiversity.

Governments and corporations are beginning to show interest in financing and supporting these models. In January 2019, a panel of international climate scientists and policy experts, called for a global treaty to limit the influence of “Big Food” - a move which saw a coalition of over 80 investors call on McDonald’s, KFC, and other fast food suppliers to take swift action by cutting carbon and water risks in their meat and dairy supply chains.

Another emerging technology that could revolutionise the global food system sounds like something out of a science-fiction novel. For over a year, Finnish researchers have been producing food from air, water and - wait for it - electricity. The process, which relies on hydrogen-oxidising bacteria, cuts out the need for plants and animals altogether, resulting in a compound that’s 50-60% protein (the rest is carbohydrate and fat). The advent of these nascent technologies could spell the beginning of the end for intensive livestock farming. Dietary and technological change are the two essential things, and hopefully they can be complemented by reduction in food waste. About a third of food produced today never reaches the table - which amounts to about 1.6 billion tonnes globally, or 3,000 tonnes every minute. Much of it spoils before it ever reaches the consumer, whereas some is wasted as a result of over-purchasing (or is discarded while still edible). Industry change will be needed too. To halt deforestation, water shortages and pollution from overuse of fertiliser, profound changes in farming practices are needed. These include increasing crop yields in poorer nations, more universal water storage and far more careful use of fertilisers. A move away from intensive systems towards agro-ecological methods (sowing crops such as clover to suppress weeds and returning organic matter to the soil by rotating nitrogen-fixing vegetables and legumes) could make us less reliant on pesticides, which have helped boost cereal and fruit production, but also killed bees and other insect species in alarming numbers. Agro-forestry could help remove carbon from the atmosphere, reduce flooding and increase biodiversity.

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In 2018, McDonald’s became the first restaurant company in the world to address global climate change by setting a target to reduce greenhouse gas emissions. If other food suppliers follow suit, this would be a positive step in the right direction. The ‘global food transformation’ scientists have called for will require nothing less than a revolution, involving not just our farming methods but consumption habits and our entire food economy. This would have to involve farmers, retailers, governments and - most importantly of all - consumers. If we are going to meet the goals of the Paris Agreement to limit global warming, then we all need to start thinking about what we’re putting on our plates. Continuing to use enormous amounts of land, grain and water to produce animal protein - in a system that will have to feed an extra 2 billion mouths by 2050 - would be just as irresponsible, some say, as continuing to burn coal.

Eating large amounts of meat and dairy is an extravagance we can no longer afford. But it’s not just about helping the planet, it’s about being mindful of our own health, as well as the wellbeing of the animals we eat. A revolution of the global food system would be a victory for all three.
All the evidence now points in the same direction: if we are going to have a sustainable future where people, animals and the planet can all flourish together, then we need to eat less meat. How we do this depends on our individual values. For some people, veganism is the answer, and it's a lifestyle that's currently advancing at an incredible rate, even in some of the most meat and dairy-loving countries on the planet. Veganuary (a charity inspiring people to try a vegan diet for the month of January) had its strongest ever year in 2019, with 250,000 people across the world taking the pledge.

Veganism has also been championed by major celebrities and influencers including BBC wildlife expert Chris Packham, Spanish footballer Hector Belkerin, musicians Beyonce and Jay-Z and Harry Potter actress Evanna Lynch. However, despite the evidence that a vegan diet has the least impact on the planet, it's unlikely that the world's diet will ever be 100% plant-based. Meat plays an important role in culture and traditions, providing income and security for many people. A simple ‘no meat’ message could also have unintended consequences for farmers’ livelihoods, as well as alienating consumers who want to eat meat.

The good news is, by making better-informed choices, the environmental impact of the food system can be reduced without the global population having to go vegan overnight. Simply cutting down your meat intake vastly reduces your carbon footprint – and is arguably more important than eliminating meat entirely. New dietary labels such as ‘flexitarian’ (only eating meat sometimes) and ‘reducetarian’ (aiming to eat less meat) are an indication of how different groups of people are already making efforts to cut down on their consumption. Additionally, ‘Meatless Mondays’ have become a global phenomenon – practised not just by individuals but also restaurants, schools, universities and hospitals around the globe.

It’s also important to remember that not all meat and dairy is created equally, and consumers can make a positive difference by choosing chicken over pork or beef, or buying grass-fed instead of grain-fed meat – which is better for the animals, the environment, and us. We can also look for meat, milk and eggs with higher welfare standards, or choose organic produce that hasn’t been subjected to the routine use of antibiotics and growth hormones.

Being mindful of the environment also means avoiding food waste. Many of us wrongly dispose of food that’s still edible, due to misunderstanding the difference between best before and use by dates. Small steps, such as meal planning and only buying what we need, can help alleviate pressure on natural resources.

While it may seem as though individual actions won’t make a difference, sustainable eating is about the food choices each and every one of us can make in our daily lives. We can’t all afford to buy electric vehicles or fit solar panels onto our roofs, but we can choose what we eat every day. And even the smallest personal decisions can add up, over time, to significant positive impacts.