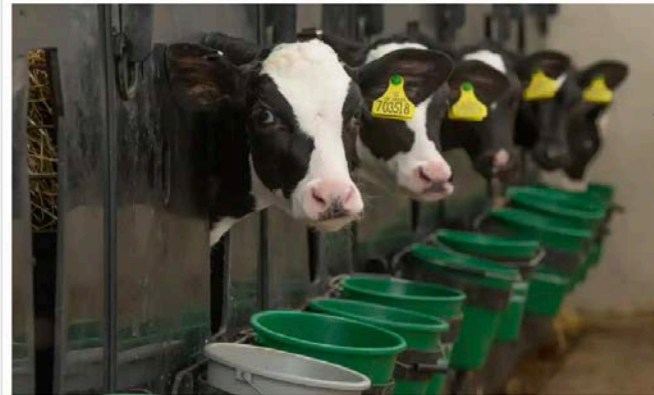


# THE MEAT OF THE MATTER

## Reach 'peak meat' by 2030 to tackle climate crisis, say scientists

Reducing meat and dairy consumption will cut methane and allow forests to thrive



▲ A plant-based diet would free up land to be returned to natural forest. Photograph: FLPA/Alamy

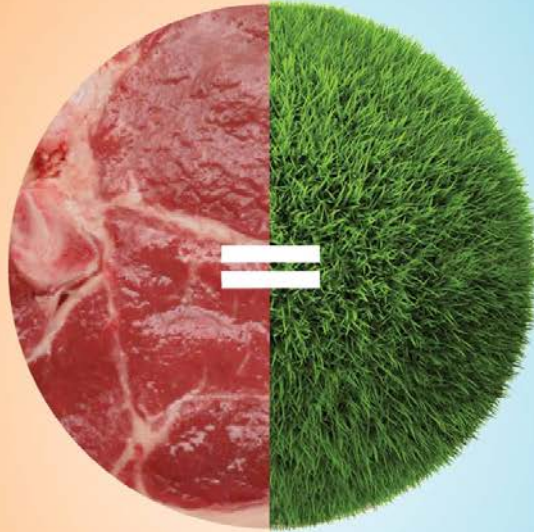
Livestock production needs to reach its peak within the next decade in order to tackle the climate emergency, scientists have warned.

They are calling for governments in all but the poorest countries to set a date for "peak meat" because animal agriculture is a significant and fast-growing source of global greenhouse gas emissions.

Cattle and sheep emit large amounts of methane while forests are destroyed to create pasture and grow the grains that are fed to intensively reared animals.

WHO IS UP FOR A CHALLENGE?

**LESS MEAT**



**LESS HEAT**

**Livestock production currently accounts for nearly 15% of our greenhouse gas emissions.**

Source: FAO

**#LessMeatLessHeat**

**MEATLESS  
MONDAY**

# WHAT DOES IT MEAN?

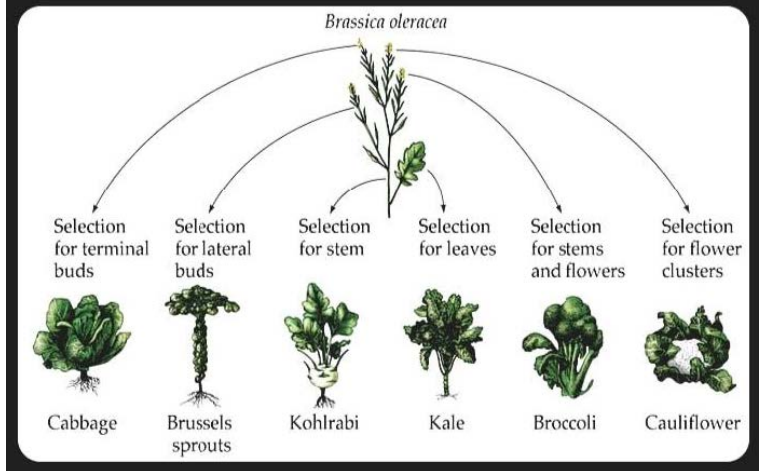


**Cut broccoli, not rainforests.**

Protect the rainforests from becoming land for grazing cattle.  
Eat more plant-based meals.

FUN FACT

That surprised look when you show someone that broccoli didn't occur "naturally" humans bred it from wild mustard



Raising animals for food requires massive amounts of land, food, energy, and water, and is a leading cause of climate change.

MEAT PRODUCTION CONTRIBUTES TO:

Leveling 80% of Amazonian rainforest and Cerrado savannah for grazing and to produce animal feed

Wasting 15 trillion gallons of water per year

Producing 130 times as much waste as that of the entire US population

Killing of 59 billion animals every year

*PLUS*...soil degradation, GHGs attributable to transport, displacement of local and indigenous peoples, animal methane production and methane from ammonium fertilizer plants....



***SO....CAN YOU BE A MEAT-EATING ENVIRONMENTALIST?***

## 10 Common Climate-Damaging Foods

These foods are among the biggest generators of climate change-causing greenhouse gases, based on emissions associated with producing them.



IF THE WORLD ATE **15%** LESS MEAT,

IT WOULD BE LIKE:



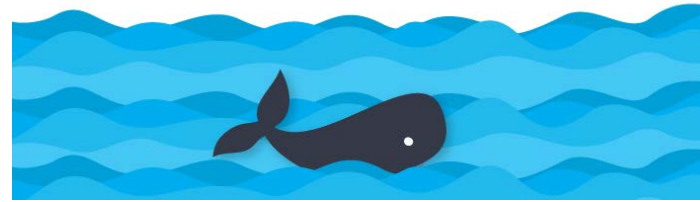
TAKING **240** MILLION CARS  
OFF THE ROAD EACH YEAR

**LIVESTOCK PRODUCTION USES  
33% OF THE EARTH'S  
ENTIRE LAND SURFACE**

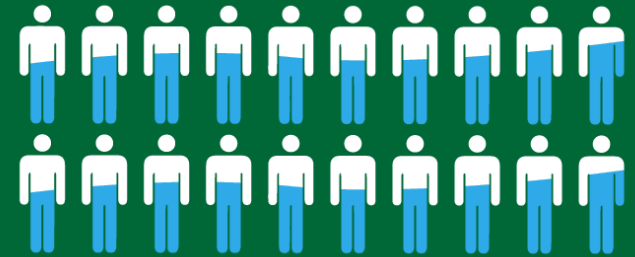


**425  
GALLONS OF WATER**

That's the amount of water it  
takes to make just one 1/4 lb. beef burger.



**SAVE ENOUGH WATER FOR  
1,700 THIRSTY PEOPLE**



A single 1/4 lb. burger takes 425 gallons to produce.  
That's the same amount as a day's supply of water for nearly 1,700 people.

**Biggest analysis to date reveals huge footprint of livestock - it provides just 18% of calories but takes up 83% of farmland.**

Without meat and dairy consumption, global farmland use could be reduced by more than 75% – an area equivalent to the US, China, European Union and Australia combined – and still feed the world.

Loss of wild areas to agriculture is the leading cause of the current mass extinction of wildlife.

The new analysis shows that while meat and dairy provide just 18% of calories and 37% of protein, it uses the vast majority – 83% – of farmland and produces 60% of agriculture's greenhouse gas emissions.

86% of all land mammals are now livestock or humans. Even the very lowest impact meat and dairy products still cause much more environmental harm than the least sustainable vegetable and cereal growing.

**One of the *Single Biggest Things You Can Do For The Environment* is to reduce the amount of meat & dairy you eat.**

## **LESS BEEF, LESS CARBON: AMERICANS SHRINK THEIR DIET-RELATED CARBON FOOTPRINT BY 10 PERCENT BETWEEN 2005 AND 2014**

**LESS BEEF = LESS CARBON**

BETWEEN **2005 AND 2014**, AMERICANS CUT THEIR BEEF CONSUMPTION,  
AVOIDING THE EQUIVALENT OF THE ANNUAL TAILPIPE EMISSIONS OF APPROXIMATELY

 **39 MILLION CARS** 



“A substantial reduction of environmental impacts would only be possible with a substantial worldwide diet change away from animal products.”  
UNEP (2010) Assessing the Environmental Impacts of Consumption and Production: Priority Products and Materials. [http://www.unep.fr/shared/publications/pdf/dtix1262xpa-priorityproductsandmaterials\\_report.pdf](http://www.unep.fr/shared/publications/pdf/dtix1262xpa-priorityproductsandmaterials_report.pdf)

Whether or not you do it because of the animal suffering, if you care about global warming and our environment, one of the most impactful and simplest things you can do is to eliminate or reduce your meat and dairy consumption.

Why?

### **Eating Vegan Or Vegetarian Even Just One Day A Week Has A Huge Impact**

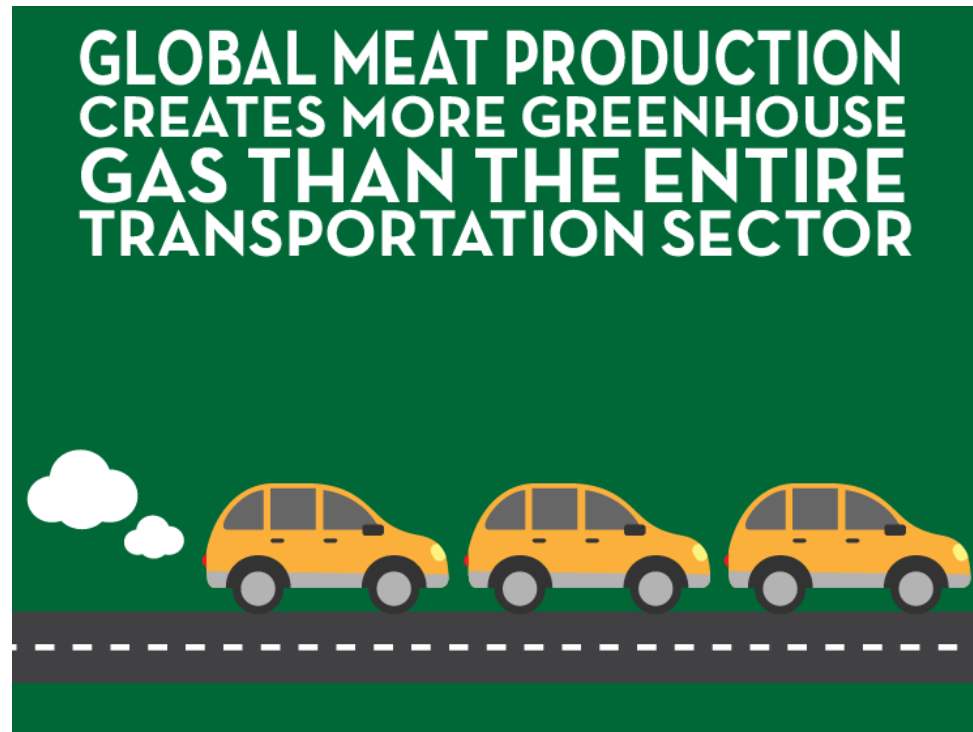
If every American ate 20% less meat it would have same effect on the environment as if we all switched from sedans to hybrids.

If you eat vegan for just one day a week, you have had a greater positive environmental impact than if you were to eat only locally-grown food seven days a week.

According to Environmental Defense, if everyone in the US skipped just one meal of chicken per week and substituted vegetarian foods instead, the carbon dioxide savings would be equivalent to taking more than half a million cars off of our roads.

If everyone ate vegetarian one day a week, we'd also save 100 billion gallons of water (aka enough to supply all the homes in New England for almost four months); 1.5 billion pounds of crops otherwise fed to livestock (enough to feed the state of New Mexico for more than a year); and 70 million gallons of gas (enough to fuel all the cars of Canada and Mexico combined and then some).

**And that is just the effect of *one day*.**





## Animal Agriculture Is Responsible For 91 Percent Of Rainforest Destruction

Livestock or livestock feed now occupies around 33 percent of the earth's entire land surface.

Between one and two acres of rainforest are being cleared *every second*. Up to 137 species of animals, plant, and insect species *are lost every day* due to this destruction.

Livestock production is a key factor in deforestation, especially in Latin America, where cattle ranching now occupies nearly 75% of the deforested areas of the Amazon rainforest, more than 90% of the Amazon that's been cleared since 1970, and more than half of the Cerrado, a neighboring Brazilian biome savannah that covers 23% of Brazil.

About 260 million acres of US forests have been cleared to create cropland to produce feed for animals raised for food.

It takes almost 20 times less land to feed someone on a vegan diet than it does to feed a meat-eater, since the crops are used directly.

## **Meat And Dairy = Greenhouse Gases**

If you eat meat, you are actively contributing to climate change.

The billions of chickens, turkeys, pigs, and cows who are crammed onto factory farms produce enormous amounts of greenhouse gases.

The livestock sector is one of the largest sources of carbon dioxide pollution, and the single largest source of both methane and nitrous oxide, which are many more times potent than carbon dioxide.

Depending on which measurements you go by, between 14% and 51% of global GHGs are caused by animal agriculture.

It's not just that all the animals that are bred solely for our consumption give off large amounts of greenhouse-gases — it's the entire massive industry around them.

Every day, animals are packed onto huge semi-trucks, shipped around the world, and processed in large factory-style slaughterhouses, where it then takes an enormous amount of energy to kill them and ship their parts around the world.

What's worse is that it's increasing: Emissions from agriculture are projected to increase 80% by 2050, as meat consumption is rising and our global population is exploding.



# Making One Hamburger Uses As Much Water As Showering For 2 Months

Almonds have gotten a bad wrap in California for the amount of water consumed in their production. But the water it takes to grow them pales in comparison to the amount it takes to produce eggs and meat.

In fact, the production of just one hamburger takes as much as 660 gallons of water to produce a hamburger, while producing a ¼ pound of tofu requires only 60 gallons of water.

It takes an enormous amount of water to grow crops for animals to eat, clean (still filthy) factory farms, and give animals water to drink.

A single cow used for milk can drink up to 50 gallons of water per day — or twice that amount in hot weather.

## The average American eats:



**736**  
almonds  
/year (2 lbs)

=

**736**  
gallons of  
water/year



**245**  
eggs/year

=

**12,985**  
gallons of  
water/year



**144**  
hamburgers  
/year

=

**102,960**  
gallons of  
water/year

**47% of California's water footprint is associated with meat and dairy.** Source: Pacific Institute "California's Water Footprint" 12/12

Sources: almonds: 23 gallons per 1-oz serving (23 almonds), CA Almond Board / 1 egg: 53 gallons, Water Footprint Network / 1 hamburger: 660 gallons, Water Footprint Network  
Frequency of average American's consumption: almonds: Washington Post / eggs: USDA / burgers: PBS



### **The Difference In Water Consumption is Phenomenal**

A person who eats a vegan diet saves 1,100 gallons of water every day, compared to a typical meat-eater's diet. By comparison, even if you follow all the government's recommendations for conserving water, you'll still only save 47 gallons a day.

The reason the government's recommendations for saving water don't include a vegan diet have to do with our country's powerful animal agriculture lobbies.

### **Animal Waste Is A Leading Cause Of Environmental Pollution**

***Animals raised for food in the US make more sh\*t than our entire human population.***

A single dairy cow produces approximately 120 pounds of wet manure per day, an amount equal to about 20-40 people. According to the US EPA, animals on US factory farms produce about 500 million tons of manure each year.

***Why this is so bad for the environment?***



# Here's why....

With no animal sewage processing plants, waste is most often stored in " lagoons" (which are so large they can be seen in aerial views of factory farms), or they get sprayed over fields — and no, that's not just fertilizer.

Factory farms spray the waste to dodge water pollution limits, creating mists that are carried away by the wind, and poor people who live near the farms are forced to inhale the subsequent toxins and pathogens.

Furthermore, when it's improperly stored and used, animal waste can destroy ecosystems and contaminate underground drinking water supplies, by allowing manure to escape into the surrounding environment.

When contaminants from animal waste seep into underground sources of drinking water, the amount of nitrate in the ground water supply can reach unhealthy levels.

Babies are particularly susceptible to high nitrate levels and may develop something called "Blue Baby Syndrome" (methemoglobinemia), an often fatal blood disorder, as a result.



## Eating Animals Uses A Ton Of Fossil Fuels

A lot of energy is used to turn a piece of an animal into a steak on your plate. First, there's the energy it takes to grow the grain to feed the cattle, which requires a heavy input of petroleum-based agricultural chemicals.

Then, there's the fuel required to transport the cattle to slaughter, and then to market.

Much of the world's meat is hauled thousands of miles.

It has to be refrigerated over the course of its life cycle, and it has to be cooked. It all adds up to a lot of energy.

According to the World Watch Institute, "it takes, on average, 28 *calories* of fossil fuel energy to produce one calorie of meat protein for human consumption, [whereas] it takes only 3.3 *calories* of fossil-fuel energy to produce one calorie of protein from grain for human consumption.

It takes the equivalent of a gallon of gasoline to produce a pound of grain-fed beef in the US. Some of the energy was used in the feedlot, or in transportation and cold storage, but most of it went to fertilizing the feed grain used to grow the modern steer or cow.

To provide the yearly average beef consumption of an American family of four requires over 260 gallons of fossil fuel.



### **Animal Agriculture Is Using Grain That Could Be Going To Hungry People**

Worldwide, around 50% of grain is fed to livestock — food that could instead be used to feed hungry people.

The world's cattle alone consume a quantity of food equal to the caloric needs of 8.7 billion people; more than the entire human population on Earth.

According to the U.N. Convention to Combat Desertification, it takes around 10 pounds of grain to produce just one pound of meat, and according to the US Department of Commerce, Census of Agriculture, 56 million acres of US land are producing hay for livestock, and only 4 million acres are producing vegetables for human consumption.

If all the grain currently fed to livestock in the United States were consumed directly by people, the number of people who could be fed would be nearly 800 million. It's estimated that almost a billion people globally don't have enough to eat, so that would cover them, and then some.

**But meat is big business!**



## Florida's top agricultural export is meat, not citrus



- Florida is home to nine out of the top 25 beef producers in the US.
- While the orange crop is the state's biggest agricultural output, its No. 1 international agricultural export is meat!

***Is this sustainable?***

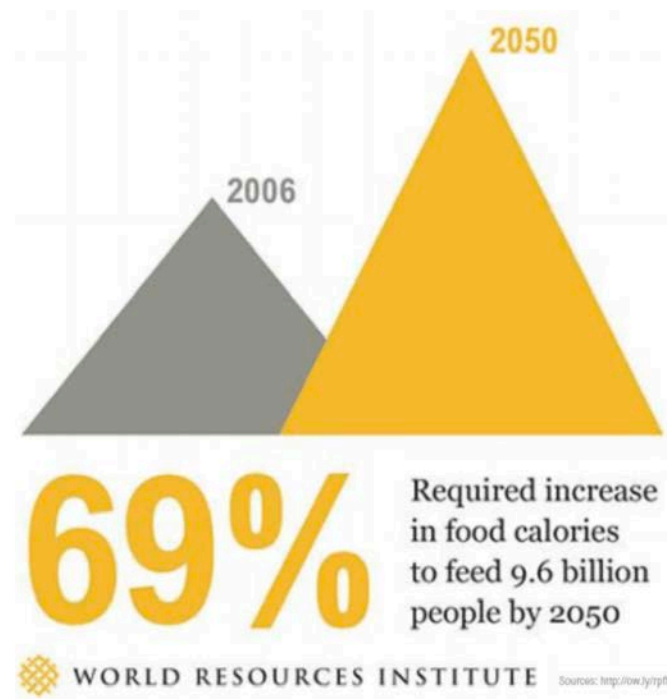
- ***Economically?***
- ***Environmentally?***
- ***Socially?***

# What is changing, and how?

**Alternative protein sources can reduce negative environmental impact.** As mentioned above, livestock is a major contributor to greenhouse gas emissions. Additionally, reducing livestock could free up global cropland, decrease soil erosion, and relieve pressure on the world's water supply.

**Consumers are seeking healthier food alternatives.** Rising obesity rates across the globe coupled with consumer interest in healthier food alternatives are also driving demand for meatless proteins.

## Our Meatless Future: How The \$90B Global Meat Market Gets Disrupted?



### POPULATION GROWTH OUTPACES FOOD SUPPLY

Even if food was distributed more evenly around the world, we still face a massive calorie gap between current food production, and food production required in the future.

At the same time, climate change will negatively impact global agriculture. In many areas, it already has.

### Demand for Plant-Based Dishes Grows



Vegan orders increased in popularity by 19 percent in 2017



Meat-substitutes are ordered five percent more on Mondays than the rest of the week



Jackfruit, a trendy plant protein, rose 33 percent in popularity for orders placed on Mondays

\*Based on GrubHub's order data from January 2015 to July 2017

#meatlessmonday



GRUBHUB

Demand for meatless dishes is increasing every day of the week!

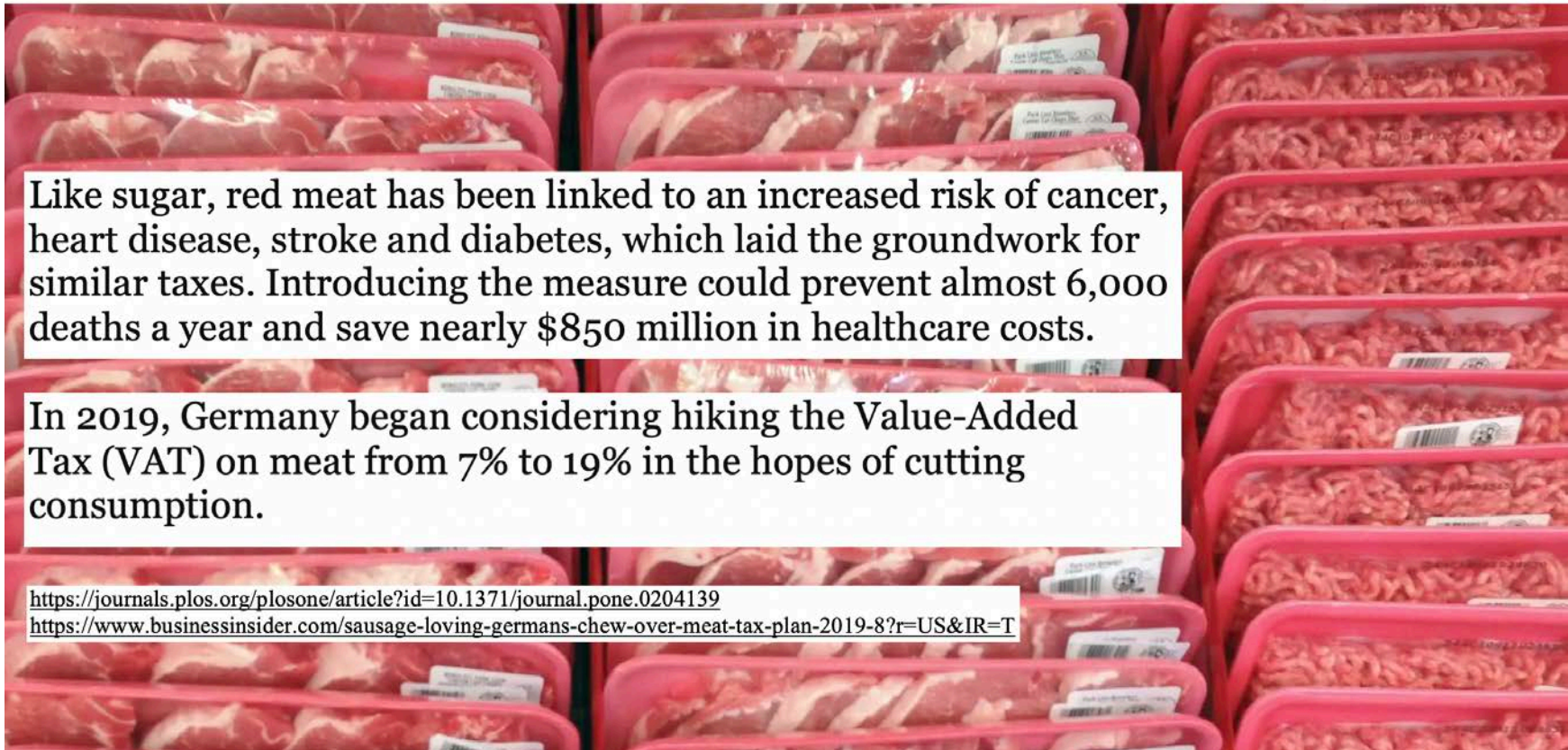
## **Governments around the world are considering taxing red meat like tobacco in an effort to curb climate change**

Like sugar, red meat has been linked to an increased risk of cancer, heart disease, stroke and diabetes, which laid the groundwork for similar taxes. Introducing the measure could prevent almost 6,000 deaths a year and save nearly \$850 million in healthcare costs.

In 2019, Germany began considering hiking the Value-Added Tax (VAT) on meat from 7% to 19% in the hopes of cutting consumption.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0204139>

<https://www.businessinsider.com/sausage-loving-germans-chew-over-meat-tax-plan-2019-8?r=US&IR=T>



# Plant vs. Meat

## BEANS VS. BEEF



**WINNER!** **ROUND 1: PRICE \$**

**\$1.07 PER POUND** **\$5.28**

ACCORDING TO THE USDA. DATA FOR FEBRUARY 2014.

**WINNER!** **ROUND 2: NUTRITION**

BLACK BEANS	PER 100 GRAMS	GROUND BEEF
130 CALORIES		270 CALORIES
0 G OF TOTAL FAT		18 G OF TOTAL FAT
0 G OF SATURATED FAT		7 G OF SATURATED FAT
0 MG OF CHOLESTEROL		80 MG OF CHOLESTEROL
8 G OF FIBER		0 G OF FIBER
2.9 MG OF IRON		2.3 MG OF IRON

**the CHAMP**

Fiber is an essential nutrient for digestion and cancer prevention.

Cholesterol and saturated fat are linked with heart disease.

**WINNER!** **BONUS ROUND: STUDIES**

BEANS	BEEF
According to the <i>Canadian Medical Association Journal</i> , adding half a cup of beans per day can reduce LDL (or "bad") cholesterol!	A study published in <i>Nutrients</i> identifies meat-eating as a risk factor for developing diabetes.

Brought to you by the Physicians Committee for Responsible Medicine • PCRM.org

**MEATLESS MONDAY PRESENTS**

## PLANT PROTEIN POWER

**CAN YOU GET FULL PROTEIN EASILY EACH DAY WITHOUT MEAT? YES, YOU CAN.**



**COMPLETE PROTEIN FROM PLANTS IS ACTUALLY BETTER THAN FROM MEAT.**

By eating a variety of plant-based dishes, your body naturally forms complete proteins to meet your daily recommended amount. Just be sure you've eaten enough calories. And getting your protein from plants—instead of red and processed meats—reduces your risk of heart disease, diabetes, obesity and cancer.


**GRAM FOR GRAM, COMPLETE PROTEIN FROM PLANTS HAS THE SAME ENERGY AS PROTEIN FROM MEATS.**

Although servings of plant-based foods and meat often differ in terms of calories, their energy value in each gram of protein is the same. So by going meatless, you can stay on the go.



**HIGH PERFORMANCE ATHLETES NOW GEAR UP WITH PLANT-BASED DISHES FOR PROTEIN.**

Nutrient dense plants are a proven source of protein for the intense demands of top level competition—without the health risks of meat. Game on.



Visit [meatlessmonday.com/plantproteinpower](http://meatlessmonday.com/plantproteinpower) to learn more. | Meatless Monday. It's good for you and good for the planet.  
#MeatlessMonday #PlantProteinPower

**MEATLESS MONDAY PRESENTS**

## PLANT PROTEIN POWER

Get your full daily amount of protein by eating enough calories from a variety of plant foods. These tasty combinations provide all the different amino acids your body needs to form protein—without meat.

### MEATLESS COMBOS THAT COMPLETE YOU

**GOOD & SIMPLE**



Peanut Butter on Whole Wheat Bread | Spinach with Walnuts | Pizza | Baked Avocado and Egg

**LATIN**



Corn Tortillas and Beans | Rice and Beans

**MIDDLE EASTERN**



Chickpeas and Rice | Hummus with Pita Bread

**ASIAN**



Soybeans and Brown Rice | Tofu and Sesame Seeds

**DISH THE FACTS**

According to the Academy of Nutrition and Dietetics, appropriately planned vegetarian (and vegan) diets are healthful, nutritionally adequate and may provide health benefits for the prevention and treatment of certain diseases. Among these are heart disease, type 2 diabetes and certain types of cancer.

Visit [meatlessmonday.com/plantproteinpower](http://meatlessmonday.com/plantproteinpower) to learn more. | Meatless Monday. It's good for you and good for the planet.  
#MeatlessMonday #PlantProteinPower

The meat industry has long been subject to ethical concerns behind meat production practices.

**Lab grown meat is also rising in popularity.** In September 2017, China announced a \$300M deal to import *lab-grown meat* from three Israel-based companies as part of a broader plan to decrease the country's meat consumption by 50%.

Such cross-country collaboration indicates that we can expect to see more experimentation across the globe on alternative protein sources.

Continued advances in genetic engineering innovation will enhance taste, flavor, and health benefits to incentivize consumption.

Bio-ag technologies will also continue to expand across largely untouched meat and seafood categories (e.g. pork, duck, eel, etc). We could see direct competitors to meat incumbent brands across virtually all frozen and prepared food categories.

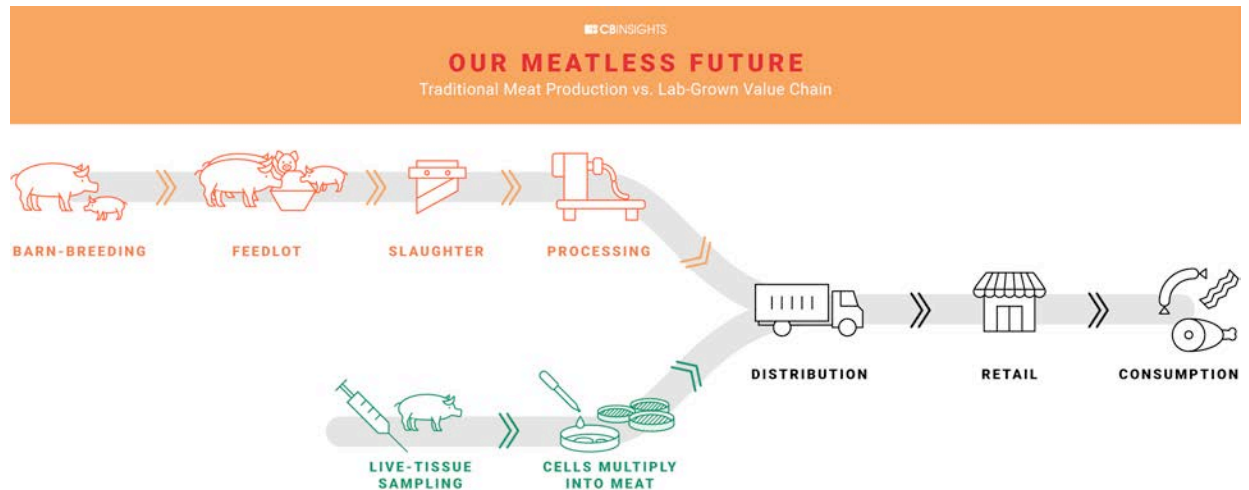
In the US, regulators are exploring cellular agriculture as a viable food source for the future. As of now, artificial meat regulation is still in early stages. Regulatory responsibility in an animal-free ecosystem could extend across multiple bodies, as biotechnology for food overlaps with many regulatory systems.

Or, a single regulatory agency could be created in the future to deal with the unique challenges of artificial meat regulation.

While plant-based products and other protein sources are taking off, lab-grown meat, in particular, faces a few obstacles.

***Could lab-based meat production and consumption alleviate ethical concerns around meat?***

***How do you feel about lab-grown meat? What are some of the issues that it presents?***



One of the main reasons that lab-grown meat is so expensive is due to the prevalence of fetal bovine serum, or FBS, in meatless products. FBS, which is extracted from cow fetuses, is a core and costly ingredient in lab-grown meat. In the next few years, we can likely expect to see the cost of lab-grown meat decrease considerably. From there, it's just a matter of which companies will get their products to market first and best position their products as worth the price.

However, startups are looking to eliminate FBS from the meatless equation, in order to cut costs. Just has reported that it has developed a method to grow cell cultured chicken without FBS, while Memphis Meats is validating methods to produce its meats without the ingredient.

**Can clean meat scale?** Though many startups in the space claim that their products will revolutionize meat consumption, the question remains whether clean meat will provide a scalable method to feed the future — or whether it's simply a new wave of molecular gastronomy.

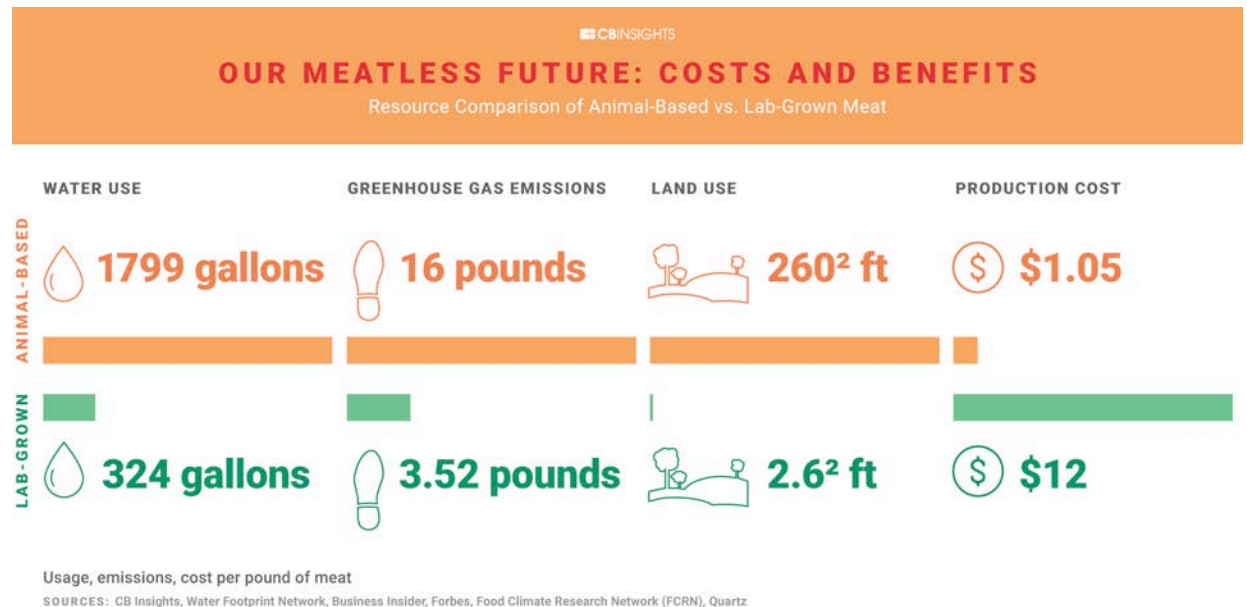
**Will lab meat products really be better for the environment?** Despite claims that less meat consumption will reduce environmental impact, lab-based technologies come with their own high costs for electricity, heating, and other resources.

**The automation of meat production could have far-reaching job implications for the agriculture industry.** The meat sector is the largest employer within US agriculture, and mainstream meatless consumption could create chaos and eliminate jobs across the entire meat production value chain.

Meat producers, lobbyists, and other bodies have a great deal at risk when considering the effects of automation across the meat industry.

## For now, high-tech meat remains expensive.

Cost considerations are crucial in scaling these products for mainstream consumption.



***What might the future hold? Where do you think the meatless revolution might be headed?***

**The meatless revolution is global...Not curbing our taste for meat could cost the U.S. almost \$300 billion each year by 2050 – with all the other amplified challenges we are facing, can we afford it?**

*Cost and scale are immediate considerations in moving these products from novelty purchases to kitchen staples.*

The greatest concentration of plant-based meat substitute products has occurred in the US.

There is also a developed meatless market in Europe, as well as expected growth of the meatless sector in Asia.

This issue is particularly urgent when attached to the \$1.6 trillion global bill that meat consumption due to climate change and health care costs that the world is expected to incur by 2050.

Plant-based meatless meat now tastes just like the real thing, and investors are predicting it become a \$35 billion alternative meat market.

After a successful test run in Burger King, *Impossible Foods* has gone nationwide with a meatless Whopper in 2019.

*Beyond Meat* had the most successful IPO for the year, with its stock price soaring 163% in mere weeks after going public, putting the company value at about \$4 billion.

Plant-based meat companies have been seeing larger and larger rounds from venture capital and other types of investors.

Dairy substitutes are further chipping away at traditional meat market share.

Regardless of the hurdles to a meatless future, clean meat and plant-based meatless meat products are clearly diversifying and growing, capturing investor and public attention alike.

***There is a rising consumer desire for transparency around the food supply chain in both meat and plant products. What issues would we still face around plant-based meat production?***



# For more casual reading with links to source data:

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<https://www.cbinsights.com/research/future-of-meat-industrial-farming/>

# WHAT ABOUT THE ETHICS OF EATING MEAT?

