

# *Meet Less Meat*



<https://vegankind.com/mag/new-documentary-wants-everyone-to-eat-less-meat-to-fight-climate-change>

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Source: <https://pixabay.com/photos/vegan-meal-dinner-salad-healthy-4809593/>

## Background Information



Source: <https://www.precisionnutrition.com/calorie-control-guide>

Have you ever wondered about the ideal amount of meat on your plate? There is no one right answer because every person's taste buds are unique. Some relish the flavors of a juicy steak, while others enjoy a plant-powered delight for ethical, health, or environmental reasons. It's a matter of striking the right balance for your body and your moral framework. What's on your plate needs to feel right for you. Whatever path you choose, a culinary adventure awaits!

In recent decades, the portion of meat on American plates has been consciously reduced, a response to current societal concerns about sustainability, health, ethical considerations, and spiritual beliefs. But in ancient times, abstaining from meat was predominantly linked to stringent religious and philosophical traditions. Jainism and Buddhism in India, for instance, practiced vegetarianism as a component of their ethical and spiritual beliefs. Similarly, certain early Christians adhered to convictions that led them to avoid consuming meat. During Europe's Medieval era, monastic communities were known for their vegetarian practices because they advocated for the well-being of animals.

Organized vegetarian movements and societies emerged in the 19th century. The first known organizations were the Vegetarian Society in the United Kingdom, founded in 1847, and the American Vegetarian Society, founded in 1850. Both advocated for the elimination of meat from our diets for reasons related to health, ethics, and the environment. These movements gained followers and multiplied in the 20th century. Notable figures like Mahatma Gandhi, who practiced veganism for ethical reasons, played a significant role in these movements. His commitment to vegetarianism remains a well-known aspect of his legacy and his philosophy of non-violence.



Plant-based protein

Source: <https://www.woolworths.com.au/shop/discover/plant-based/what-are-meat-alternatives>

Veganism and plant-based diets have garnered increased support in the 21st century. Environmental awareness, ethical considerations for animal welfare, and health implications continue to be primary reasons for embracing plant-based diets. Documentaries, books, and online content have played pivotal roles in disseminating information and raising awareness about animal farming practices. The progress in food technology and culinary innovations has been crucial in developing numerous plant-based alternatives that effectively mimic the taste and texture of animal products. This development facilitates a smoother transition for individuals seeking more sustainable dietary choices.





Source: <https://icdasustainability.org/about-2/about-sustainability/>

Social media platforms have also been crucial in facilitating the creation of vegan communities to provide support, share information, and promote a plant-based lifestyle. Influencers and celebrities promoting veganism actively participate in plant-based initiatives like Veganuary, where individuals commit to a vegan lifestyle for the month of January. These initiatives are meant to encourage people to try a vegan lifestyle and to incentivize more sustainable eating.

Whether you choose a plant-based regimen, an omnivorous diet, or a hybrid approach, achieving balance is paramount for overall well-being. The key lies in mindful choices that meet individual nutritional needs while considering the long-term impacts on health and the planet. Finding equilibrium between protein sources, incorporating a variety of vegetables and fruits, and paying attention to portion sizes are a must.

## **The History of Fish and Poultry Consumption**

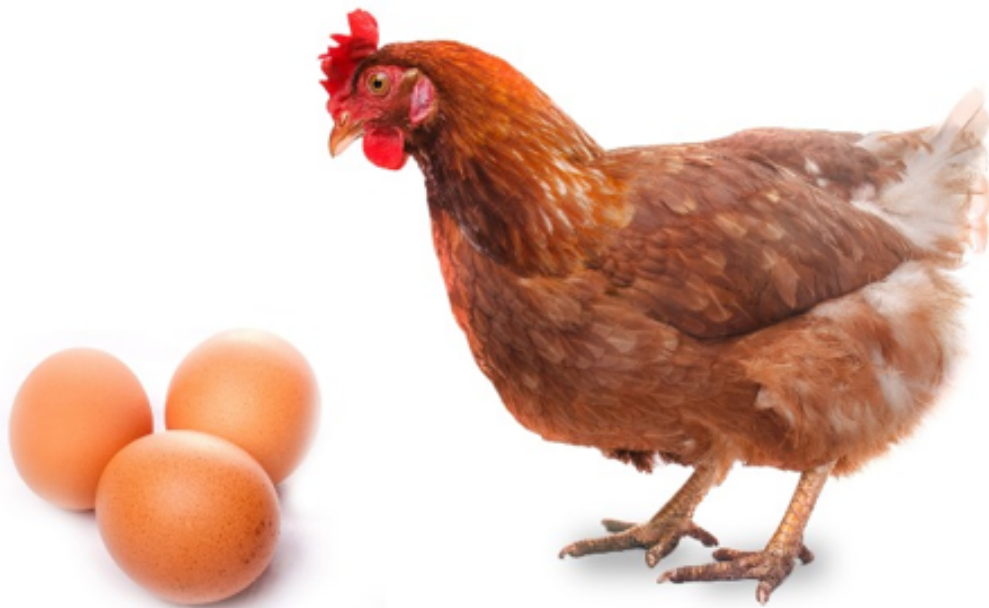


Source: [https://www.tohoku.ac.jp/en/press/fish\\_intake\\_by\\_pregnant\\_women.html](https://www.tohoku.ac.jp/en/press/fish_intake_by_pregnant_women.html)

The consumption of fish spans millennia, and it's deeply embedded in the history of human civilizations. Ancient cultures, such as the Egyptians and Greeks, recognized the nutritional value of fish, and they incorporated fish dishes into their diets. Evolving fishing methods—from rudimentary tools to more sophisticated techniques—ensured that fishermen from these cultures could provide their people a steady supply of fish.

In Europe during the Medieval era, the Catholic Church's practice of abstaining from meat on Fridays elevated fish consumption, which influenced culinary traditions that persist today. The Age of Exploration expanded global trade routes, diversifying the types of fish available for consumption. However, concerns about the sustainability of fishing practices, such as overfishing and the environmental impact of fishing, have become significant issues in the global fishing industry.

Initiatives for sustainable fishing, certification programs, and awareness campaigns aim to address these challenges and promote responsible seafood consumption. Some groups advocate for reducing or eliminating fish consumption for environmental and ethical reasons. One such group is called the Fish Free February campaign, which encourages individuals to abstain from consuming fish during the month of February, promoting awareness about overfishing and its impact on marine ecosystems.



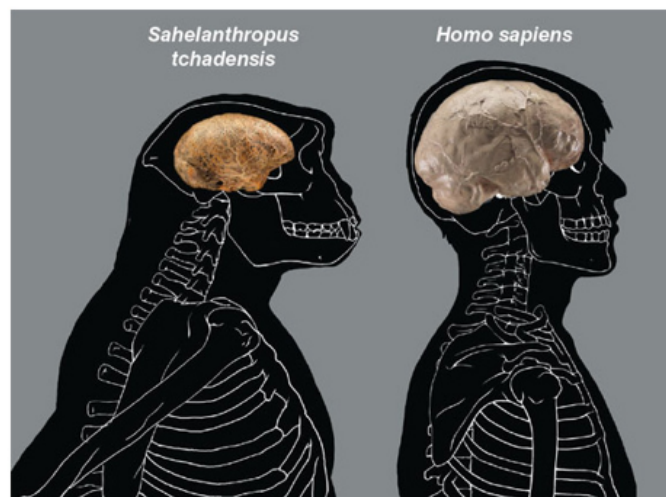
**Source:** <https://the-media-leader.com/attention-elasticity-the-attention-economys-chicken-and-egg-question>

The history of poultry consumption is marked by a fascinating journey of domestication and culinary evolution. Chickens were domesticated around 8,000 years ago in Southeast Asia, and they provided a reliable source of eggs and meat. The Romans played a crucial role in shaping Western cuisine by developing various poultry recipes, and chickens became symbols of wealth and status. The industrialization of the 20th century revolutionized poultry farming, making chicken more affordable and widely accessible.

Ethical considerations in poultry farming have gained prominence in recent decades, sparking movements for humane and sustainable practices. The concept of conscious consumption is increasingly gaining importance. A conscious consumer is one who makes deliberate food choices, like supporting free-range, organic, and locally sourced poultry options to align with their values and to contribute to more sustainable agricultural practices.

### How Cooking Meat Helped Humans Evolve

Including meat in the diet was an important milestone in the evolution of humanity. Anthropologists believe that cooking meat played an important role in the progression of early Homo sapiens. One of the main advantages was that eating meat increased the availability of energy, supporting the development of larger brains in early humans.



Source: <https://www.americanscientist.org/article/meat-eating-among-the-earliest-humans>

Around 1.9 million years ago, humans began harnessing fire to cook meat, unlocking numerous benefits. This practice made meat more digestible, providing easier access to vital nutrients. By pre-digesting food outside the body, humans reduced the energy expenditure required for digestion, allowing more energy for other activities and for energy-intensive processes like brain growth.



Cooking also broadened the diet, making tough plant materials and various meats palatable. Crucially, it eliminated harmful pathogens, reducing the risk of illnesses.

## Sustainability and Public Awareness

Public awareness about the impacts of meat consumption has been raised through various initiatives and platforms. Documentaries such as *Cowspiracy* (2014) and *The Game Changers* (2018) have highlighted the environmental and health consequences of meat production, reaching a wide audience through streaming platforms. Social media campaigns like Meatless Monday encourage individuals to reduce their meat intake by promoting plant-based meal ideas and sharing information about the benefits of meatless diets. Non-profit organizations such as the Humane Society and Greenpeace advocate for sustainable food systems and animal welfare, organizing events, conducting research, and lobbying for policy changes to address the issues associated with industrial meat production. Additionally, educational programs in schools and universities raise awareness among students about the environmental impact of meat consumption and the benefits of plant-based diets.



Source: <https://now.tufts.edu/2020/01/13/busting-myths-about-red-meat>



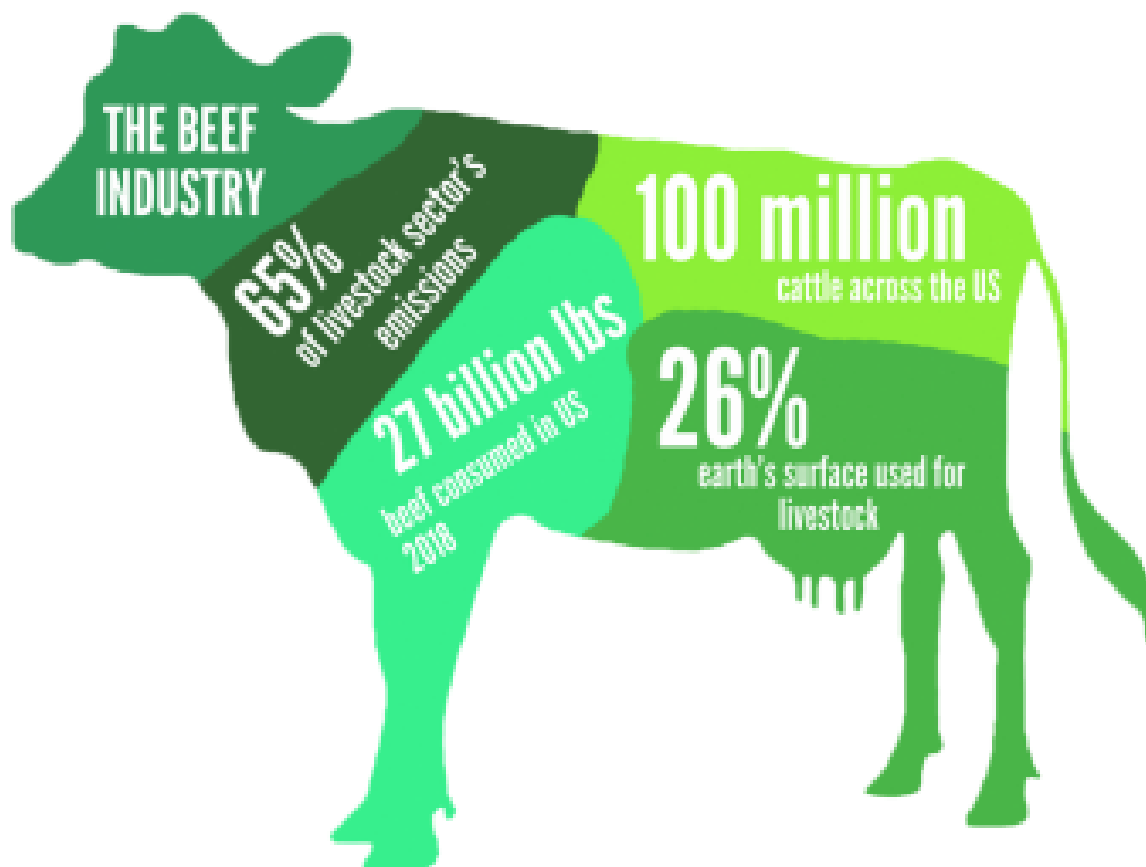
## Challenges and Opportunities



Source: <https://www.farmersweekly.co.za/opinion/by-invitation/challenges-and-opportunities-for-sas-red-meat-producers/>

Changing meat consumption habits introduces a range of challenges and opportunities that extend beyond personal dietary decisions and that impact society and the environment. The challenges involve working through cultural norms, taste preferences, and the convenience associated with meat-based diets. Additionally, there may be concerns about meeting nutritional requirements, especially for essential proteins and nutrients found in meat. However, the opportunities are significant, ranging from improving personal health to contributing to welfare of animals to addressing environmental sustainability.

Ever since agriculture became a prominent source of food thousands of years ago, meat-eating lifestyles have been widely adopted by cultures worldwide. But the consumption of meat has come under increasing scrutiny due to its profound environmental implications. As global demand for meat continues to rise, the environmental concerns become more pronounced. From deforestation for livestock grazing to the substantial greenhouse gas emissions associated with animal agriculture, the environmental impact of meat production is considerable. Understanding the adverse effects of meat intake on the environment is key for making dietary choices that are sustainable and eco-friendly.



Source: <https://redwoodbark.org/57149/culture/the-real-impacts-of-celebrated-sustainable-trends/>

## The Environmental Impact of Red Meat Production

### Water



Source: <https://www.peta.org/features/meat-dairy-industry-wastes-water-supply/>

The production of meat requires great quantities of water, with the vast majority used to produce feed. The irrigation process for feed requires blue water, which is water found in surface and ground reservoirs. The use of blue water can lead to water depletion, salinization, and soil degradation.

Wastewater from slaughterhouses contains nitrogen and phosphorus, which contribute to decreased oxygen levels in water and excessive growth of toxic algae.

### Greenhouse Gasses



Source: <https://www.videvo.net/stock-video-footage/greenhouse-gas/>

Meat production is a major contributor to greenhouse gas emissions. Processes like enteric fermentation in ruminant animals release methane, while the management of animal manure produces methane and nitrous oxide. Deforestation for pastureland and feed crops releases stored carbon dioxide. The energy-intensive production of animal feed, transportation, processing, and land-use changes all contribute to the significant carbon footprint of the meat industry.

### Deforestation



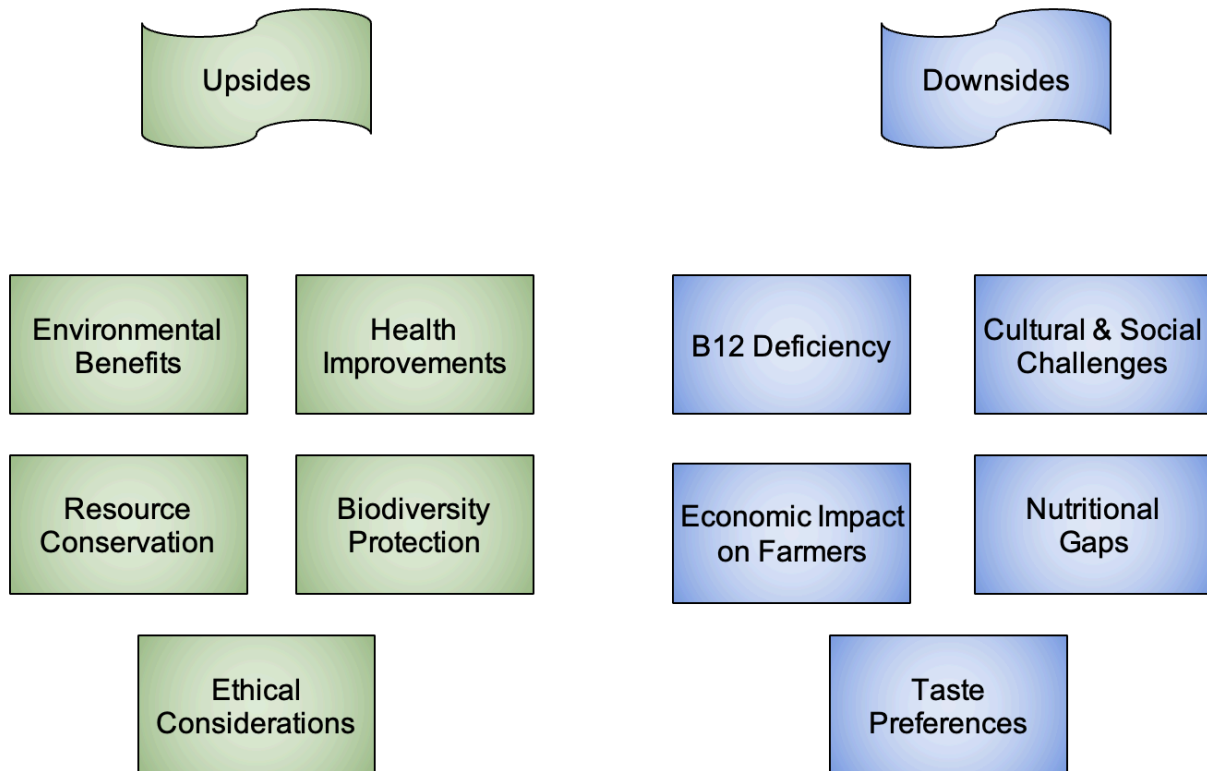
Source: <https://www.washingtonpost.com/world/interactive/2022/amazon-beef-deforestation-brazil/>

Beef production drives deforestation, primarily through the expansion of pastureland. As demand increases, forests are cleared for cattle ranching, especially in regions like the Amazon. This involves cutting down trees, releasing stored carbon, and diminishing the forest's capability to absorb and store carbon dioxide (CO<sub>2</sub>) from the atmosphere. The environmental impact includes greenhouse gas emissions, loss of biodiversity, and disruption of ecosystems.

### Upsides and Downsides of Reducing Meat Consumption

While it's true that reducing your meat intake can have significant benefits to the environment, human health, and animal welfare, there are some disadvantages related to nutritional deficiencies and the economic impact on farmers. Navigating the complex landscape of meat consumption involves an exploration of both the upsides and the downsides of its impact on our lives.

There's no denying that savory dishes play an important part of our cultural traditions, but we must also acknowledge that the consumption of meat has environmental, health, and ethical ramifications. Some of the most important upsides and downsides are listed below.

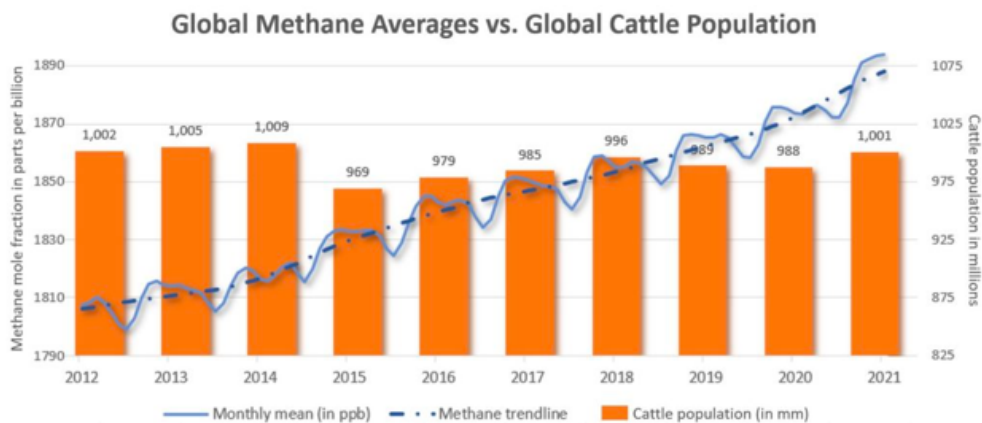


## Benefits of Cattle Farming

The methane produced by cows as they digest food is a natural part of the carbon cycle. This is called biogenic methane. Methane is a greenhouse gas that plays a role in natural processes, including the carbon cycle that regulates our planet's climate. Understanding this connection helps us appreciate the intricate balance of nature's carbon dynamics.

Contrary to what many think, cows actually help balance carbon through a natural process. While they do produce methane (a potent greenhouse gas) when digesting food, they don't add more carbon to the environment than they take in. When cows eat plants, which have carbon, they burp out some methane. The good news is that, unlike some gasses that stay in the air for a very long time, methane only sticks around for about eight to ten years. After that, it turns into CO<sub>2</sub> and water. So while cows do emit greenhouse gasses, it's not as bad as it might seem, and nature helps balance it out over time.

The graphic below shows the relationship between the cattle population and methane fraction from 2012 to 2021. The cattle population has remained steady over that time, but the production of methane has gradually risen, which is normal, taking into account the time that methane persists in the atmosphere and the natural carbon process involved.



Source: <https://dirt-to-dinner.com/5-ways-dairy-cows-cattle-can-help-the-environment/>



It's also important to highlight another aspect of cattle's contribution to sustainability through a process known as upcycling. Roughly 90% of what cattle consume isn't suitable for direct human consumption, which means that the animal can be a valuable part of a sustainable food system. Cattle efficiently transform inedible plants—such as grasses and various byproducts like brewers' grains, pea pulp, beet tops, and potato peelings—into high-quality, nutrient-rich protein. For instance, cattle incorporate distillers' grains from the corn ethanol sector, cottonseed from cotton production, and beet pulp from sugar beet processing. By turning these byproducts into beef, cattle contribute to a more sustainable and interconnected food and agricultural system.

### ***Environmental Impacts of Aquaculture***



Source: <https://geny.org/the-environmental-impact-of-aquaculture/>

Aquaculture, the farming of fish and aquatic species, plays a crucial role in meeting the world's growing demand for seafood. And as the demand for seafood continues to rise, the sustainability of aquaculture practices becomes more important. While aquaculture can ease the strain on wild fisheries, its environmental impact requires careful management. Achieving a balance between increasing seafood production and protecting ecosystems calls for innovative, responsible practices. Aquaculture can have both positive and negative environmental impacts. In the next table, we examine some of the key aspects of the practice.

<b>Positive Environmental Impacts</b>	
Habitat Preservation	By providing an alternative to fish caught in the wild, aquaculture can help preserve natural habitats and ecosystems that might otherwise be impacted by overfishing.
Alleviation of Strain on Wild Fisheries	Aquaculture can help meet the growing demand for seafood without putting additional stress on wild fish populations, which are often overexploited.
Employment Benefits	Aquaculture can contribute to local economies by providing employment and supporting communities that rely on fishing.
<b>Negative Environmental Impacts</b>	
Pollution	Intensive aquaculture operations can pollute bodies of water, with excess nutrients, antibiotics, and waste products from fish. This can harm local ecosystems and biodiversity.
Energy Use	Some forms of aquaculture, especially those involving intensive systems, may require significant energy inputs to maintain water quality, aeration, and temperature control.
Disease Transmission	Dense populations of farmed fish in aquaculture facilities can facilitate the spread of diseases. If not managed properly, diseases can escape from aquaculture operations and affect wild fish populations.

**Additional Impacts of Shrimp Farming**

Shrimp farming, a booming industry meeting global demand for this popular seafood, also unfolds a complex narrative of prosperity and environmental concern. As the appetite for shrimp grows, so does the industry's footprint, leaving a trail of environmental impacts that merit close examination. From the conversion of vital mangrove ecosystems to the use of chemicals and the potential for disease spread, shrimp farming raises critical questions about sustainability, making it a vital sector of the aquaculture industry.



Source: <https://www.feednavigator.com/Article/2016/10/03/First-ASC-certified-shrimp-farm-in-Africa>

<b>Most Notable Concerns about Shrimp Farming</b>	
Destruction of Habitats	Shrimp farms often require the conversion of mangroves, vital coastal ecosystems, into ponds. This results in the loss of biodiversity and disrupts the delicate balance of these habitats.
Water Pollution	<p>Effluents from shrimp ponds—containing uneaten feed, chemicals, and waste—can lead to water pollution. This pollution negatively impacts surrounding aquatic ecosystems and may harm local communities relying on clean water sources.</p> <p>Additionally, Intensive shrimp farming may involve the use of antibiotics, pesticides, and chemicals to control diseases and enhance production. These substances can have adverse effects on water quality and non-target species.</p>

Disease Spread	High stocking densities in shrimp farms can facilitate the rapid spread of diseases. To combat this, farmers often use antibiotics, contributing to antibiotic resistance and posing potential risks to human health.
Feed Production	The production of feed for shrimp often relies on wild-caught fish, contributing to overfishing and putting additional pressure on marine ecosystems.

**Alternatives That Make Aquaculture More Sustainable**

A range of alternatives can make aquaculture more sustainable. Integrated multi-trophic aquaculture (IMTA), for example, involves forming multiple species in the same aquatic environment, creating a symbiotic relationship where waste from one species serves as nutrients for another. This approach minimizes environmental impacts and maximizes the efficient use of resources.

Recirculating aquaculture systems (RAS) recycle and purify water within closed systems, reducing water consumption and minimizing the release of pollutants into the environment. Selective breeding programs aim to develop fish strains with desirable traits such as fast growth, disease resistance, and efficient feed conversion.

Creating alternative feeds sourced from sustainable origins like algae, insects, and plant proteins can diminish the need for wild-caught fish in feed production, conserving marine resources and lessening strain on fish populations.

Additionally, efforts to restore habitats like mangroves, seagrasses, and oyster reefs can bolster ecosystem robustness and aid aquaculture efforts. Adherence to certification programs and sustainability protocols guarantees that aquaculture ventures meet rigorous environmental and social benchmarks, promoting accountable practices within the industry.

## Environmental Impacts of Poultry Farming



Source: <https://www.youtube.com/watch?v=A6osRlienQg>

The poultry-farming industry—which encompasses the rearing of chickens, ducks, and turkeys—has undergone rapid expansion to satisfy the needs of a burgeoning global population. However, behind the seemingly efficient machinery of poultry production lies a complex tapestry of environmental challenges, from the disposal of substantial volumes of waste to concerns about air and water pollution. The table below shows the key issues that the poultry industry must address to evolve toward a more sustainable future.

<b>Environmental Impacts Associated to Poultry Farms</b>	
Water Pollution and Water Usage	The discharge of untreated waste into bodies of water contaminates them with excess nutrients, pathogens, antibiotics, and chemicals. Poultry farms also require significant water for various purposes, such as cleaning, cooling, and maintaining the health of the birds, contributing to water scarcity issues in some regions.



<p>Air Pollution</p>	<p>Poultry farms contribute to air pollution through the release of ammonia, particulate matter, and other pollutants from poultry waste and emissions from ventilation systems. These pollutants can degrade air quality, leading to respiratory issues for both animals and nearby residents. Pollutants can also contribute to the creation of smog.</p>
<p>Land Use and Deforestation</p>	<p>The expansion of poultry farms often leads to deforestation and habitat destruction as natural ecosystems are cleared to make way for farm infrastructure and feed production. This loss of habitat can disrupt local biodiversity and ecological balance, impacting wildlife populations and ecosystems.</p>
<p>Energy Consumption</p>	<p>Poultry farms require significant energy inputs for heating, ventilation, lighting, and equipment operation. This energy consumption contributes to greenhouse gas emissions because it relies heavily on fossil fuels, further exacerbating climate change and environmental degradation.</p>
<p>Antibiotic Resistance</p>	<p>The widespread use of antibiotics in poultry farming to prevent and treat disease can lead to the development of antibiotic-resistant bacteria, posing risks to human and animal health. Antibiotic-resistant bacteria can spread through the environment via poultry waste and contaminated water sources, soil, and crops, potentially compromising the effectiveness of antibiotics for medical treatment.</p>

**Alternatives That Make Poultry Production More Sustainable**

Implementing sustainable practices in poultry farming is crucial for minimizing environmental impact and ensuring long-term viability. One approach is pasture-raised poultry, through which farmers allow chickens to graze on pasture, promoting natural behavior and reducing the need for supplemental feed. Integrating poultry into diversified farming systems, such as agroforestry or mixed-crop livestock systems, enhances ecosystem health and resilience. Efficient feed management practices, renewable energy adoption, and water conservation measures further reduce environmental footprint and production costs. Sustainable manure management, organic and regenerative practices,

and compliance with certification standards also play key roles in improving sustainability in poultry farming. By adopting these alternatives, poultry farmers can mitigate environmental pollution, enhance soil health, and meet consumer demand for ethical and environmentally responsible poultry products.



Source: <https://pixabay.com/photos/chuckle-chick-chicken-meadow-980806/>

## Solutions



Source: <https://www.veganvejetarven.com/en/vegan-vejetarven-testleri>

Given the environmental problems caused by most livestock farming, it's crucial that we explore solutions to reduce meat intake. Whether motivated by ethical concerns, environmental sustainability, or a desire for improved well-being, the journey toward eating less meat is a difficult adjustment for many people and cultures, but it's a necessary step given the state of the world. As we explore these options, we need to understand the need for diverse approaches that accommodate individual preferences and foster positive, lasting changes.

There is a diverse array of solutions available to reduce meat intake, and each option offers a unique avenue for individuals to align their eating habits with values of compassion, environmental sustainability, and health consciousness. In the table below, we have offered some accommodating approaches to reducing meat intake.

<b>Accommodating Approaches to Reducing Meat Consumption</b>	
Flexitarianism	Encourages people to eat primarily plant-based foods while allowing for occasional consumption of meat and other animal products.
Pescetarianism	Incorporates some seafood (fish or shellfish) into an otherwise vegetarian diet.
Reducitarianism	The conscious reduction of consumption of meat and other animal products without completely eliminating them from the diet.
Part-Time Veganism	Also known as a “flexible vegan” or “weekday vegan,” this diet follows a vegan diet for most meals but allows for some flexibility, incorporating animal products occasionally.
Plant-Based Before 6	Prioritizes plant-based foods earlier in the day and gives some flexibility in the evening, when a wider range of foods—including meat, dairy, and animal products—can be consumed.
Occasional Meat Eating	Allows for the consumption of meat. Occasional meat eaters may choose to incorporate meat into their meals only on specific occasions or when personal preferences dictate.
Meatless Weekdays	Dedicates certain weekdays exclusively to plant-based eating, omitting any meat or animal products from meals during those days.
Cyclical Plant-Based Eating	A dietary approach that alternates periods of strict adherence to a plant-based diet with the incorporation of a more flexible omnivorous eating pattern.



Mindful Eating	Fosters a more conscious and intentional approach to eating and encourages people to be more aware of their food choices. The awareness can extend to the consideration of the ethical, environmental, and health implications of eating meat.
Seasonal Eating	Emphasizes the consumption of foods that are harvested during a particular season of the year. This practice aligns with the natural growing cycles of various fruits, vegetables, and other crops.

Another set of creative approaches to reducing meat consumption involves reimagining its role in our meals. Some people only use meat as a flavor enhancer rather than the main course. Others replace red meat with more sustainable alternatives. No matter which alternative you opt for, all of them showcase the adaptability and creativity in reshaping our dietary habits with a well-being that is sustainable.



Source: <https://pixabay.com/photos/vegetable-skewer-paprika-tomato-3317060/>



<b>Creative Approaches</b>	
Replace red meat with more sustainable alternatives	Involves replacing traditional red meat with alternative protein sources that are more environmentally friendly. Plant-based alternatives like tofu, tempeh, legumes, and meat substitutes made from plants are great choices.
Use meat only as flavor enhancer	In this approach, smaller amounts of meat are used to infuse the meal with a savory taste, which allows you to avoid large portions. This reduces overall meat consumption and allows consumers to appreciate the taste of meat while emphasizing other flavorful and nutritious ingredients.
Opting for smaller portions and mixed dishes	This strategy focuses on moderating meat consumption by choosing smaller portions and incorporating a variety of ingredients into mixed dishes. Options for diverse ingredients include vegetables, grains, and legumes.

Besides the approaches mentioned above, some dietary options are less flexible but can have health and environmental benefits as well.




<b>Trending Dietary Approaches</b>	
Vegan	Excludes all animal products, including meat, dairy, eggs, and honey. It primarily consists of plant-based foods such as fruits, vegetables, grains, legumes, nuts, and seeds. Veganism extends beyond diet, encompassing a lifestyle that avoids the use of animal-derived products in various aspects.


Vegetarian	Vegetarianism excludes meat but may include animal products (dairy & eggs). Variations include <i>lacto-vegetarian</i> (includes dairy), <i>ovo-vegetarian</i> (includes eggs), and <i>lacto-ovo vegetarian</i> (includes eggs and dairy).
Pegan	Pegan is a hybrid of paleo and vegan diets, aiming to combine the principles of both. It emphasizes whole, nutrient-dense foods, including vegetables, fruits, nuts, seeds, and lean proteins. 75% of the diet is made up of vegetables and fruit, less than 25% remains for animal-based proteins.
Keto	The ketogenic (keto) diet is a low-carbohydrate, high-fat diet designed to induce a state of ketosis in the body. It involves significant reduction of carbohydrates, an increase in fats, and a moderate intake of protein. The goal is to shift the body's primary fuel source from glucose to ketones.
Bulletproof Diet	A very low-carb Paleolithic diet that emphasizes saturated fats. This diet restricts gluten, sugar, grains, and legumes and nearly eliminates fruits because of high sugar content. This Diet recommends adhering to the keto diet for five or six days a week, then eating more carbs the rest of the week.
Dash Diet	To control blood pressure and promote healthy eating, this diet emphasizes fruits, vegetables, whole grains, and low-fat dairy and includes lean meats, nuts, beans, and vegetable oils. It limits foods high in saturated fat, salt & added sugar.

## Fasting

<b>Fasting</b>	
Intermittent Fasting	<p>Involves cycling between periods of eating and fasting. Offers flexibility to individuals based on their preferences and lifestyle. Some of the most popular methods include:</p> <ul style="list-style-type: none"> <li>- 16/8: 16 hours fasting, 8 hours of eating</li> <li>- 5/2: Eating normally for 5 days and significantly reducing calories for 2 non-consecutive days</li> </ul>
Alternate-Day Fasting	<p>Involves alternating between days of unrestricted eating and days of significant calorie restriction or fasting. On fasting days, people typically consume few calories or no food at all, while on non-fasting days, they eat normally.</p>
Every Other Day Eating (EOD)	<p>Alternates a day of eating with a day fasting, which allows for a more flexible approach to caloric restriction. On fasting days, individuals may consume a limited number of calories (e.g., 500 to 600 calories), while on non-fasting days, they eat without restrictions.</p>
Weekly 24-Hour Fast	<p>Involves fasting for a full 24-hour period once or twice a week, typically from dinner one day to dinner the next day. During the fasting period, individuals abstain from consuming any calories, although they may drink water, tea, or other non-caloric beverages.</p>

<p>Circadian Fasting</p>	<p>Ensures your time-restricted feeding lines up with your body's internal clock. It involves timing your meals with the rise and fall of the sun and eating larger meals earlier in the day and fasting during the evening, when your digestion may not be as active.</p>
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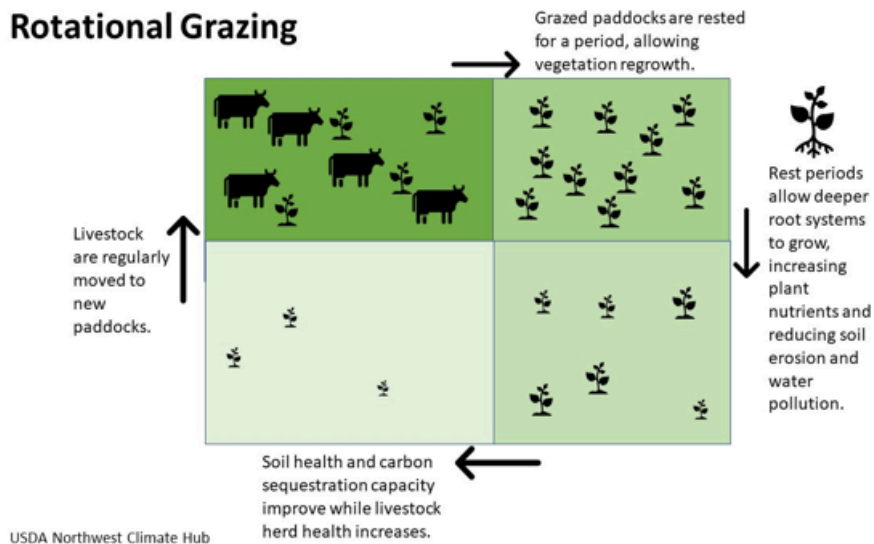
<p><b>Practical Guide to Serving Size</b></p>	
<p>Meat</p>  <p><b>Meat protein</b></p> <p><a href="https://feelfreshnutrition.com/blog/2021/12/16/serving-sizes-the-secret-is-in-the-palm-of-your-hand">https://feelfreshnutrition.com/blog/2021/12/16/serving-sizes-the-secret-is-in-the-palm-of-your-hand</a></p>	<p>A great measure for a portion of meat protein—such as beef, lamb, pork, or chicken—is the size of the palm of your hand. You can also use the thickness of your hand as well. Meat is a great source of B vitamins, iron, and zinc—all very important to the healthy functioning of our bodies.</p>
<p>Fish</p>  <p><b>White fish vs. Oily fish</b></p> <p><a href="https://feelfreshnutrition.com/blog/2021/12/16/serving-sizes-the-secret-is-in-the-palm-of-your-hand">https://feelfreshnutrition.com/blog/2021/12/16/serving-sizes-the-secret-is-in-the-palm-of-your-hand</a></p>	<p>A serving of white fish should equal your whole hand because white fish is less dense and lower in calories than oily fish.</p> <p>Oily fish like salmon and sardines are higher in calories due to their beneficial omega-3 fat content, DHA, and EPA, all of which support brain and heart health. For fatty fish, the recommended serving size is around 100 g (rather than 140 g for white fish), so a portion of fatty fish is closer to a large palm.</p>
<p>Carbohydrates</p>  <p><b>Carbohydrates</b></p> <p><small>This isnt some kind of anti-establishment image. just an easy guide on carb portion sizes.</small></p> <p><a href="https://feelfreshnutrition.com/blog/2021/12/16/serving-sizes-the-secret-is-in-the-palm-of-your-hand">https://feelfreshnutrition.com/blog/2021/12/16/serving-sizes-the-secret-is-in-the-palm-of-your-hand</a></p>	<p>A clenched fist is the ideal portion size for starchy carbohydrates like potatoes, sweet potatoes, rice, quinoa, pasta, or whole grain bread, which provide a sustained release of energy, keeping you fueled throughout the day. It's important to differentiate between starchy carbohydrates and refined carbohydrates like white bread, white sugar, and baked goods, which provide a quick burst of energy followed by a crash. Starchy carbohydrates help your body maintain energy levels for longer periods.</p>

<p><b>Dietary Fats</b></p>  <p><b>Dietary fats</b> Fats - 2 x your thumb is a good measure for fat at each meal.</p> <p><a href="https://feelfreshnutrition.com/blog/2021/12/16/serving-sizes-the-secret-is-in-the-palm-of-your-hand">https://feelfreshnutrition.com/blog/2021/12/16/serving-sizes-the-secret-is-in-the-palm-of-your-hand</a></p>	<p>Using your thumb as a guide, you can estimate the appropriate portion of fats for each meal. This category encompasses heart-healthy unsaturated fats such as nuts, avocado, seeds, hummus, and olive oil, along with saturated fats like butter and cheese, which should be consumed sparingly. It's important to be mindful that fats are highly calorie-dense compared to other macronutrients, so even small amounts can significantly increase calorie intake.</p>
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### Sustainable Farming

Sustainable farming encompasses a diverse range of practices aimed at mitigating environmental impact while ensuring agricultural productivity. Rotational grazing and manure management are sustainable practices that offer solutions to farming's environmental impacts. In conjunction with the alternatives mentioned in the challenges and opportunities section, rotational grazing and manure management are also viable solutions to the negative impacts of livestock farming. These solutions are integral components of the broader spectrum of sustainable alternatives, addressing challenges such as soil degradation, water pollution, and biodiversity loss.

#### Rotational Grazing



Source: <https://www.climatehubs.usda.gov/hubs/international/topic/rotational-grazing-climate-resilience>



Switching to sustainable farming is crucial for transforming the meat and dairy industry. As environmental and ethical concerns increase, sustainable practices offer a holistic solution. This shift prioritizes eco-friendly methods, reducing the industry's environmental footprint and promoting animal well-being.

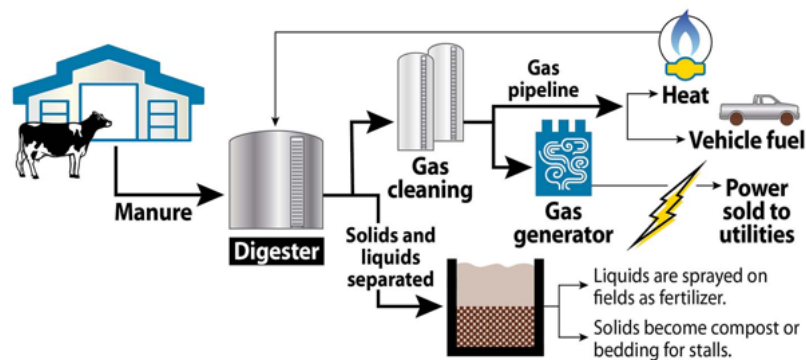
Rotational grazing is a sustainable and strategic approach to managing livestock, particularly in pasture-based systems. Instead of allowing animals continuous access to a large pasture, rotational grazing involves dividing the pasture into smaller sections or paddocks. Livestock are systematically rotated through these paddocks, allowing them to graze in one area while the others undergo rest and regrowth. The primary goal is to mimic natural grazing patterns, promoting healthier pastures, improving forage use, and enhancing animal welfare.

This method offers several benefits, including preventing overgrazing, minimizing soil compaction, and optimizing forage quality. By giving pastures periods of rest, rotational grazing encourages the growth of diverse and nutritious forage, supporting a more balanced diet for the livestock. Additionally, it contributes to soil health, water retention, and overall ecosystem resilience. Rotational grazing is widely recognized for its sustainable and regenerative practices, aligning with the principles of agroecology and promoting the long-term health of both livestock and the land.

Two impactful approaches within sustainable farming include multi-paddock grazing, where cattle rotate through small-fenced areas across a ranch, and the integration of livestock into crop rotations. In the latter, animals such as cattle play a role in managing cover crops during winter, reducing reliance on synthetic fertilizers. These practices not only enhance soil health but also exemplify sustainable alternatives, contributing to the overall transformation of the meat and dairy industry.

## Solutions to Manure Management

The dairy industry has found significant benefits through the adoption of *anaerobic methane digesters*. In this innovative process, dairy farms collect manure and deposit it into domed, rubber-lined ponds adjacent to the barns, effectively capturing methane emissions. This captured methane serves a dual purpose: powering the farm's electricity needs or returning to the power grid. Farms on which this method is used turn GHG-negative as they use methane instead of fossil fuels for their energy requirements.



Solid-liquid separation system

Source: <https://www.findfamcredit.com/landscapes-articles/methane-digesters->

Solid-liquid separation, in contrast, is a valuable manure management technique that entails segregating the solid and liquid components of manure, which offers significant environmental and agricultural advantages. In this process, manure undergoes a process that separates solids from liquids. The separated solids can be further processed for applications like bedding material or compost. The liquid portion, which is known as effluent, contains diminished nutrient concentrations, and it can be applied to crops, diminishing the risk of nutrient runoff and minimizing environmental impacts. Solid-liquid separation not only improves nutrient management and alleviates odor issues but also fosters sustainable agricultural practices by enabling a more precise application of nutrients, thereby reducing the overall environmental footprint associated with manure handling.

## **Manure Management Successful Stories**



Anaerobic digesters for manure management in Vermont

Source: <https://www.waste360.com/anaerobic-digestion/vermont-based-farmers-host-large-ad-operation-supplying-neighboring-college-with-renewable-natural-gas>

### **Renewable Energy from Dairy Farms: Anaerobic Digestion in Vermont**

Manure management is crucial for sustainable agriculture, and successful stories highlight innovative solutions that address environmental concerns while generating valuable resources. From anaerobic digestion systems to composting initiatives, these examples showcase the positive outcomes of effective waste management practices in modern farming.

In Vermont, several dairy farms have implemented anaerobic digestion systems to manage manure effectively while generating renewable energy. For instance, the Goodrich Family Farm in Salisbury operates an anaerobic digester that processes cow manure, food waste, and brewery waste to produce biogas, which is then used to generate electricity and heat. This system not only reduces methane emissions from manure but also provides sustainable energy for the farm and surrounding community, demonstrating the potential for integrated waste management and renewable energy production.

### ***Nutrient Recovery in Poultry Farming: Innovations from the Netherlands***

In the Netherlands, meanwhile, poultry farms have adopted innovative nutrient recovery technologies to manage manure and extract valuable nutrients for agricultural use. For example, the company Manure Company Holland developed a system called Nijhuis Ammonia Recovery (NAR), which separates ammonia from poultry manure and converts it into ammonium sulfate fertilizer. By recovering ammonia, the system reduces nitrogen emissions from manure and produces a high-quality fertilizer that can be used to enrich soil fertility. This approach not only mitigates environmental pollution but also contributes to sustainable agricultural practices by closing nutrient loops and minimizing the need for synthetic fertilizers.

### **Marin Carbon Project**

Marine carbon projects, much like the success stories in manure management, exemplify innovative strategies to mitigate environmental impacts and enhance sustainability. In manure management, techniques such as anaerobic digestion and composting have transformed waste into valuable resources, reducing methane emissions and producing renewable energy. Similarly, marine carbon projects aim to leverage natural processes for environmental benefit. For example, the restoration of mangroves, seagrasses, and salt marshes—often termed "blue carbon" initiatives—has proven highly effective in sequestering carbon dioxide, akin to how improved manure management practices capture and repurpose greenhouse gasses. These coastal ecosystems not only absorb CO<sub>2</sub> but also protect shorelines and support biodiversity. Both fields highlight the potential for human ingenuity to harness nature's capabilities in addressing climate change, emphasizing conservation, restoration, and sustainable management practices as critical components of global carbon mitigation efforts.

## Conclusions

Eating less meat offers numerous advantages for people, the environment, and animals. Understanding these various aspects can empower people to make more conscious dietary choices. Embracing a diet with reduced meat consumption requires a mindful approach that emphasizes moderation, awareness, and sustainable decision-making.

There are diverse approaches available for individuals seeking to reduce their meat intake. Some options offer flexibility, allowing for moderate meat consumption, while others advocate for the elimination of meat or the incorporation of periods of fasting. Each approach can be tailored to fit any lifestyle or specific dietary needs, offering long-term benefits for both human health and the environment.

That said, cattle do offer some environmental benefits, including carbon sequestration, which involves capturing and storing carbon dioxide from the atmosphere in soil and vegetation, helping to mitigate climate change. Additionally, upcycling in farming refers to the remarkable ability of cattle to transform inedible plants into various valuable products or resources, reducing waste and promoting resource efficiency.

Sustainable farming practices such as effective manure management and rotational grazing can further enhance the sustainability of the food system. By implementing effective manure management techniques like composting or anaerobic digestion, farmers can reduce methane emissions and nutrient runoff, leading to improved air and water quality. By rotating livestock through different paddocks, farmers can prevent overgrazing, minimize soil erosion, and enhance carbon sequestration in the soil. This helps mitigate climate change and the negative impacts of agriculture on surrounding ecosystems.



## Research

You can learn more about cow burps here:

<https://www.greenbiz.com/article/beyond-burps-4-ways-cows-have-positive-impact>

<https://tammi.tamu.edu/2018/03/05/solid-liquid-separation-animal-manure-wastewater/>

Here's an article about the evolution of diets:

<https://www.nationalgeographic.com/foodfeatures/evolution-of-diet/#:~:text=By%20starting%20to%20eat%20calorie,to%20have%20much%20smaller%20guts.>

Read about the benefits of cattle upcycling here:

<https://www.beefitswhatsfordinner.com/raising-beef/upcycling#:~:text=When%20cattle%20graze%20their%20ruminant,consumption%20%E2%80%93%20a%20process%20called%20up%20cycling.>

This article is about manure management:

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