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## Vegetarianism

Mylan Engel Jr.  
Northern Illinois University, DeKalb, IL, USA

### Abstract

Ethical vegetarians maintain that vegetarianism is morally required. The principal reasons offered in support of ethical vegetarianism are (i) concern for the welfare and well-being of the animals being eaten, (ii) concern for the environment, (iii) concern over global food scarcity and the just distribution of resources, and (iv) concern for future generations. Each of these reasons is explored in turn, starting with a historical look at ethical vegetarianism and the moral status of animals.

### Keywords

Vegetarianism; Animal ethics; Moral status; Environmentalism; Hunger; Food security; Global justice; Future generations

### Introduction

Vegetarians refrain from eating animals. Ethical vegetarians refrain from eating animals for moral

reasons. This entry explores both the non-anthropocentric and anthropocentric moral reasons for vegetarianism. The principal non-anthropocentric reason for ethical vegetarianism is direct moral concern for the welfare and well-being of the animals being eaten. The principal anthropocentric reasons for vegetarianism are (i) concern for the environment, (ii) concern over global food scarcity and the just distribution of resources, and (iii) concern for future generations. The entry begins with a brief historical look at ethical vegetarianism and the moral status of animals.

### Ethical Vegetarianism: A Historical Overview

Ethical vegetarianism has a rich history dating back more than 2,500 years. Pythagoras (ca. 570–490 BCE) is one of the earliest known and most prominent proponents of vegetarianism. From what we know of his teachings as spelled out by Ovid, Pythagoras offered at least four moral reasons for refraining from eating meat. First, he maintained that eating meat requires the unnecessary killing of animals, since nature provides bountiful plant-based alternatives that “require no bloodshed and no slaughter” (Walters and Portmess 1999, p. 16). Second, he insisted that killing animals dehumanizes humans: “Oh, what a wicked thing it is for flesh to be the tomb of flesh, . . . Must you destroy

another to satiate your greedy-gutted cravings?” (Walters and Portmess 1999, p. 17). Third, he thought it wrong to kill animals for food, because they have done nothing to deserve it (Walters and Portmess 1999, pp. 17–18). Finally, because he believed that human souls transmigrate into nonhuman animals, Pythagoras condemned eating meat on the grounds that doing so might involve the murder of kindred souls: “So I warn you, lest appetite murder brotherhood, I warn you by all the priesthood in me, do not exile what may be kindred souls by evil slaughter. Blood should not nourish blood” (Walters and Portmess 1999, p. 19).

Plutarch of Chaeronea (ca. 56–120 CE) argued that humans are not naturally carnivorous (Walters and Portmess 1999, p. 29). He also argued that animals are intrinsically valuable and deserve moral consideration in their own right because they are sentient, intelligent creatures and, thus, should not be killed and eaten (Walters and Portmess 1999, p. 32). Porphyry (ca. 232–304 CE) held that justice requires that we do no harm to any being capable of being harmed, and since animals can be harmed, the *do no harm* principle must be extended to every animated being (Walters and Portmess 1999, pp. 44–45).

Aristotle (384–322 BCE) had quite a different view of our moral relationship with animals. He maintained that every being that exists has a *telos*, i.e., an ultimate purpose for existing. Aristotle held that the purpose of the superior is to rule over the inferior and the purpose of the inferior is to serve the superior. He also held that the rational is superior to the irrational. Because he regarded animals as inferior irrational beings, Aristotle concluded that the purpose of animals is to serve the needs of rational man: tame animals serve as food and as beasts of burden, and wild animals serve as food and provide clothing and instruments (Regan and Singer 1989, pp. 6–7).

Aquinas (1225–1274) echoed Aristotle in insisting that rationality is what makes a being worthy of moral consideration and respect. He maintained that only rational creatures are free and autonomous, and only free and autonomous creatures have *intrinsic value*, i.e., value in and of themselves. Animals, being irrational creatures,

have only *instrumental value*, i.e., they have value only to the extent that they are of use for rational creatures. Kant (1724–1804), too, followed Aristotle in embracing the *rationality criterion* of moral considerability. For Kant, animals are not rational members of the kingdom of ends, and so, the categorical imperative does not apply to them. Like Aquinas, Kant concluded that animals only have instrumental value; they are not ends in themselves but rather, mere means to an end – that end being man.

Descartes (1596–1650) took linguistic ability to be the mark of mentality. Because he held that all nonhuman animals are incapable of using language, Descartes concluded that all nonhuman animals are mindless machines – mere *automata* devoid of thought and reason. When coupled with the rationality criterion of moral considerability, the Cartesian view of animals implies that animals are bereft of morally significant interests. Historically, Aristotelianism and Cartesianism helped shape Western attitudes regarding the treatment of animals, including killing them for food, for if animals are devoid of morally significant interests, then killing them and eating them does not violate their interests.

But not all modern philosophers were persuaded by the Aristotelian/Cartesian view of animals. Voltaire (1694–1778) appealed to neurophysiological evidence to challenge Descartes’s claim that linguistic ability provides the only compelling evidence of mentality: “has nature arranged all the means of feeling in this animal, so that it may not feel? Has it nerves in order to be impassible? Do not suppose this impertinent contradiction in nature” (Regan and Singer 1989, p. 21). Voltaire also argued that animal behavior – such as nervous pacing or jumping for joy – often provides us with excellent evidence of an animal’s current mental states. David Hume (1711–1776) also rejected Cartesianism with respect to animals. He insisted that no truth is more evident than that animals are endowed with thought and reason. Hume also thought it obvious that animals are not only capable of experiencing pain and pleasure but also capable of experiencing fear, anger, courage, and other emotions.

Jeremy Bentham (1748–1832) argued that animals deserve direct moral consideration. He rejected the rationality criterion of moral considerability, insisting that when it comes to the moral status of animals, the relevant question “is not, Can they *reason*? nor Can they *talk*? but, Can they *suffer*?” (Regan and Singer 1989, p. 26). Like Bentham, Henry Salt (1851–1939) also thought that the capacity to suffer is what makes a being worthy of moral consideration. Because animals are capable of suffering, Salt thought it morally unjustifiable to cause them unnecessary pain. He also thought it wrong to kill animals unnecessarily. Since we can meet all of our nutritional needs with a vegetarian diet, Salt argued that it is wrong “to breed and kill animals for merely culinary purposes” (1886, p. 10).

Many of these historical themes repeat themselves in the contemporary debate over ethical vegetarianism: What property or feature makes a being worthy of moral consideration? Which beings deserve moral consideration, and how much consideration are they owed? Are we justified in killing animals for food, when equally nutritious plant-based foods are readily available? Contemporary answers to these questions are addressed in what follows.

### Setting the Stage for the Contemporary Debate

Three factors play a critical role in the contemporary case for ethical vegetarianism. The first concerns *sentience*, i.e., the capacity to suffer and/or experience pleasure or happiness. There is growing scientific and philosophical consensus that many animals – certainly all vertebrates – are conscious, sentient creatures that can feel pain and can suffer. The evidence for animal sentience parallels the evidence we have for thinking our fellow humans are capable of feeling pain:

- Animals manifest pain behavior, not just reflex actions to noxious stimuli (protective pain) but subsequent pain-induced behavioral modification caused by bodily damage (restorative pain).

- We observe significant anatomical and neurophysiological similarity between humans and many animals (including all mammals and most vertebrates).
- Efferent and afferent nerves run throughout their bodies, including myelinated A-delta fibers (the kind of fibers responsible for acute “protective pain” in humans) and unmyelinated C fibers (the kind of fibers responsible for “restorative pain” in humans).
- Endogenous serotonergic and opioid pain-control mechanisms are present in mammals, birds, and fish. [Why would organisms incapable of feeling pain have endogenous pain-control systems?]
- Analgesics and anesthetics cause animals to stop exhibiting pain behavior, presumably because these substances prevent the pain itself in much the way they prevent pain in humans.
- There is compelling experimental evidence that the capacity to feel pain enhances survival value in animals, based on the self-destructive tendencies displayed by animals that have been surgically deafferented.

In short, there is overwhelming evidence that mammals, birds, and fish can feel morally significant pain.

Second, despite the scientific, philosophical, and commonsense awareness that animals are conscious, sentient beings in their own right, farmed animals are regarded as commodities and are treated as if they were mere “production units” devoid of morally significant interests. The process of converting conscious, sentient animals into meat begins by forcibly impregnating female cows, pigs, chickens, turkeys, ducks, emus, and sheep. The resulting offspring are then typically housed intensively in inhospitable, massively overcrowded warehouses or sheds for the duration of their lives. For example, chickens are warehoused in sheds containing up to 100,000 birds, where each bird is only allotted seven-tenths of a square foot of floor space. Since the animals cannot move about freely in these overcrowded conditions, they are forced to stand in their waste. The noxious ammonia

fumes from the urine cause chronic lung and eye irritation. In these unnatural conditions, the animals are prevented from satisfying even their most basic instinctual urges (e.g., to nurse, stretch, move around, root, groom, build nests, rut, establish social orders, select mates, etc.), which causes severe stress in the animals. The stress, in turn, increases aggression. To prevent losses from aggression, the animals receive preemptive mutilations. For example, to prevent chickens and turkeys from pecking each other to death, the birds are “debeaked” using a scalding hot blade that slices through the highly sensitive horn of the beak. Other routine mutilations include toe removal, tail docking, branding, dehorning, ear tagging, ear clipping, teeth pulling, and castration – all performed *without* anesthesia. *Unanesthetized* branding, dehorning, ear tagging, ear clipping, and castration are standard procedures on small-scale family farms, as well. The final stage in the “meat production” process is slaughter. Some animals meet with on-site slaughter, but most are shipped to slaughterhouses without food or water and without adequate protection from the elements. At the slaughterhouse, the animals are hung upside down and are brought via conveyor to the slaughterer who slits their throats. In many cases (and all “ritual kill” cases), the animals are fully conscious throughout the entire ordeal (Engel 2000, pp. 861–865). Worldwide, over 60 billion land animals are slaughtered for food each year. No other human activity results in more pain, suffering, frustration, and premature death than animal agriculture.

Third, there is no nutritional need to eat meat. This fact should be obvious from the number of vegetarians worldwide. According to some estimates, there are 375 million vegetarians worldwide. According to other estimates, there are 400–500 million vegetarians in India alone. Even with the lowest estimates, there are hundreds of millions of perfectly healthy vegetarians worldwide. There is also scientific consensus on the healthfulness of meat-free vegetarian diets. In their joint position paper on vegetarian diets, the American Dietetic Association and the Dietitians of Canada maintain that appropriately planned

vegetarian diets are “healthful, nutritionally adequate, and provide health benefits in the prevention and treatment of certain diseases” and are “appropriate for all stages of the life cycle, including during pregnancy, lactation, infancy, childhood, and adolescence” (Mangels et al. 2003, p. 748). The health benefits of vegetarian diets are also highlighted in USDA’s *Dietary Guidelines for Americans, 2010*: “In prospective studies of adults, compared to non-vegetarian eating patterns, vegetarian-style eating patterns have been associated with improved health outcomes – lower levels of obesity, a reduced risk of cardiovascular disease, and lower total mortality.” It is easy to eat a well-balanced, nutritionally complete vegetarian diet. No special food combining is necessary. All one needs to do is eat sufficient calories centered around the following four food groups: whole grains (5+ servings/day), vegetables (3+ servings/day), fruits (3+ servings/day), and legumes (2+ servings/day). Anyone who eats the recommended daily servings of these four food groups will be eating a nutritionally sound plant-based diet (though vegans, who consume 100 % plant-based diets, should include a reliable source of B12 in their diets). Far from being risky, such a diet reduces one’s risk of heart disease, cancer, stroke, hypertension, obesity, and diabetes (Mangels et al. 2003, p. 748).

### **Ethical Vegetarianism and Consideration for Animals**

The question at the heart of the ethical debate over vegetarianism is this: Are we justified in raising and killing animals for food, when equally nutritious plant-based food is readily available? Ethical vegetarians argue that the answer to this question is “no.” This section will explore three such arguments: (i) the utilitarian argument, (ii) the deontological rights-based argument, and (iii) the argument from moral consistency. The next section “[Ethical Vegetarianism, Environmental Sustainability, and Global Justice](#)” will explore three interrelated anthropocentric reasons for ethical vegetarianism.

## The Utilitarian Argument for Ethical Vegetarianism

Peter Singer (1975, 2011) defends ethical vegetarianism on preference utilitarian grounds. Properly understood, *preference utilitarianism* combines a principle of equality with a principle of utility maximization. The principle of equality requires us to give *equal consideration* to the interests of every being having interests, regardless of race, gender, or species. The utility maximization principle requires us to act in ways that maximize the satisfaction of interests of all those affected by our behavior.

Singer argues that *sentience* is both necessary and sufficient for possessing interests. It would be nonsense to say that a rock has an interest in not being kicked down the street. Rocks lack interests because they cannot suffer or experience pleasure. However, a cat does have an interest in not being kicked down the street, because she would suffer if kicked down the street. Since any sentient being has an interest in avoiding suffering, sentience is sufficient for possessing interests. Consequently, the principle of equality must be understood as applying to all sentient beings: we must give *equal weight* to the like interests of all sentient beings when carrying out our utilitarian calculations. Giving animals equal consideration does not imply that we must treat all animals alike, but it does require that we give their pleasures and pains equal weight with human pleasures and pains when carrying out our utilitarian calculations. Failure to deliberate in this way is *speciesism*, a baseless form of discrimination akin to racism and sexism.

Since the principle of equality requires us to factor animals' interests into our utilitarian calculations in an impartial way, a compelling utilitarian case can be made for ethical vegetarianism. According to preference utilitarianism, an action is right for a person just in case, *out of all the actions available to that person*, that action maximizes the satisfaction of interests of all those affected by the action (i.e., just in case no other action produces more *net* interest satisfaction). We know that meat production, by its very nature, involves harming animals, causing them to suffer, and killing them prematurely. Since animals' interests are affected by our dietary choices, we

must factor their suffering into our utilitarian calculations. Is all of the pain that farmed animals suffer outweighed by some greater gain that could not be achieved in any other way? Eating meat is not necessary for survival or good health. What about pleasure? People do enjoy the taste of meat and get pleasure from eating it. Does human gustatory pleasure justify raising and killing animals for food? Singer offers three compelling reasons to think not. First, on any candid appraisal, it is extremely doubtful that the fleeting pleasure humans get from eating meat outweighs all of the pain, suffering, and misery farmed animals experience in the process of becoming that meat. Second, in rearing and killing animals for food, we are sacrificing their most significant interests (i.e., their interests in avoiding pain, in moving about freely, in living lives appropriate to their kind, etc.) in order to satisfy trivial interests of our own (i.e., our desire for particular taste sensations), and the principle of equality requires that we give significant interests greater weight than trivial ones. Third, were we to grant, for the sake of argument, that the gustatory pleasure people get from eating meat does outweigh the pain, suffering, and misery farmed animals endure in becoming that meat, it still wouldn't follow on utilitarian grounds that eating meat is permissible; for utilitarianism requires us to consider *all* available actions, and one action available to us at mealtimes is to eat a cruelty-free meatless meal that we enjoy just as much. Since eating delicious plant-based foods can satisfy our interest in "tasty" nutritious meals without requiring farmed animals to suffer, utilitarianism entails that vegetarianism is morally required.

## The Rights-Based Argument for Ethical Vegetarianism

Tom Regan (1983) argues that animals have moral rights and that raising and killing them for food violates their rights. He begins his defense of animal rights by arguing that *the rights view* provides a better account of our moral duties to our fellow humans than other prominent approaches to ethics. Regan rejects utilitarianism on the grounds that it sanctions sacrificing individuals for trivial gains in utility. He rejects

contractarianism since it entails that we have no direct duties to those cognitively impaired humans who are incapable of understanding the social contract. Unlike these other views, the rights view maintains that all human beings are *equally valuable* in and of themselves. Because all humans are equally inherently valuable, Regan argues, they have an equal moral right to be treated in ways that respect their value.

Why are all humans equally inherently valuable? Regan's answer is that they are all *experiencing subjects of a life* – i.e., conscious beings with experiential welfares that matter to them. Since human infants, senile humans, and mentally deficient humans are equally experiencing subjects of a life, they have equal inherent value and the same right to respectful treatment as all other human beings.

Regan next observes that humans aren't the only animals who are subjects of a life. Since many nonhuman animals are also subjects of a life, Regan concludes that they too have equal inherent value and the same right to respectful treatment as humans – they cannot be used as a mere means to our ends. When we raise and kill animals for food, we treat inherently valuable beings in ways that reduce them to the status of “things.” In doing so, we fail to respect their inherent value, we violate their rights, and we act immorally, as a result. Because animal agriculture systematically violates the rights of animals, the rights view calls for the total dissolution of animal agriculture.

Regan argues that vegetarianism is morally obligatory. But how, exactly, does one move from the wrongness of animal agriculture to the wrongness of eating meat? After all, a dead piece of meat in the grocery store is not a subject of a life and thus does not have rights. So, why is purchasing and eating that meat wrong on the rights view? According to the rights view, it is categorically wrong to purchase the products of an unjust industry. Any practice or institution that systematically violates rights by treating inherently valuable beings as mere things to be consumed is inherently *unjust*. Because the meat industry systematically violates the rights of farmed animals by treating them as mere things

to be killed for food and profit, the meat industry is an inherently unjust institution. Since it is categorically wrong to purchase the products of an unjust industry, it is categorically wrong to purchase and consume meat. Consequently, vegetarianism is morally required.

### Objections to Singer's and Regan's Defenses of Vegetarianism

Both Singer and Regan predicate their arguments for ethical vegetarianism on the *equal considerability* premise:

(EC) Animals deserve *exactly the same degree of* moral consideration as that owed humans and/or have rights *equal in strength* to the rights of humans.

Critics typically respond to Singer's and Regan's arguments by dismissing the underlying normative theories (i.e., utilitarianism and the rights view, respectively) on which their arguments are based and by rejecting the equal considerability premise. For example, Carl Cohen (2001) rejects Regan's rights view and, by implication, (EC). Cohen insists that all and only those beings with the *capacity for moral autonomy* have rights (2001, p. 36). Because humans have this capacity, they have rights. Because animals lack the capacity for moral autonomy, they lack rights, and if they lack rights, they ipso facto lack rights *equal in strength* to the rights of humans. If animals lack rights, as Cohen insists, then killing them for food obviously does not violate their rights. Regan and others have responded to Cohen's criticism by noting that many humans lack the capacity for free moral judgment, and yet, we still think these humans have moral rights equal in strength to the rights of autonomous humans. If our pre-theoretical intuition that nonautonomous humans have moral rights is correct, then contra Cohen, the capacity for moral autonomy is not a necessary condition for possessing moral rights.

Peter Carruthers takes a similar tack when criticizing Singer's utilitarian argument for vegetarianism. He finds both utilitarianism and the

equal considerability premise underlying it to be unacceptable. As for utilitarianism, he asks us to imagine stumbling upon a burning building containing 100 healthy dogs in cages and 1 old friendless man. We only have time either to flip the electronic switch that frees all the dogs from their cages simultaneously or to pull out the old man, but not both. Suppose, moreover, we know saving the dogs would maximize interest satisfaction. In such a situation, utilitarianism requires us to save the dogs rather than the old man. Carruthers finds this result “morally outrageous” (1992, pp. 95–96).

Carruthers finds (EC) equally unacceptable. He takes (EC) to imply that killing an animal is just as morally serious as killing a human. Accepting that implication would force us to regard practices, like animal agriculture, which involve the regular slaughter of animals, as being as morally reprehensible as the Nazi holocaust, in which case any form of opposition, no matter how violent, e.g., bombing farmers’ homes, would be fully justified (Carruthers 1992, p. 96). Carruthers finds these implications “morally abhorrent” (1992, p. 96).

It is not clear how effective or how fair Carruthers’s criticisms are. First, Singer denies that the equal considerability premise entails that all lives are equally valuable. He argues at length that the killing of a person (i.e., a self-aware, autonomous individual with a sense of the future) is more seriously wrong than the killing of a merely sentient animal. Singer is not endorsing a form of speciesism here, for not all humans are persons and some nonhumans (e.g., chimpanzees, bonobos, gorillas, and orangutans) are persons, on his view. So, Singer’s view does not imply that factory farming is the moral equivalent of the Nazi holocaust, though other authors, quite independent of Singer, have made such comparisons.

Regarding Carruthers’s charge that utilitarianism’s commitment to (EC) justifies using violence to bring an end to animal exploitation, it is highly unlikely that perpetrating violence on farmers would be an effective means of reducing farmed animal suffering, and if, as is likely, it failed to reduce animal suffering, then such violence would only serve to increase the total

amount of suffering in the world (because of the additional human suffering it produced), which is antithetical to utilitarianism.

There are, then, compelling reasons to think that both Cohen’s and Carruthers’s criticisms miss their marks. Even so, many people intuitively side with Cohen and Carruthers in their rejection of (EC). For present purposes, we can sidestep the question of whether or not (EC) is true, because many arguments for ethical vegetarianism do not presuppose (EC). The next section will explore such an argument.

### **Ethical Vegetarianism and Moral Consistency**

A number of philosophers (Curnutt 1997; Engel 2000, 2001; DeGrazia 2009) have sought to reduce the argument for ethical vegetarianism to its simplest form. Starting with three common-sense moral principles that we all accept, these philosophers force us to examine the logical and practical implications of our own beliefs. The principles are:

- (P1) It is wrong to harm, or support practices that harm, sentient animals *unnecessarily*.
- (P2) It is wrong to cause, or support practices that cause, sentient animals to suffer *unnecessarily*.
- (P3) It is wrong to kill, or support practices that kill, sentient animals *unnecessarily*.

These principles are not in dispute. Even the staunchest defenders of animal use embrace these commonsense principles. For example, Cohen explicitly endorses (P2) and (P3): “we, as moral agents, have a general obligation to avoid imposing needless pain or death” (2001, p. 226). Carruthers also endorses (P2): “Most people hold that it is wrong to cause animals unnecessary suffering. . . . all will agree that gratuitous suffering – suffering caused for no good reason – is wrong” (1992, p. 8). Principles (P1)–(P3) are so central to our conception of morality that any moral theory that conflicted with them would be rejected as unsatisfactory on reflective equilibrium grounds. Since any adequate moral view must cohere with these

principles, we can appeal to these principles directly when defending ethical vegetarianism.

In the section “[Setting the Stage for the Contemporary Debate](#),” we observed three things:

- (I) Mammals, birds, and fish are sentient beings that can experience morally significant pain.
- (II) There is no way to raise animals for food without harming and killing those animals. Meat production inherently involves harming animals, causing them to suffer, and killing them.
- (III) There is no nutritional need to eat meat.

Given III, all of the harm, suffering, and premature death inflicted on farmed animals is *unnecessary*. It serves no vital human *need*. Given I, II, and III, it follows that when one purchases meat, one is supporting a practice (*viz.*, animal agriculture) that harms sentient animals, causes them to suffer, and kills them *unnecessarily*. Since it is wrong to cause, or support practices that cause, sentient animals unnecessary harm, unnecessary suffering, and/or unnecessary premature death, (P1)–(P3) entail that it is wrong to purchase and consume meat (whenever plant-based food is available, which in modern societies is almost always). Consequently, those of us who accept (P1)–(P3) are rationally committed to the immorality of eating meat, on pain of inconsistency. Thus, our very own beliefs entail that vegetarianism is morally required (Engel 2000, 2001).

Non-anthropocentric concern for animals isn’t the only reason for thinking that vegetarianism is morally required. There are also compelling anthropocentric reasons for thinking vegetarianism obligatory. The next section examines three such reasons.

### **Ethical Vegetarianism, Environmental Sustainability, and Global Justice**

In her groundbreaking book *Diet for a Small Planet* (1971), Francis Moore Lappé defended vegetarianism by demonstrating the nutritional

adequacy of vegetarian diets and by highlighting both the negative impact meat production has on the environment and the role animal agriculture plays in global food scarcity. Lappé’s reasons for vegetarianism remain as salient today as they were in 1971. The present section explores three interrelated reasons for thinking that vegetarianism is morally required: (i) environmental sustainability, (ii) concern over global food scarcity and the just distribution of resources, and (iii) concern for future generations.

### **Animal Agriculture and the Environment**

Animal agriculture is an extremely resource-intensive, environmentally degrading, highly inefficient means of food production. This subsection will focus on animal agriculture’s contribution to water shortage, water pollution, deforestation, loss of biodiversity, and soil erosion. Subsequent subsections will focus on animal agriculture’s waste of nutrients, its impact on climate change, and its impact on humans.

#### **Water Usage**

Meat production consumes vastly more water (per kg and per kcal) than grain and root vegetable production. When measured by weight, meat production requires 100–200 times more water per kg produced than grain and vegetable production. For example, it takes 500 liters of water to grow 1 kg of potatoes and 900 liters of water to grow 1 kg of wheat, but it requires 100,000 liters of water to produce 1 kg of beef (Engel 2000, p. 871). Even when measured by calorie, beef production requires 20 times more water per kcal produced than grain and root vegetable production. Either way you measure it, animal agriculture is extremely inefficient in its water usage, compared to grain and vegetable production. If there were unlimited supplies of fresh water, such water inefficiency might not be a problem, but supplies of fresh water are, indeed, limited. According to the UN, water scarcity already affects every continent on the planet, with 1.2 billion people currently living in areas of physical scarcity. Against this backdrop, it is imperative that humans take effective steps to reduce their water footprint. In light of animal agriculture’s

water inefficiency, switching from a meat-based diet to a vegetarian diet is one of the most significant steps one can take to reduce one's water footprint. Skipping one shower a week reduces one's water footprint by 60 gal per week. Skipping one quarter-pound hamburger reduces one's water footprint by 6,000 gal. For someone currently eating a quarter pound of beef per day, switching to a vegetarian diet would reduce his/her water footprint by 42,000 gal (i.e., 175,000 liters) per week.

#### Water Pollution

Animal agriculture is one of the leading causes of surface-water and groundwater pollution. Raising animals for food generates an enormous amount of hazardous waste in the form of excrement. In the USA, for example, livestock produce 250,000 lb of excrement *per second*, resulting in *one billion tons* of unrecycled waste per year (Engel 2000, p. 872). This waste contains pathogens (including viruses and antibiotic-resistant bacteria), heavy metals, hormones, antibiotics, ammonia, and high levels of nitrogen and phosphorous, which make their way into rivers, lakes, coastal waters, and groundwater as a result of rainfall and irrigation runoff. The excess nitrogen and phosphorous cause river eutrophication (i.e., excess plant growth that causes fish to die from lack of oxygen) and coastal "dead zones." The other pollutants can contaminate drinking water supplies, rendering them unfit for human consumption. A 1995 General Accounting Office Report to the US Senate Committee on Agriculture, Nutrition, and Forestry found that animal waste runoff was responsible for impairing 72 % of rivers and streams, 56 % of lake acres, and 43 % of estuary miles (Engel 2000, p. 872).

#### Deforestation, Loss of Biodiversity, and Soil Erosion

Animal agriculture is also the primary driver of deforestation in South America, as rainforests are being clear-cut at a rate of 80,000 acres per day to make room for new pastureland and/or for new fields in which to plant feed crops. When rainforests are replaced by monocultures, the indigenous animals and plants that depend on

that rainforest ecosystem for nutrients and shelter are driven to extinction through loss of habitat. We are now losing an estimated 50,000 species each year, due to habitat loss and degradation, a rate of extinction 50–500 times greater than the background rate reflected in the fossil record. Ever increasing meat production is the driving force behind this loss of biodiversity.

We are also losing topsoil at an alarming rate – another negative by-product of the livestock industry. Much of arable land around the world is devoted to feed crop production. In the USA, for example, 80 % of the corn and 95 % of the oats grown are fed to livestock. The excessive cultivation needed to produce these crops is responsible for the loss of seven billion tons of topsoil in the USA each year. Nearly one third of the world's arable land has been lost as a result of soil erosion. Currently, the USA is losing topsoil at a rate 13 times faster than the rate of soil formation (Engel 2000, pp. 871–872). Since topsoil is necessary for growing crops for direct human consumption, continued loss of topsoil threatens the survival of our species.

#### Nutrient Inefficiency, Global Hunger, and the Just Distribution of Resources

Each year farmers grow more than enough grain and beans to adequately nourish every human being on the planet, and yet, currently, one out of every nine humans on the planet is suffering from *undernutrition*, a form of malnutrition resulting from insufficient calories and/or lack of essential nutrients. Building on Lappé's insights, the present section explains the role animal agriculture plays in generating global food scarcity.

#### Global Hunger and Starvation

Undernutrition due to lack of sufficient nutrients and calories causes stunting of growth and wasting of bodily tissues and sometimes causes premature death. Worldwide, 795 million people are currently undernourished. In 2011, 165 million children globally experienced stunting and 52 million children experienced wasting as a result of undernutrition. That same year, 3.1 million children under the age of five died due to

undernutrition. While hundreds of millions of humans around the world are suffering from undernutrition and its attendant diseases, no cows on feedlots are undernourished. Instead, they are being fattened on nutrient-rich grains and legumes (viz., corn and soybeans). Those same grains and legumes could be used to adequately nourish all of the nearly 800 million humans suffering from undernutrition, but instead they are fed to cows and steers so that people in affluent nations can eat beef. Since it takes 13 lb of grain to produce one pound of beef, the process of raising grain-fed cattle for food results in a significant net loss of food, calories, and macronutrients.

#### Nutrient Inefficiency

By cycling grain through livestock to produce animal protein, we lose 90 % of that grain's protein, 100 % of its carbohydrates, and 100 % of its fiber. We also lose 90 % of its caloric energy. A brief examination of the trophic pyramid explains why so much energy is lost by cycling grain through livestock. Green plants are *autotrophs* (literally, "self-nourishers"), because they convert solar energy and inorganic matter into energy-rich organic molecules via photosynthesis. In contrast, animals are *heterotrophs* (literally, "nourished from others"), because they must obtain their energy and most of their nutrients by eating other organisms. Autotrophs are the *primary producers* of food energy and comprise the first trophic level of every food chain. As autotrophs are consumed, their energy is transferred to heterotrophic consumers up the food chain. At the second trophic level are *primary consumers* – herbivores that consume plants directly. The third trophic level consists of *secondary consumers* – carnivores that eat herbivores. Because herbivores and carnivores are more active than plants, they expend a significant amount of their assimilated energy on bodily maintenance, making that energy unavailable to the next trophic level. "Trophic efficiency" refers to the percentage of energy that is transferred from one trophic level to the next. Since terrestrial habitats have a mean trophic efficiency of 10 %, 90 % of the plant energy

consumed by livestock does not get transferred to the humans who consume those animals. Were humans simply to consume plants directly, there would be 90 % more food energy available for assimilation by humans – more than enough to completely nourish every human on the planet.

#### Just Distribution of Resources

If we were living in a world where every human enjoyed an overabundance of food and where all humans for the foreseeable future would also enjoy an overabundance of food, then employing highly inefficient systems of food production would not be unjust (at least where humans are concerned). But we don't live in such a world. We live in a world with significant global food scarcity, where that very scarcity is the result of the inefficiencies inherent in meat production. When we cycle grains and legumes through livestock to produce animal protein, we are, in effect, squandering food that could adequately nourish all of the world's undernourished people. Squandering food in a time of food scarcity strikes many as unjust, especially when one considers why so much food is squandered. We squander food to meet the taste preferences of affluent people. Affluent people don't *need* meat to survive or flourish; they just *desire* meat for its flavor. The hundreds of millions of undernourished humans, however, do *need* adequate amounts of beans and grains just to survive. Utilitarian, Kantian, and Rawlsian theories of justice all agree that *survival needs* trump *trivial desires*. It is simply unjust to let people starve to death so that affluent people can experience trivial and fleeting taste sensations.

#### Climate Change and Future Human Generations

There is scientific consensus that the world is warming. The past three decades have been the warmest on record going back to 1850, and each of the last three decades has been warmer than the preceding decade. Based on observed increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level, the Intergovernmental Panel on Climate Change [IPCC] has concluded that the warming of the climate system is

unequivocal. The FAO judges it to be *firmly established* that anthropogenic (human-generated) climate change is occurring, and the IPCC has very high confidence that human activities – in particular, those activities resulting in greenhouse gas emissions – are the *dominant cause* of warming since 1950.

The principal anthropogenic greenhouse gases are carbon dioxide [CO<sub>2</sub>], nitrous oxide [N<sub>2</sub>O], and methane [CH<sub>4</sub>]. According to the IPCC, global atmospheric CO<sub>2</sub> concentrations have increased from a preindustrial value of 280 ppm to a value of 391 ppm in 2011 – an increase of 40 %. Atmospheric concentrations of nitrous oxide (which has a *global warming potential* 296 times greater than CO<sub>2</sub>) are 20 % up from 270 ppb to 324 ppb. And atmospheric concentrations of methane have increased 150 % from preindustrial concentrations of 722 ppb to 1803 ppb in 2011. As these gasses concentrate in the atmosphere, they prevent infrared radiation being emitted from the Earth's surface from escaping into space. By trapping the heat that would have otherwise escaped into space, these greenhouse gasses result in positive radiative forcing, the net effect of which is an increase in global mean air temperature at the Earth's surface. A rise in temperature of 3.3 °C by 2080 would put stress on the water resources of 2.5–3.2 billion people and would expose 29 million people to coastal flooding (Singer 2011, p. 217). The only way to slow the rate of warming and thereby reduce the harm future humans will experience from such warming is for humans collectively to significantly reduce their contributions to greenhouse gas emissions.

The amount of greenhouse gasses an individual is personally responsible for contributing to the atmosphere is popularly referred to as that individual's "carbon footprint." We owe it to future humans to take effective steps to reduce our carbon footprints. One of the most significant factors affecting our carbon footprint is what we eat. In fact, what we eat has a bigger impact on our carbon footprint than what we drive. The livestock sector is responsible for 18 % of greenhouse gas emissions measured in CO<sub>2</sub> equivalents [that's more than all transportation combined] (FAO

2006, p. xxi). Livestock production accounts for 9 % of anthropogenic CO<sub>2</sub> emissions, 37 % of anthropogenic methane emissions, 65 % of anthropogenic nitrous oxide emissions, and 64 % of anthropogenic ammonia emissions (FAO 2006, p. xxi). By switching to a vegetarian diet, one reduces one's carbon footprint by 1.5 tons of CO<sub>2</sub> per year, a greater reduction in CO<sub>2</sub> emissions than trading in one's SUV for a hybrid vehicle. Given animal agriculture's sizeable contribution to global warming, our duty to leave future human generations with a habitable planet as good as our own provides yet another sound moral reason to adopt a vegetarian diet.

## Conclusion

The case for ethical vegetarianism is overdetermined. When one eats meat, one not only supports the unnecessary harming, exploiting, and killing of farmed animals, one also supports an environmentally destructive and unsustainable system of agriculture that wastes and/or destroys vital resources (i.e., water, topsoil, rainforests, and nutrients), exacerbates global hunger and the unjust distribution of resources, and contributes to climate change on a massive scale. Any *one* of these reasons – the animal exploitation and abuse inherent in meat production, meat production's environmental destructiveness and unsustainability, animal agriculture's inefficient use of vital resources, the meat industry's role in promoting global food scarcity and worsening an already unjust distribution of resources, and the meat industry's contribution to climate change – would constitute a good reason for ethical vegetarianism. Taken collectively, these reasons provide an overwhelming case for the moral obligatoriness of vegetarianism.

## Cross-References

- ▶ [Agricultural Ethics](#)
- ▶ [Animal Ethics](#)
- ▶ [Animal Rights](#)
- ▶ [Anthropocentrism](#)

- ▶ Applied Ethics
- ▶ Biodiversity
- ▶ Climate Change and Health
- ▶ Food Security
- ▶ Future Generations
- ▶ Justice, Global
- ▶ Moral Status
- ▶ Zoocentrism

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