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Permaculture

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Synonyms

Alternative agriculture; Bottom-up global food praxis; Holistic food production; Multifunctional farming strategy; Permanent food production

Introduction

Permaculture is a design system where the goal is the generation and maintenance of resilient permanent cultures. These permanent cultures are based upon the sustainable production of permanent food supplies made possible by designing and managing nested systems of flora and fauna. The design aspect of permaculture is based upon insights drawn from holistic ecology, systems thinking, and sustainable agroecology. Permaculture is now a global movement but has its basis in the pioneering work of the Australians Bill Mollison and David Holmgren, who were inspired by agroecological forestry practices of the Southern Hemisphere as well as indigenous farming practices. Mollison explains that permaculture "claims to be designed agriculture, so that the species, composition, array and organization of plants and animals are the central factor" (Mollison 1979).

Permaculture design can be applied to any human habitat, from an apartment to a house, to an office space, to a farm, to a neighborhood street and community, to an entire town or even city. This is because the core features of permaculture design are transferable to any place humans live and work, because all such places are products of human design and intention. The goal of permaculture is to base such design on systems thinking so that the flourishing of human culture and human health can occur. While anthropocentric, the underlying result is that if designed well, then nature also flourishes and is healthy, and the entire interrelated systems that make up permaculture communities are resilient, fecund, and able to generate abundance. At its core, permaculture aims to design efficient, healthy systems of permanent dwelling and habitat, at every scale, from a house to the planetary commons.

Key Permaculture Principles

Holmgren has created a list of 12 goals that guide the design, construction, and active maintenance of a permaculture system. The two key design principles are described here, but all 12 are seen as interrelated. The first principle is the recognition that all systems are nested and interconnected. The permaculture ideal is to design self-generating, closed-loop systems where energy cycles are captured and recycled within the system, leading to overall system

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growth, productivity, and health. This relates to a second permaculture principle, which is to observe and interact with the natural systems upon which a community depends for survival. By observing and interacting with systems, and especially food systems, permaculture design optimizes energy flow and designs for multifunction and for redundancies in food production systems. For example, a chicken provides multiple functions in a permaculture system: it provides nitrogen to the soil via manure; it provides eggs and eventually meat to humans; it provides insect control, thus helping eliminate the need for chemical-based pesticide inputs brought in from outside the system; it helps aerate roots via scratching; and it provides entertainment and natural beauty. With the use of a mobile chicken coop, a flock of chickens can quickly clear a field of weeds while also helping add nitrogen-rich manure to the soil. The field is then ready for polyculture planting, with each plant being part of a larger functional design. For example, plants are planted in "guilds," so that they help provide synergistic support and nested function for one another. A blueberry bush might have nitrogen-fixing legumes planted under it, while beneficial flowers might be planted around it that can attract pollinating insects, and after they fall the leaves of the bush becomes part of a compost pile so that nutrients are able to be applied back into the system. Designing for redundancies means that along with chickens, a system may also include ducks, geese, or turkeys; and besides blueberries, a system may also contain bramble bushes or other fruit-bearing bushes. These two principles – observing and solving for pattern and system efficiencies and designing for function and redundancy – form the basis of permaculture design for any system and especially for agroecosystems that provide humans with food, fuel, and fiber.

Another core permaculture design principle is designing systems so they can catch and store energy. This may include using south-facing walls to capture radiant heat, using solar energy for power and to heat water, harvesting rain water, and building swales and hedgerows. Another principle is based upon understanding a permaculture system as being a closed system, so that the goal is to produce no waste, especially toxic waste. In a closed system, the waste of one process becomes the energy to create another process. Compost is the ideal example of this aspect of permaculture design.

A further principle is to create edge and zone habitats where creativity can occur. Related to the principle of observing patterns in nature, permaculture design recognizes that zone/edge ecosystems in nature are the most creative; for example, coral reefs, estuaries, and wetlands contain very high levels of biodiversity and nutrient cycling. This relates to designing by zones, with zones closest to a house or common area containing flora and fauna that are used the most and that need the most attention, such as greens and culinary spices. The further out from this zone, typically called zone one, then the design changes, so the farthest zone, typically called zone five (most permaculture systems at the farm or community level contain five zones), contains sustainable timber production. The ideal goal of permaculture in terms of food production is to create edible forests that are populated by stone fruits and nut trees. These are long lasting and resilient and provide multiple functions. In tropical and subtropical areas, they also provide a year-round supply of calories, and they create habitat for other species. These and other principles help permaculture designers work towards achieving their goal, which is to capture sunlight energy and cycle this through closed-loop design systems based on nature's patterns where the continual output is increased yield of food items and the sustainable use of natural capital.

Permaculture Ethics

While permaculture aims to design sustainable, resilient permanent cultures that are built upon perennial food production, there is also a very clear ethical element permeating permaculture. This ethic is based upon mixing insights gleaned from ecology, sustainability, sustainable

agriculture, environmental philosophy, traditional ecological knowledge, and Marxist political economy, with other intellectual tributaries adding to the overall ethical milieu of permaculture. The result of this ethical component is that many in the global permaculture movement are critical of industrial agriculture and the industrial economy and they are concerned with issues like excessive human population growth, species extinction and loss of biodiversity, and loss of indigenous cultures. The ethic is formulated as "Care for the Earth, Care for People, and Fair Share." It may also be expressed as "Earth Care, People Care, Fair Share." This ethical mantra recognizes that the earth is a finite system, and everything needed to survive is generated from sunlight entering our earth's system. Thus, basing a permaculture design on these ethics works to ensure that the earth, from which everything else derives, is healthy, and at the same time, everyone in a community (from local to global) is cared for and has access to healthy food and adequate resources because they are equitably shared. By designing edible landscapes of polyculture guilds, multifunctional flora and fauna, and by farming and growing these in ways that minimize inputs of chemical fertilizers and pesticides and that instead promote system resilience, permaculture aims to generate food security.

Summary

Permaculture has gained in popularity in the last 10 years, with a proliferation of blogs, magazines, and workshops devoted to teaching permaculture design and principles. There has also been a proliferation of online websites devoted to permaculture and online videos that teach permaculture techniques. There is a loosely affiliated global permaculture network that hosts trainings in permaculture design and a residential training typically lasts 1–2 weeks. People pay to attend these trainings and receive a certification in permaculture design. They are then able to offer trainings to other people interested in learning about permaculture. Permaculture has guilds, organizations, training centers, and networks in most every country. The Transition Town movement has grown out of permaculture, and there are many intentional-based communities and ecovillages based upon permaculture design and ethics, including Crystal Waters in Australia, which was founded by Mollison and Holmgren. The goal of all of these trainings, groups, teachers, and communities is to create resilient, permanent human cultures built upon the ethical foundations of permaculture.

Cross-References

- ▶ Agricultural Ethics
- ▶ Climate Change, Ethics, and Food Production
- ▶ Ecotopia
- ▶ Expertise in Agriculture: Scientific and Ethical Issues
- ▶ Food and Class
- ▶ Food Security
- ▶ Food Waste
- ▶ Multifunctional Agriculture
- ▶ Saving Seeds

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Pest Control

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Synonyms

Agricultural pollution; Agrochemicals; Integrated pest management; Pesticides; Pests

Introduction

Pest control is the human-directed effort to reduce the population and impact of any species that harms agricultural production and food storage. A pest species can be arthropod (insect and mite), vertebrate (animal), plant (weed), or plant pathogen. A control strategy may be chemical, mechanical, or biological. A chemical control is the spraying of a pesticide. Mechanical control consists of some kind of physical disturbance of the pest species or its habitat (e.g., plowing weeds or removing all crop residues which provide refuge for insect pests). Biological control is the manipulation of beneficial organisms to reduce the impact of pest species. This entry chiefly addresses arthropod (insect and mite) pests in agriculture and insecticides and their alternatives in crop production.

Pest control emerged as an ethical issue with industrialization of agriculture and the associated development of pesticide technologies. Health and environmental problems were popularized by publication of Rachel Carson's (1962) *Silent Spring*, which takes its title from the collapse of bird populations due to pesticide poisoning. *Silent Spring* was the first major book to raise serious questions about the industrialization of agriculture. Carson's argument brought invisible agrochemicals into public view, documenting how pesticides used to produce food were also poisoning human health and the environment. There are thousands of pesticide products using many different biological mechanisms to kill or control different kinds of pests, rendering categorical statements about the harm or safety of pesticides meaningless. Some classes of pesticides pose grave risks to human health, but those risks vary widely by pesticide, type and duration of exposure, and prior health condition. Pesticides contaminate surface and groundwaters. Organisms that depend upon freshwater ecosystems are particularly vulnerable to pesticide contamination: fish, mammals, and aquatic invertebrates.

Carson made normative claims upon society and its institutions on the basis of ecological principles, arguing that many pesticides should be banned and that ecologically rational alternatives to pesticides exist and should be used. She criticized the atomistic and anthropocentric worldview that gave rise to indiscriminate pesticide use, and its assumption that human beings could and should master nature. Her work led to the creation of the US Environmental Protection Agency and the banning of some classes of harmful pesticides. *Silent Spring* is the most influential book in this topical field and laid down fundamental ethical arguments in pest control that continue to be debated today.

Pesticides are powerful technologies, yet they are very simple to use. The propensity of pesticides to cause undesired negative consequences on people and the environment has made them the most controversial agricultural technology – until transgenic crops were developed. Pesticides persist as an ethical problem because they are an economically rational but ecologically irrational technology, with direct economic benefits accrued by the private user yet many diffuse negative impacts on human health and public goods that are difficult to economically quantify. Their continued use reflects the broader pattern of utilitarian thinking in industrial agriculture (Thompson 1995). This ethical problem connects activities in fields, factories, homes, and government.

Scientists have demonstrated that ecologically informed alternatives exist or could be developed to take the place of pesticides; however, these require additional labor to assess the actual threat posed by pests. Although slow to be realized and

fitful, some progress in the voluntary reduction of harmful pesticides has been made, from the development of less hazardous chemicals to the greater use of integrated pest management strategies (see below). Were the full range of off-site negative impacts of pesticides charged to farmers, their economic calculus would shift and more reductions in use could be achieved. However, the use of pesticides in aggregate does reduce the cost of food to consumers. This essay begins with an overview of pests and the pesticide complex, followed by discussions of the human health and environmental impacts of pesticides. Ecological and political controversies surrounding pesticides are then presented, followed by a discussion of more sustainable alternatives.

Pests and Pesticides in Agriculture

A tiny fraction of the world's arthropod, plant, and plant pathogen species damage and destroy agricultural crops, although estimating the economic cost of pests is notoriously difficult. Worldwide, approximately three billion kilograms of pesticides are applied annually, worth US $40 billion. Data on US pesticide use and costs is strongest and illustrates the economic calculus. Roughly one sixth of the global total is applied in the USA (Pimentel 2005). The majority of US pesticides are herbicides used to control weeds in annual crops, but most insecticides are applied to horticultural and perennial crops. There is roughly a four-to-one economic return to the agricultural producer on pesticide costs. Despite significant pesticide use, US agriculture loses up to 37 % of its yield due to pests, roughly a third attributable to arthropod, plant, and plant pathogens (Pimentel 2005). Many of these pests are indigenous to the region of a crop's center of evolutionary origin and have found their way to new crop production regions. Other pest species have moved over from related host plants to attack introduced agricultural crops.

The global pesticide complex consists of all aspects of pesticides' lifecycles, from conception to human and environmental fate (Galt 2008). This complex is extraordinarily complicated, and data to accurately characterize it is thin and uneven. Across the developing world, data is scarce if it exists at all. A tiny fraction of applied pesticides makes physical contact with intended target pests. Research has found that between 0.001 % and 0.3 % of the amount sprayed reaches pests (Pimentel 1995). The human and environmental fate of the other 99 + % of pesticides dominates the ethical debates about pest control. Pesticides break down into their chemical components in the environment and thus become less hazardous. Pesticides developed in the post-World War II era were highly persistent, causing environmental harm over years or decades. When these were banned by governments, some of the pesticides that took their place were more acutely hazardous, but much less persistent. Over the past generation in the developed world, new pesticides have been developed that are less hazardous and affect a smaller subset of insects. Some progress has been made in developing alternative delivery technologies, but these have generally been in a few high value crops.

Human Health Impacts

Ethical consequences of pesticide use may be roughly divided into human and environmental impacts. Some social groups are at much greater risk of exposure to pesticides and their negative effects than others. Those most at risk are those who handle and apply pesticides regularly, followed by farmers and farmworkers, their families, rural communities, and consumers. Estimates of pesticide poisonings range between one and five million every year worldwide (Harrison 2011). Those who mix, handle, and apply are routinely exposed to hazardous materials. Many farmworkers who prepare and apply pesticides are unable to understand the full risks of handling or mishandling pesticides (Wright 1990). Protective gear is mandated by government regulation in industrialized countries, but in the developing world, many pesticide applicators do not use this. Farmers and farmworkers who do not apply pesticides may be exposed to them by drift or direct contact on crops.

Government regulation in industrialized countries restricts the access of workers to recently sprayed fields until they are assumed to have broken down chemically.

Families of farmworkers are exposed when their parents return home with clothes contaminated by chemical residues. Children's health is more vulnerable to pesticides due to their biological development processes. Rural communities are disproportionately exposed to pesticides due to their proximity to farms. Pesticide residues have been found on some fresh produce, even though this is regulated. In developed countries pesticide residues in produce are generally very low and generally considered to pose trivial health threats, although studies have shown that residue testing of imported produce may be inadequate (Galt 2009). Activist critics of pesticides have appealed to consumer anxieties about pesticide residue.

The global pesticide complex is now highly differentiated, reflecting the broad trends in economic globalization (Galt 2008). Industrialized countries began regulating, restricting, and banning pesticides in the 1970s; however, many of the pesticide-manufacturing companies operate in many countries. After they were banned in Europe and North America, hazardous pesticides continued to be manufactured there, but were exported to developing world famers, where regulations were weak or nonexistent. Some of these pesticides were subsequently found on produce imported back to countries where they were banned, a phenomenon popularized as the "Circle of Poison" (Weir and Schapiro 1981). This popular conceptualization has persisted, despite scholarly criticism of it as overly simplistic and inaccurate (Galt 2008). Wright (1990) demonstrated that public concern about pesticide residues prompted growers in Mexico to replace persistent pesticides with acutely toxic chemicals, decreasing the risk of pesticides making their way into the USA on food, but increasing the health risks to farmworkers. Thus, consumer concern about pesticides had the perverse effect of exposing politically vulnerable farmworkers to more dangerous farming practices. Wright's work illustrates the critical dynamic of power and knowledge in efforts to reduce pesticide impacts. Subsequent pesticide manufacturing has shifted to the developing world, and a divergence of pesticide use depending upon whether the product will be exported for the regulated international market, or marketed domestically with little if any regulation (Galt 2009).

Pesticide drift is the airborne movement of pesticides into residential areas. Drift is invisible, often odorless, and ephemeral (Harrison 2011). It can result in severe injury or even death. The normal application of pesticides routinely results in drift that may travel meters or many kilometers and thus contact human beings, other living organisms, other crops, soil, or water. Pesticides may be carried far by winds or in fog. Drift incidents are characterized by many pesticide companies and regulatory agencies as "accidents," suggesting that they could not be anticipated and no one is responsible for them. Critics describe drift as routine, an anticipatable consequence of pesticide use, and accuse regulatory agencies of disregarding patterns of negative health consequences on workers and communities. Poor, rural communities are at the greatest risk of pesticide drift, rendering this an environmental justice issue. Anti-drift activism appears to be on the rise (Harrison 2011).

Contact with some classes of pesticides poses dangers to human health. Some pesticides can cause direct injury (e.g., harm to lungs or skin), systemic health problems (e.g., harm to endocrine, or immune systems), cancer, or in some cases, death. These symptoms may be immediate or slow to develop. Mothers exposed to low doses of some pesticides can pass chemicals to children in utero and thus cause substantial harm to the child's neurological system, with lifelong health implications. There are substantial epistemological challenges to proving scientifically that a specific pesticide exposure event (whether in the field, from drift, or residue on produce) resulted in a human health consequence. Toxicological investigations of pesticides are frustrated by the diversity of biological mechanisms of different classes of pesticides, the different means and duration of exposure, the accumulation of

harmful chemicals from many sources over a lifetime, the complexity of human bodily responses to synthetic chemicals, and the interaction of all of these factors.

The Ecological Dimension

Pest control was revolutionized by the discovery and use of DDT, a synthetic compound that became widely used during World War II (Perkins 1982). Prior to DDT, insecticides had been less effective and were costly relative to the control they provided. DDT is a broad spectrum contact insecticide, meaning that it kills most kinds of insects upon exposure, often immediately. It was initially believed to be safe to use on human beings and provided substantial benefits during the war by killing lice on human refugees and mosquitos bearing diseases, especially malaria. The discovery of DDT launched the production of a class of insecticides with similar attributes that became widely used for decades. DDT was also used in mass outdoor spraying campaigns to control mosquitos in many countries.

The rapid adoption of these insecticides in the postwar years profoundly shaped the pest control practices, the farming practices more generally, the science of entomology, and the agrochemical industry (Perkins 1982). Older, less effective and more harmful pesticides were virtually abandoned. Research into and practice of mechanical biological control entered a period of decline. Farmers who quickly adopted these techniques gained economic advantage over their neighbors. Insecticides dominated research in entomology, and fueled a dramatic expansion of the farm chemical input industry. The economic advantage of these insecticides substantially accounts for this, but persistent pesticide use also reflects a broader social attitude of faith in technological progress that discourages critical questions about undesirable consequences (Perkins 1982).

Carson brought to public attention the ecological principles that made indiscriminate use of insecticides self-defeating. The DDT family of insecticides initially killed all insects, including natural enemies (beneficial insects such as predators and parasitoids that would naturally suppress pests). Their lethal action was generally immediate and impressive to observe. However, populations of plant-eating insects generally recover more quickly from insecticide treatment than beneficial insects, which are generally more vulnerable to pesticides. No longer held in check by natural enemies, insect pest populations may be higher several weeks after pesticide treatment than before. This phenomenon is termed a pest outbreak. Pesticide resistance is the ability of a population of pests to survive pesticide treatments that had previously controlled that population. Resistance develops in a population through a natural selection process that favors the reproduction of organisms that are less susceptible to the specific lethal effect of the pesticide, and these are able to pass on their genetic traits to their offspring. Resistance causes pesticides to fail. More than 500 pest species have populations that manifest resistance. In an attempt to compensate for these problems, farmers may use even more pesticides, thus paying more for less benefit, and accelerating the process of resistance, a process known as the pesticide treadmill (van den Bosch 1978).

Carson's *Silent Spring* is one of the most influential expressions of environmental philosophy ever published, due to the topic, her evocative language using powerful imagery, and her broader critique of science and government. She described in scientific and poetic terms how new insecticides were pushing popular bird species (e.g., bald eagle, brown pelican) to the brink of extinction. Using normative language, she drew attention to the irreversibility of species extinction. Carson raised philosophical questions about human thinking about new technologies. She criticized the indiscriminate use of pesticides, but also the broader scientific paradigm that promoted them. She decried the seeming inability of pesticide users to recognize its serious environmental consequences and called for more investment in biologically based alternative pest control techniques. She also raised broader questions about scientists and politicians and their paradigm (or institutional patterns of thought),

asking why they disregarded widespread problems caused by indiscriminate use of insecticides.

Political Controversies

Silent Spring prompted a nationwide debate in the USA about pesticides, technological progress, environment, and regulation. Carson's testimony before the US Congress made several normative claims about pesticide use, regulation, and policy, and these were carried forward by advocacy groups and in lawsuits over subsequent decades. She argued individuals should have a right to protection from poisons introduced by others into the environment; only those able to understand the hazards of pesticides should be allowed to purchase and use them; regulatory institutions should be independent of political influence and safeguard public health and the environment; the government should fully support the development of safe, ecologically based alternatives. Carson criticized the US Department of Agriculture for its failure to question the indiscriminate use of pesticides and to investigate the health and environmental consequences. Critics dismissed Carson as a hysterical woman lacking scientific credentials and accused her of ignoring the benefits of pesticides in the control of insect-borne disease. So powerful was Carson's work that it provoked immediate public pressure on elected officials for greater environmental protection. It galvanized civil society groups who brought new ideas about the environment and scored legal and legislative victories by linking popular ideas in society with political advocacy. The US Congress created the US Environmental Protection Agency (EPA). To address charges that the US Department of Agriculture suffered from a pro-pesticide bias, the congress passed the Federal Environmental Pesticides Control Act in 1972 to transfer responsibility for pesticide registration and regulation to the EPA. The move to ban DDT began in some European countries in the 1960s, and a high profile lawsuit led to a ban on DDT in the USA in 1972. Carson's critique was picked up in many countries, prompting pesticide restrictions and the creation of environmental agencies.

Despite Carson's influence on public opinion, pesticide use continued to rise over subsequent decades. To carry forward *Silent Spring*'s critique, entomologist Robert van den Bosch wrote *The Pesticide Conspiracy* (1978), charging the entire pesticide research, manufacture, sales, and use system of suffering from a conflict of interest. He described a "pesticide mafia" of agrochemical manufacturing companies, university and public officials, and large growers who found it to their personal financial interest to promote pesticides in violation of the public interest. He railed against their collusion and claimed that they purposefully sabotaged alternative research and strategies, subsequently labeled as van den Bosch's "corruption" hypothesis (Perkins 1982). Activist criticism of pesticides has fostered anti-farming attitudes among the public. Subsequently, much of the energy of antipesticide activism has shifted to contest transgenic crops, extending analogous ethical criticisms to that technology.

DDT and associated products were banned worldwide as an agricultural pesticide by the 2004 Stockholm convention, although it is still used in farming in some countries. In 1996, the US Congress passed the Food Quality Protection Act, the most significant reform of the nation's pesticide laws since the creation of the EPA. It mandated a major, thorough analysis of pesticides, including those previously exempted from review, informed by risk analysis, and improved understanding of medical toxicology and the role of cumulative health impacts. After *Silent Spring*, pesticide use in the USA continued to rise, although chiefly through greater use of herbicides in corn and annual crops, and has remained relatively stable over the past generation. The intent of the Food Quality Protection Act – and others like it in the EU and elsewhere – was to favor "softer" (less hazardous) pesticides, and some progress has been made. Manufacturers have developed pesticides that are more selective and less persistent; products that attract pests into trap to kill them, thus precluding the need for spraying and synthetic insect pheromones which interfere with insect reproduction (Warner 2007).

In the USA, farmers use roughly $10 billion in pesticides annually, and this provides approximately $40 billion in the value of crop protection. However, Pimentel (2005) estimates that they result in approximately $9 billion in harm on public health and the environment. Thus, those who profit the most from the production, sale, and use of pesticides receive almost all the economic benefit, and the costs are imposed on other people and the environment. This uneven distribution of costs and benefits underpins the ethical assertions that public funding of alternatives to pesticides is a matter of justice (Pimentel 2005).

Scientists and policymakers have long recognized that some introduced (nonnative) species can become highly destructive pests. To detect and exclude them, public authorities regulate international trade and inspect imported goods, especially fresh produce. If new potential pests are detected, imported goods are destroyed or turned away, a practice known as agricultural quarantine. If introduced pests become established, they may require ongoing control, often with pesticides. Eradication is the effective removal of all pests in a new region to prevent recurring costs associated with control. Eradication of introduced pests becomes highly controversial when pests establish in residential or urban landscapes, because this requires the application of pesticides in areas where nonfarming regions for the benefit of agriculture. Eradication is costly and rarely successful, but when it does succeed, the aggregate economic benefit is substantial.

The Search for Alternatives

Biological control is the action of natural enemies in maintaining a pest's density at a lower average than would occur in their absence. As a pest control strategy, classical biological control is the importation and introduction of natural enemies to control pests, generally introduced arthropods and weeds. Biological control entered the popular imagination in the late nineteenth century with the successful control of a nonnative California citrus pest, the cottony cushiony scale. An American entomologist in Australia discovered that the vedalia beetle, a natural enemy, effectively controlled the scale in its native habitat. He shipped beetles to the USA to be released in citrus orchards, and they quickly reproduced and provided control of the pest (Perkins 1982). When successful, classical biological control is an ideal pest control strategy because the introduced natural enemy population provided recurring suppression of pests. Classical biological control is a public interest science because its beneficiaries are farmers and society as a whole, but it depends upon the ongoing investment of public funds. Biological control was virtually abandoned as a science in the DDT era, but enjoyed a surge in interest after an endorsement by Carson (Warner 2007).

However, in the 1950s, a band of entrepreneurial entomologists in California developed a framework for controlling pests now known as Integrated Pest Management (IPM). Originally developed with insect pests, IPM has subsequently been expanded to include all pests, including weeds, vertebrates, and pathogens. The scientists who pioneered IPM did so to help growers make pesticide use more pragmatic, but subsequently appealed for its adoption to serve the public interest (Perkins 1982). IPM built upon the ecological principles in biological control (e.g., predator–prey relationships, population dynamics, and habitat manipulation) to recommend pesticides only when pest populations rise beyond an economic threshold at which the cost of the pesticide will be exceeded by pest damage. Its developers used the term "integrated" because they recognized that biological control alone as a strategy was not necessarily economically practical, but that when integrated with other techniques, it can be. IPM assumes an understanding of the ecological relationships between crop, pest, natural enemies, and human decision making. IPM recommends pesticides but only in ecologically informed ways.

The rise of ecologically informed alternative agricultural paradigms poses a challenge to continued reliance on manufactured pesticides. Organic agriculture, when true to its ideals,

follows an alternative farming philosophy and uses alternative farming practices. Organic farming practices pest control. It uses certain forms of pesticides that are less hazardous and derived from naturally occurring substances. Experienced organic farmers frequently report they have few problems with insect pests, but that weeds are difficult to control with organic techniques.

Agroecology is defined as the application of ecological concepts and principles to the design and management of sustainable food systems (Gliessman 1998). Thus, it seeks to mimic the function and structure of "natural" ecosystems, by enhancing nutrient cycles, natural pest control, and the biodiversity of farming systems (Warner 2007). Agroecologists criticize reliance on monoculture because this production system causes pest outbreaks and relies upon agrochemical inputs to remain productive. Monoculture generally increases per acre production of one crop, but the resulting farming system is inherently brittle and unstable. The logic of monoculture generally precludes serious consideration of farming systems that mimic natural ecosystems.

Summary

Pest control is a foundational component of industrial farming. A tiny fraction of the world's arthropod, plant, and plant pathogen species damage and destroy agricultural crops, but their economic impact is considerable. The rapid adoption of DDT-related insecticides after World War II profoundly shaped the pest control practices, the farming practices more generally, the science of entomology, and the agrochemical industry. Although controversial and contested, pesticide use is driven by the economic advantage it provides to the users, even though substantial (but difficult to measure) costs are imposed on workers, rural communities, and the environment.

Rachel Carson's *Silent Spring* made agricultural pollution – and pesticides specifically – visible to society by decrying its widespread impact on wildlife. *Silent Spring* is among one of the most influential expressions of environmental philosophy ever published, due to the topic, her evocative language using powerful imagery, and her broader critique of the paradigm and human values that gave rise to the pesticide industry. She brought to public attention a most disturbing irony: the agriculture upon which human society depends for sustenance was poisoning the environment and human beings. Indiscriminate use of chemical technologies risked the planet and future generations. Carson pointed to "extraordinary array of alternatives," based on ecological science. "Much of the necessary knowledge (of alternatives) is now available but we do not use it" (Carson 1962, p. 11).

Cross-References

▶ Agricultural Ethics

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Peter Singer and Food

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Synonyms

Animal suffering; Factory farming; Preference utilitarianism; Speciesism; The ethics of eating; Vegetarianism

Introduction

Peter Singer became well-known internationally after the publication of *Animal Liberation* in 1975. His research is strictly connected with food and eating as he investigates the area of well-being of nonhuman animals in order to prevent their suffering. He wrote many relevant books in this field: *Animal Factories* (with coauthor Jim Mason in 1980); *In Defence of Animals*, a collection of essays by philosophers, scientists, and activists in the Animal Liberation Movement, published in 1985; and the more recent *The Way We Eat. Why our food choices matter* (with coauthor Jim Mason in 2006). According to philosopher Helga Kuhse, Singer is "almost certainly the best-known and most widely read of all contemporary philosophers"; yet he has also been hailed as "one of the world's 100 most influential people" and "among the most influential philosophers alive," but he has also been brandished "the most dangerous man on earth," accused of being a "public advocate of genocide" for his theories about abortion, euthanasia, and infanticide. Born in 1946, Peter Singer grew up in a fairly typical "heavy meat-eating" Australian family. As a graduate student at Oxford University in 1971, he became a vegetarian after learning about factory farming; from then on, he focused his research, his teaching, and his philosophy on the importance of preventing suffering by a "preference utilitarian" perspective, in order to extend ethics beyond sentient beings. (For this reason his moral point of view is commonly known as "extensionism.") As he wrote in his seminal book, which became the Animal Liberation Movement manifesto, "the aims of the movement can be summed up in one sentence: to end the present speciesist bias against taking seriously the interests of nonhuman animals" (Singer 1985). The fundamental moral issue of eating for Singer is not merely the fact that humans kill animals for food; rather, it is more the idea that the animals just have unhappy lives and humans are really doing this for something that they do not need to eat.

Eating Ethically

Eating is an ethical issue as it deals with animal well-being and suffering. But this habitude should not be generally considered as a "raising ethical issue," because "eating is even more essential than sex, and everyone does it, usually more than once a day" (Singer 2005). The first step in moral evaluation of eating and food choices is to increase everyone's consciousness: the most evident problem – as Singer pointed out – is that humans are generally ignorant of the abuse of living creatures that lies behind the food they eat. They do not usually care, indeed, about the way the food they eat is produced, about the way nonhuman animals live and suffer in the industrial factories, as humans do not consider the environmental consequences of their feeding and the political cost of their choices at the market. As Singer wrote: "When we eat – or more specifically, when we pay for what we eat, whether at a farmer's market, a supermarket, or

a restaurant – we are taking part in a vast global industry. [. . .] Food production affects every person on this planet and untold billions of animals as well. It is important, for the sake of the environment, animals, and future generations, that we see our food choices as raising serious ethical issues and learn the implications of what we eat" (Singer 2005). Hence, on the one side, consumers have an ethical responsibility not only to choose accurately but also to be aware of the way their food is produced; on the other side, the big brands have a corresponding obligation to be more transparent about their suppliers, in order to make their customers informed about what they are eating. But in many cases the biggest food companies themselves do not know how they perform on these issues, betraying a profound lack of ethical responsibility on their part.

This human lack of interest for animal suffering is caused, for Singer, by a sociological shift, linked to the ethics of globalization and by the western and Christian tradition, which both accepted the idea that animals are essentially resources for human use and benefit: they should be considered as merely means or products – an interesting interpretation of this issue is suggested by Camosy, who unconventionally points out the possibility to match the Christian thought with Singer's philosophy (Camosy 2012). In Singer's words: "For most humans, especially those in modern urban and suburban communities, the most direct form of contact with nonhumans animals is at meal time: we eat them" (Singer 2009). Moreover, "the use of animals for food is probably the oldest and the most widespread form of animal use. There is also a sense in which it is the most basic form of animal use, the foundation stone on which rests the belief that animals exist for our pleasure and convenience. If animals count in their own right, our use of animals for food becomes questionable – especially when animal flesh is a luxury rather than a necessity" (Singer 1993). Therefore, according to Singer, eating should be a moral issue because it concerns the possibility of someone's suffering, and, from a benthamian/utilitarian point of view, "if a being suffers, there can be no moral justification for refusing to take that suffering into consideration" (Singer 2001).

Utilitarianism and Vegetarianism

In his early writings Peter Singer showed the possibility to ground a vegetarian philosophy on a utilitarian moral perspective: "I am a utilitarian. I am also a vegetarian. I am vegetarian because I am a utilitarian. I believe that applying the principle of utility to our present situation – especially the methods now used to rear animals for food and the variety of food available to us – leads to the conclusion that we ought to be vegetarian" (Singer 1980). The reason is quite simple: Singer is a utilitarian, and utilitarians typically focus on the moral imperative to improve well-being (or happiness or "utility") and to avoid pain (or physical suffering). The fundamental moral issue in eating is, as observed above, animal treatment: "What are the implications of utilitarianism for our treatments of animals? When we apply utilitarianism to the issue of how we should treat animals, one vital point stands immediately. Utilitarianism, in its classical form, aims at maximizing pain and maximizing pleasure" (Singer 1980).

The focal point in this approach is, thus, the possibility to experience and feel pain and pleasure: "The capacity for suffering and enjoying thing is a pre-requisite for having interests at all, a condition that must be satisfied before we can speak of interests in any meaningful way .[. . .] If a being suffers, there can be no moral justification to take that suffering into consideration. No matter what the nature of the being, the principle of equality requires that its suffering be counted equally with the like suffering [. . .] of any other being. If a being is not capable of suffering, or of experiencing enjoyment or happiness, there is nothing to be taken into account. This is why the limit of sentience [. . .] is the only defensible boundary of concern for the interests of others" (Singer 2001).

Emphasizing sentience is the first step, in Singer's thought, towards an extensionist ethics, as it should causes the end of an anthropocentric "speciesistic" approach; granting a moral status to nonhuman animals – at least to some of them – also means considering them as individuals capable of choosing and acting with a purpose and

a project. The first and the main purpose for a sentience being is – according to Singer – to experience (and cause) pleasure and to avoid suffering, unless there is a sufficient justification: this is one of the most basic moral principles, shared by virtually everyone. In this respect everyone can correctly say with Singer that almost all nonhuman animals are morally significant entities: they have moral standing like humans and unlike stones. Referring to Bentham, indeed, Singer wrote: "the question is not, Can they reason? nor, Can they talk? but, Can they suffer? That is indeed a crucial question to ask whenever we are talking about beings who are capable of suffering and one that is clearly relevant to how we should treat both humans and nonhuman animals. Can they suffer? Can they enjoy life? If so, they have interests that we should take into account, and we should give those interests equal weight with the interests of all other beings with similar interests" (Singer 2009). Here Singer's argument, though appealing, is quite weak because of its arbitrary starting-point grounded in self-interest: "Is there any reason why we should accept that ethical judgments can arise only by way of universalizing self-interested decision-making?" (Buckle 2005).

A utilitarian focus on well-being is, moreover, classically understood as a balancing act: since it is not always possible to enjoy maximal well-being – in many cases, indeed, one's interests conflict with another one's – everyone should act in order to balance interests and perhaps to maximize happiness while minimizing suffering: "The only principle of equality I hold is the principle that the interests of every being affected by an action are to be taken into account and given the same weight as the like interests of any other being [. . .]. The principle of equality of interests merely makes it explicit that, because the principle of utility is the sole basis of morality, no other principle will limit the application of the principle of utility, or affect the way in which it operates. [. . .] As I said in *Animal Liberation* – The basic principle of equality does not require equal or identical *treatment*; it requires equal *consideration*" (Singer 1980).

Yet the consistent application of the abovementioned principles seems to lead directly to vegetarianism or, at least, to the avoidance of factory-farmed meat. The argument here is disarmingly simple and linear:

1. In modern factory farms, animals who are raised and slaughtered for food suffer considerable pain (Singer and Mason 1980).
2. Humans could easily nourish their selves without eating nonhumans animals.
3. The only reason to eat flesh is the enjoyment of how they taste.
4. The gustatory pleasure is not a sufficient justification for causing torment and suffering.
5. So, it is morally wrong to produce and consume such products.

That is to say: "If we are prepared to take the life of another being merely in order to satisfy our taste for a particular type of food, then that being is no more than a means to our end" (Singer 1990). But, as Cora Diamond points out, a similar approach is to a certain extent reductive and constraining, because it "makes it hard to see what is important either in our relationships with other human beings or in our relationship with animals" (Diamond 2004).

The utilitarian's argument for vegetarianism is quite simple – but surely more effective – than the one proposed by Tom Regan and the promoters of animal rights, as it shows how pleasure and suffering are strictly connected with sentience, without introducing any other elements (such as "duty" or "right") in order to protect interests.

This is, precisely, one of the most criticized arguments by Singer's opponents: the same reasons that lead someone to reject unfair treatment for animals are not strong enough to encourage changes in his lifestyle: "Critics allege that while utilitarians and consequentialists generally may oppose conventional animal productions, their theoretical basis for opposition doesn't warrant individual dietary change" (Almassi 2011).

Vegetarianism: Change Your Philosophy, Change Your Life

Once one has clarified the reasons why it would be immoral to eat meat, it is necessary to translate these reasons into concrete ways of acting, in

order to change things. But Singer's thought is quite different from traditional vegetarianism, as it focuses not so much on the need to not eat meat, but rather on the moral obligation to prevent pain and suffering of nonhuman animals: "Some writers [. . .] think of vegetarians as immoral absolutists, who will stick to their belief in the immorality of eating meat no matter what. Thus Cora Diamond writes: – one curious feature of the Peter Singer sort of argument . . . is that your Peter Singer vegetarian should be perfectly happy to eat the unfortunate lamb that has just been hit by a car –. Why is this curious? Is it only curious on the assumption that vegetarians must think it *always* wrong to eat meat" (Singer 1980).

Peter Singer, thus, is not an absolutist vegetarian: he embraces vegetarian philosophy as the only possible way to support the interests of a larger number of sentient beings; in this respect, "the answer is to boycott all meat and eggs produced by large-scale commercial methods of animal production, and encourage others to do the same. Consideration for the interests of animals alone is enough justification for this response, but the case is further strengthened by the environmental problems that the meat industry causes" (Singer 1998). Even more: "*Merely* becoming a vegetarian, without doing anything else to change our treatment of animals, may have no effect at all. But I do not advocate this passive form of vegetarianism. I advocate vegetarianism as something which underpins, makes consistent, and gives meaning to all our other activities on behalf of animals" (Singer 1980).

Ethics, Food, and the Environment

Human choices about food are intrinsically moral for another important reason: they should have a more or less negative impact on the environment: "Environmentalists are increasingly recognizing that the choice of what we eat is an environmental issue" (Singer 1998). The reason is quite simple: "Animals raised in sheds or on feedlots eat grains or soybeans, and they use most of the food value of these products simply in order to maintain basic functions and develop unpalatable parts of the body like bones and skin. To convert eight or nine kilos of grain protein into a single kilo of animal protein wastes land, energy, and water" (Singer 1998). Nowadays, agriculture is a major source of greenhouse-gas emissions and also one of the sectors most at risk from climate change: these are the two most important topics to be taken into account when it is necessary to express a moral judgment; grazing ruminant animals, like cattle and sheep, also contribute significantly to climate change. The moral question goes as follows: are humans still able to afford this luxury on a crowded planet with a growing human population? The more realistic answer is negative: "Intensive animal production is a heavy user of fossil fuels and a major source of pollution of both air and water. It releases large quantities of methane and other greenhouse gases into the atmosphere. We are risking unpredictable changes to the climate of our planet – which means, ultimately, the lives of billions of people, not to mention the extinction of untold thousands of species of plants and animals unable to cope with changing conditions – for the sake of more hamburgers. A diet heavy in animal products, catered to by intensive animal production, is a disaster for animals, the environment, and the health of those who eat it" (Singer 1998).

Obesity: Weigh More, Pay More

For a similar reason, it is possible to consider even obesity as an ethical issue, because an increase in weight by some imposes costs on others; these costs are not only "financial costs" but also "environmental" ones: this is the main reason that brings Singer to the ethical condemnation of obesity. The author reports a number of examples to strengthen his thesis: the higher environmental impact of fuels for transports, for example, an increase in the use of jet or train fuel implies higher greenhouse-gas emissions, which could make worsen the condition of global warming, and the necessity to build new infrastructures – when people get larger and heavier, indeed, fewer of them fit onto a bus or train; moreover, hospitals must order stronger beds and operating tables, have to build extra-large toilets, and so on.

These facts are enough, in Singer's mind, to condemn obesity and to justify public policies

that discourage weight gain, for example, by taxing foods that are disproportionately implicated in obesity. These policies may also help in obtaining two positive consequences: discouraging their consumption by people who are at risk of obesity and using revenue raised to offset the extra costs that overweight people impose on others. In a utilitarian perspective, obesity is an ethical matter, that is to say it should be considered not only as a personal issue but as a universal one: valuing both human well-being and environmental health, human weight is everyone's business.

Factory Farming and Animals Treatment

"The case against using animals for food is at its strongest when animals are made to lead miserable lives so that their flesh can be made available to humans at the lowest possible cost. Modern forms of intensive farming apply science and technology to the attitude that animals are objects for us to use. In order to have meat on the table at a price that people can afford, our society tolerates methods of meat production that confine sentient animals in cramped, unsuitable conditions for the entire duration of their lives. Animals are treated like machines that convert fodder into flesh, and any innovation that results in a higher "conversion ratio" is liable to be adopted. [. . .] If we do not change our dietary habits, how can we censure those slaveholders who would not change their own way of living?" (Singer 1993). As Singer and Mason showed in their recent book *The Way We Eat*, in the United States alone, many billions of animals are killed each year for human consumption, almost all of them raised in "factory-farm" conditions in which their well-being is systematically sacrificed. A minimal decent life for animals, indeed, is not possible in CAFOs (Concentrated Animal Feeding Operations), because the main purpose of factory farms is to reduce expenditures and thereby maximize profits. As Singer wrote, it is not an individual's problem, but rather a political (and economical) one: "The real ethical issue about factory farming's treatment of animals isn't whether the producers are good or bad guys, but that the system seems to recognize animal suffering only when it interferes with profitability. The animal industry always says that producers take care of their animals because what is good for the animals is good for the producer" (Singer and Mason 2006).

However, the real Singer's purpose is to shed light on the condition of animals in factory farms in a very effective way, in order to make everyone think about the real standard of living of nonhuman animals (Singer 2010). In this regard, he shows how about 90 % of US breeding sows spend today most of their lives locked in really tight cages, unable to turn around, and kept on short tethers; he highlights how, in the same way, veal calves are confined for all their lives in individual stalls that do not permit them to turn around, lie down, or stretch their limbs. The same goes for chickens, which cannot move around "not because they are overstocked, but because it hurts their joints so much. Sometimes vertebrae snap, causing paralysis. Paralyzed birds or birds whose legs have collapsed cannot get to food or water and [. . .] die of thirst or starvation" (Singer and Mason 2006).

In this regard, the factory farm is nothing more than the application of technology to the idea that animals are means to human's ends.

Food and Policies

For Singer's purposes the philosophical thought should be made into political activism and militancy: this is the reason why humans should begin to see the purchase and consumption of factory-farm products, whether by an individual or by an institution like a university, as a violation of the most basic ethical standards of how they should treat animals and the environment. This is, nowadays, one of the big moral issues, and human beings are – in Singer's mind – superficially overlooking it, focusing merely on issues like the use of embryos for research and gay marriage.

The issue should be analyzed and solved in social and political terms: the problem may not be

with citizens' attitudes, but rather that, at the federal level, the political system allows big industries too much power to frustrate the needs of popular majorities. Americans, indeed, seem to care just as much about animal welfare as Europeans do: thus, how is it possible to explain the gap between Europe and the United States on farm animal welfare? Looking at the political systems: as demonstrated by Singer, while in Europe the concerns of voters about animal wellness have been successful in persuading members of national parliaments, in the United States, similar concerns have had no noticeable effects on the Congress. While in Europe there are national legislations and EU directives that respond to the concern of animal welfare, in the United States there is no federal legislation and very little state legislation on this concern. The reason is quite simple for Professor Singer: in the US electoral politics, money counts for more than the opinions of voters.

Another fundamental moral issue with a huge political impact deals with agriculture: "No other human activity has had as great an impact on our planet as agriculture. When we buy food we are taking part in a vast global industry. Americans spend more than a trillion dollars on food every year. That's more than double what they spend on motor vehicles, and more than double what the government spends on defense" (Singer and Mason 2006). This moral issue is two-sided: on the one side, customers have the moral obligation to buy locally and in season in order to save energy and transportation costs and to discourage the global market; on the other side, it is needed to prevent the purchase of agricultural land in developing countries by rich ones with international policies.

Summary

In Singer's thought, eating is an ethical and a political issue together: it is an ethical issue as it deals with animal wellness and suffering; it is, indeed, a political issue since it concerns international policies regarding the environmental impact and the climate change, in large part influenced by our food choices. In this perspective, vegetarianism seems to be the only possible way to support the interests of a larger number of sentient beings in order to realize the preference utilitarian moral imperative.

Cross-References

- ▶ Agricultural Ethics
- ▶ Agricultural Science and Ethics
- ▶ Animal Welfare: A Critical Examination of the Concept
- ▶ Christian Ethics and Vegetarianism
- ▶ Climate Change, Ethics, and Food Production
- ▶ Environmental Ethics
- ▶ Farmer Types and Motivation
- ▶ Industrial Food Animal Production Ethics
- ▶ Meat: Ethical Considerations
- ▶ Obesity and Responsibility
- ▶ Population Growth
- ▶ Trade Policies and Animal Welfare
- ▶ Vegetarianism

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Plant-Based Diets and Scientific Value Judgments

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Synonyms

Ethics; Nutrition; Philosophy; Plant-based diet; Value judgments; Vegan diet; Vegetarian diet

Introduction

Diets containing animal products predominate in the developed world. Fewer than 10 % of persons in the USA follow a vegetarian-inclined diet; fewer than 3 % are strict vegetarians who consume no meat, poultry, or fish; and less than 1 % are vegans who consume no animal products (Vegetarian Times 2008). Furthermore, diets in the developed world are often characterized by heavy consumption of animal products– up to 250 pounds annually (Daniel et al. 2011). As the developing world industrializes, industrial animal agriculture is expanding, and dietary patterns are shifting towards the heavy consumption of animal products characteristic of the West (Delgado 2003). Despite these facts, the consumption of animal products has become the object of much moral scrutiny over the past few decades, because of animal welfare concerns, environmental concerns, public health concerns, and nutritional concerns. A key supposition in moral arguments for partially or completely plant-based diets is that human beings can sustain healthy lives without animal products. Were diets excluding animal products significantly damaging to human health, then arguments for morally obligatory plant-based diets would be seriously weakened.

A large amount of nutritional science about plant-based diets, defined here as strict vegetarian or vegan diets, has accumulated in the past few decades, much of which indicates that plant-based diets are not only capable of meeting human nutritional needs but can actually provide health benefits as compared to omnivorous diets (see, e.g., American Dietetic Association 2009; Fraser 2009). However, plant-based diets are also associated with certain putative health risks, the most significant being the risk of protein deficiency, vitamin D and B12 deficiency, iron deficiency, and calcium deficiency – though these health risks are not necessarily unique to vegan diets (American Dietetic Association 2009 and Dunn-Emke 2005). These risks may be invoked in discussions of food ethics as counting against the moral obligatoriness of plant-based diets for some or even all persons, either because such persons cannot obtain the necessary nutrients, can obtain them only with difficulty, or cannot reasonably be expected to have the knowledge to appropriately plan a plant-based diet (see, e.g., George 1994).

Furthermore, in recent years there has been an increased interest in the so-called Paleolithic diets (e.g., there are now a number of journals that study such "Paleo" diets), which are explicitly based on the premise that humans are best adapted evolutionarily to consuming a large portion of their calories from meat and also to avoiding certain foods such as starches (see, e.g., Cordain 2002). Because of these issues the

nutritional adequacy of plant-based diets cannot be assumed as an uncontroversial starting point in discussions of food ethics, despite scientific agreement in general terms about their potential nutritional adequacy.

When engaging discussions about plant-based nutrition, it is important to view claims critically, since they often appear to be influenced by covert value judgments or framing assumptions. At times these value judgments and framing assumptions are evident in published philosophical or scientific literature; they also appear in conversation with sufficient frequency to merit examination. This entry reviews some of these value judgments and assumptions and shows how they may affect discussions about the nutritional adequacy of plant-based diets, particularly in Western countries such as the USA where omnivorous diets predominate. The goal is not to settle debates about the nutritional adequacy of plant-based diets but rather to improve the quality of discourse about nutrition and food ethics by alerting the reader to what might be hitherto unnoticed, but potentially contestable, judgments present in the nutritional assessment of plant-based diets.

Are the Risks of Plant-Based Diets Scrutinized More Closely than the Risks of Omnivorous Diets?

The adoption of animal products into the diet of modern humans or our ancestors is not something that occurred only after a comprehensive risk analysis was performed and indicated that such products pose no risk; in fact no dietary pattern is free of risk. When considering the nutritional adequacy of plant-based diets, then, the appropriate determination is one of risks and potential benefits *as compared to alternative dietary patterns*. Such determinations cannot be made appropriately if all relevant risks and potential benefits are not considered or are considered in a biased fashion whereby some are selectively under- or overemphasized. A number of considerations suggest that plant-based diets may commonly be subject to differently stringent evaluation than omnivorous diets.

One such consideration is that the possible healthfulness of plant-based diets tends to be called into question while the possible healthfulness of diets containing animal products does not. For example, the American Dietetic Association (ADA) has published a position paper examining the nutritional adequacy of vegetarian diets (American Dietetic Association 2009) but has not published a position paper examining the nutritional adequacy of omnivorous diets. While the ADA statement is favorable to vegetarian diets, including total vegan diets, the very fact that such a position paper exists demonstrates a presupposition that the nutritional adequacy of plant-based diets cannot be assumed–either by the ADA, or by the American public more generally, to whom the ADA statement might be addressed. While academic articles examining specific health risks associated with the consumption of animal products can be found in the nutritional literature (see, e.g., Sinha et al. 2009; Hebels et al. 2012), such articles do not appear (in most cases) to have prompted significant doubt or worry, either among nutritionists or the general public, about whether it is *possible* or *difficult* to be healthy on an omnivorous diet. Rather, the risks associated with the consumption of animal products are usually considered in isolation or else coupled with recommendations to change specific aspects of an omnivorous diet, such as increasing the percentage of fruits and vegetables, decreasing overall meat consumption, or replacing red meat with poultry or fish, rather than eliminating animal products from one's diet entirely (see, e.g., Sinha et al. 2009; Popkin 2009).

In contrast, academic articles specifically examining or even questioning the overall healthfulness of plant-based diets *at a categorical level* are comparatively easier to locate (Waldman et al. 2005; Weaver et al. 1999; Haddad et al. 1999; Ingenbleek and McCully 2012). Whereas the risks of consuming certain types or amounts of animal products may motivate discussion of how persons consuming animal products can be healthier, the risks of plant-based diets are often discussed in the context of whether persons following plant-based diets *can* be

healthy or *how difficult* it is for them to be healthy. This difference in rhetorical framing is subtle but important. Even where nutritional assessments of plant-based diets conclude that they can meet humans' nutritional needs, the rhetorical posture often seems to be that such diets require positive nutritional justification: they are assumed to be risky, or at least of questionable healthfulness, until shown otherwise. As one article puts it: "The adequacy and nutritional effect of diets based entirely on plant foods is still under investigation" (Haddad et al. 1999). Hence, plant-based diets per se may be thought to require positive justification in a way that omnivorous diets per se are not, even though there are nutritional concerns relating to both dietary patterns and even though there is consensus that plant-based can be healthful for persons in all life stages.

Furthermore, when the potential advantages of plant-based diets over omnivorous diets are discussed, they are usually framed as *potential benefits* of plant-based diets, rather than *potential risks* of omnivorous diets. Again, this difference in rhetorical framing is subtle but important: it gives the impression that plant-based diets are perhaps associated with some desirable things, rather than the impression that omnivorous diets are associated with undesirable things. In contrast, were these differences framed as risks of omnivorous diets, the rhetorical effect would be one of portraying omnivorous diets as possibly harmful in comparison to plant-based diets, with the predictable upshot of conditioning debates about food ethics in terms of the permissibility of imposing risk on one's self, one's children, or the public's health by eating animal products.

While plant-based diets are associated with some risks, 33 % of adults and 17 % of children in the USA are obese (CDC 2012), and the USA is currently struggling with a significant public health burden from a number of chronic diseases directly linked to diet in general and the consumption of animal products in particular (Walker et al. 2005). Plant-based diets compare favorably to omnivorous diets as concerns body mass index, hypertension, type 2 diabetes, certain types of cancer, and all-cause mortality (American Dietetic Association 2009; Fraser 2009). In light of these facts, the relative overemphasis in the academic literature on the risks of plant-based diets as compared to the risks of omnivorous diets may indicate a subtle cultural bias (Varner 1994a, b).

A second potential indicator of differential scrutiny between plant-based and omnivorous diets is the rhetoric of "appropriate planning." Any dietary pattern can be unhealthy if not planned appropriately. The overwhelming preponderance of omnivorous diets and the public health burden of diet-related diseases in the USA suggest that many persons following omnivorous diets are not planning them appropriately. Nonetheless, the importance of appropriately planning a plant-based diet often seems to be overemphasized as compared to omnivorous diets. For example, one prominent nutritionist has claimed that it is "unethical for people to bring up their children as vegetarians, *unless they take great care to know what they're doing*" (Singer and Mason 2007, at 226; see also George 1992). Similar statements concerning omnivorous diets are not generally made. Critics of plant-based diets might respond that more knowledge is required to appropriately plan plant-based diets as compared to omnivorous diets, but this is questionable. For example, it is not obvious that any special expertise is required to heed the ADA's recommendation that "an assortment of plant foods [be] eaten over the course of a day" to provide adequate protein intake and variety (ADA 2009). As Gary Varner observes, "anyone who can learn the meaning of 'legume' and find the vitamin section in the supermarket can understand how to follow [plant-based nutritional] guidelines" (Varner 1994a, p. 35).

A third way in which plant-based diets may be subject to differential scrutiny is that their specific risks may be overemphasized while their specific benefits are underemphasized. Varner (1994a, b) has described how discussions of plant-based diets in the nutritional literature tend to devote more space to their risks than their potential benefits, sometimes ignore important research relating to their benefits, and may

overemphasize the evidence supporting risks while calling into question the evidence supporting their benefits. Though more recent nutritional literature generally does a better job of discussing the benefits of plant-based diets, the overall amount of attention paid to risk as compared to benefit still seems disproportionate in many instances.

There are at least two reasons why the risks of plant-based diets may be scrutinized more closely than omnivorous diets. One possible reason is self-interest: most persons in the USA and developed world consume large amounts of animal products and may be reluctant to change their preferred dietary pattern. A relative overemphasis of the risks of plant-based diets provides a reason against changing dietary patterns, since a person's own health can be cited as a reason not to adopt a plant-based diet. A second reason derives from what has been termed the cultural theory of risk selection. Sociologists and psychologists studying risk perception have long observed that both individual and group attitudes towards risk are variable and conditioned by a number of factors in addition to the probability or nature of an adverse outcome (see, e.g., Douglas and Wildavsky 1983; Finkel 2008). Such factors include social values and the familiarity of the risk in question. When risk-bearing activities or situations are unfamiliar, or when such activities or situations do not conform with widely shared social values, risks tend to be regarded as higher. Consistent with these observations, the statistical normalcy of omnivorous diets and the fact that moral views often underlying plant-based diets are not widely shared at present both may result in plant-based diets receiving added scrutiny as compared to omnivorous diets.

Framing Assumptions and Value Judgments in the Assessment of Dietary Risk

In addition to the general level of scrutiny given to plant-based and omnivorous diets, an examination of the nutritional literature indicates that framing assumptions and value judgments also significantly impact the nutritional evaluation of plant-based diets. One type of framing assumption concerns the way in which plant-based diets are defined. Studies of plant-based nutrition have, until very recently, frequently used as study populations the so-called new vegetarians, such as macrobiotics, who are persons following particular and often restrictive versions of plant-based diets based on religious principles. Such persons may eschew certain plant-based food sources and/or supplements. Not surprisingly, studies of plant-based nutrition carried out in such populations may document certain nutritional deficiencies, such as vitamins D or B-12 deficiency (Varner 1994a).

Even where nutritional studies do not focus on special subgroups of persons following plant-based diets, they often focus on the diets that people *happen* to eat and not the diets they *should* be eating from a nutritional planning standpoint. For example, a recent study found that vegans had a 30 % higher risk of bone fracture than omnivores, but upon closer inspection, it turns out to be the case that many of the vegans in the study were not taking in adequate calcium and that the increase in fracture incidence for vegan diets disappeared after calcium intake was controlled for (Appelby et al. 2007). These kinds of findings are important for documenting the risks of inappropriately planned plant-based diets, but they cannot be generalized to plant-based diets per se. Nonetheless, there is a historical tendency in the academic literature to identify "new vegetarians" with *all* vegetarians (Varner 1994a), and this tendency is still evident in some recent published work (see Finch and Stanford 2004, p. 11).

Contestable value judgments may be involved in the definition of dietary risk itself. In some cases, dietary risk associated with plant-based diets is assessed based on dietary intake or bioavailability of key nutrients such as iron, calcium, or sulfur-containing amino acids (Lönnerdal 2009; Ingenbleek and McCully 2012). However, this can be a problematic way to assess risk. For example, the lower bioavailability of nonheme iron in plant foods may be compensated for in some cases by the comparatively higher iron content in these foods. For many consumers in

developed countries for whom food availability is not an issue, simply increasing the amount of a food consumed can also compensate for lower bioavailability.

Furthermore, dietary intake might not always be a good criterion for risk assessment by itself.

As concerns iron, for example, increased absorption and decreased excretion can help to compensate for decreased dietary intake (American Dietetic Association 2009). Moreover, the adequacy of actual dietary intake needs to be assessed against an appropriate standard. For example, persons following plant-based diets may need less calcium than is generally recommended, since calcium requirements increase with protein intake, since persons following plant-based diets generally consume less protein than persons following omnivorous diets, and since the US RDA for calcium was set based on an assumption that most persons would be following Western diets high in animal protein (Lanou 2009; see also Bhatia 2008).

In other cases, the risks of plant-based diets are defined by reference to biochemical indicators of questionable importance. For example, studies may assert that plant-based diets are associated with a risk of iron deficiency based on the finding that persons following such diets have lower serum ferritin levels than persons following omnivorous diets (Lisowska et al. 2006). While serum ferritin is often considered an important indicator of overall iron stores, vegetarians or vegans with low serum ferritin levels often have normal serum iron levels, as well as normal hemoglobin levels. Furthermore, the ADA notes that the "incidence of iron-deficiency anemia among vegetarians is similar to that of nonvegetarians" (American Dietetic Association 2009). Hence, the attribution of iron deficiency risk to persons following plant-based diets on the basis of low ferritin levels is questionable, as "the physiologic significance of low serum ferritin concentrations is uncertain at this time" (Craig 2009, p. 1629S).

Contestable value judgments may also be involved in dietary risk assessment because the risks of one dietary pattern may be assessed without reference to the risks of alternative dietary patterns. Dietary calcium intake provides a good example. One recent commentary (e.g., Weaver 2009) recommends dairy intake as an essential part of a healthy vegetarian diet, since in the author's view persons are unlikely to achieve adequate calcium or potassium intake without it. This is a contestable claim, not least because the author explicitly defines "vegetarian diet" as one that does not include soymilk, despite the fact that fortified soymilk is widely available and can (notwithstanding calcium present in other plant foods or supplements) provide similar levels of calcium to cow's milk, which provides the majority of calcium in standard Western diets.

A counterpoint response notes that the consumption of dairy products may be associated with a number of diseases, including prostate and ovarian cancer, some autoimmune disease, allergy, and otitis (Lanou 2009). Furthermore, Western countries, in which omnivorous diets predominate, and which have the highest protein and calcium intakes, also have the highest incidence of osteoporotic bone fracture, something known as the "calcium paradox." Some commentators recommend a shift to an appropriately planned plant-based diet for *optimal* bone health (Lanou 2009; Anderson 1999).

Serum ferritin provides another example. The lower serum ferritin levels sometimes documented in persons following plant-based diets have been cited as a risk of iron deficiency. However, there is some evidence that serum ferritin levels are positively associated with cardiovascular disease (You and Wang 2005). Heme iron, but not nonheme iron, has also been associated with cardiovascular disease (Geissler and Singh 2011). Hence, the lack of heme iron in plant-based diets, and also the lower serum ferritin levels sometimes seen in persons following plant-based diets, can also be viewed as a possible benefit compared to omnivorous diets.

The framing of a risk can influence a person's perception of its magnitude. For example, the aforementioned 30 % increase in fracture risk seen in vegans as compared to omnivores was reported as a relative risk. When this is translated to an absolute risk, the risk difference between vegans and omnivores was about 1 % (Appelby et al. 2007). When presented this way,

the overall magnitude of the risk looks much less serious than when presented as a 30 % increase.

Finally, it should be emphasized that as concerns vitamins D or B12, their metabolites, calcium, and iron, studies may report conflicting results. For example, some studies find that persons following plant-based diets have low serum ferritin levels (Lisowska et al. 2006), while others do not (American Dietetic Association 2009). Even where unplanned or poorly planned diets are concerned, evidential value judgments are involved in determining whether sufficient evidence exists to say that a putative risk is real.

Naturalness and Evolution

Arguments about naturalness and evolution may also play a role in the nutritional assessment of plant-based diets. Both strong and weak forms of this argument are recognized. The weak form holds that even if supplements or fortified foods are capable of meeting nutritional needs on a plant-based diet, we should prefer omnivorous diets because supplements are unnatural, whereas sourcing these nutrients from animal products is natural. This form of argument is really just an application of the "natural is good" argument to the realm of nutrition. The argument that what is good or right can be defined in terms of what is natural, or that what is natural provides a good *criterion* for identifying goodness or rightness, has been substantially criticized in the philosophical literature and so will not be reviewed in any detail here. For example, it is arguably "natural" for humans to be both violent and prejudiced towards persons not like them, but both of these tendencies are arguably bad from a moral standpoint. Furthermore, it may be recommended that persons following omnivorous diets take vitamin supplements in some circumstances, and many foods (e.g., breakfast cereals) are vitamin fortified. Hence, arguments from naturalness may apply equally to plant-based and omnivorous diets.

A strong form of the naturalness argument holds that humans are best adapted from an evolutionary standpoint to eating meat and that the substitution of other protein sources and/or supplements for meat in the diet will be less healthful. This argument does not equate naturalness with goodness per se but rather holds that the most appropriate diet for humans is the one that is most conducive to our health or flourishing; that what is most conducive to our health or flourishing can be discovered through an examination of humans' ancestral dietary patterns and/or other evolutionary considerations; and that an examination of these evolutionary considerations shows a meat-containing or even meat-rich diet to be best.

This is the form of argument underlying the so-called Paleolithic (or Paleo) diets. Specific components of Paleolithic diets may include high intake of lean animal protein; high intake of fresh fruits and vegetables, particularly green, leafy vegetables; the elimination of starchy vegetables, dairy, and all grains from the diet; increased intake of nuts and seeds; and the elimination of processed foods altogether (Cordain 2002). The present concern is with plant-based versus omnivorous diets, so the relevant question is whether large amounts of lean animal protein are nutritionally superior to plant-based protein with or without appropriate supplements.

There are two lines of argument supporting Paleolithic diets. The first is the empirical observation that modern, developed countries show high incidences of a number of chronic diseases not seen in less developed countries or in contemporary hunter-gatherer societies. The second is the supposition that humans are best-adapted genetically to eating a diet closely approximating what our ancestors ate prior to the development of domestic agriculture and therefore that the chronic diseases seen in developed nations are attributable to deviations from this diet (Cordain 2002). Limited direct empirical data support the conclusion that Paleolithic diets may help to lower blood pressure, decrease body mass index, and control blood sugar, particularly in persons who are obese and/or diabetic, compared to no dietary change (Lindberg 2012). However, it is not presently clear which components of Paleo diets are most responsible for these

benefits – such benefits may, for example, be attributable to overall caloric restriction instead of animal protein. Furthermore, most of the arguments supporting Paleolithic diets are indirect and not based on direct empirical data.

A number of counterarguments raise doubts about the plausibility of Paleolithic nutrition. First, the lack of "diseases of civilization" seen in modern hunter-gatherer societies, despite sometimes high intakes of animal protein and fat, may be attributable to a very active lifestyle and not the benefits of diet itself – a point which proponents of Paleolithic nutrition often indirectly note themselves. Second, proponents of Paleolithic nutrition may make contradictory claims concerning evolutionary adaptation, for example, by endorsing "thrifty gene" hypotheses to explain humans' storage of excess carbohydrates as fat while also maintaining that Paleolithic diets did not contain significant carbohydrate (Knight 2011).

Third, theories of Paleolithic nutrition are premised on the idea that humans' genetic evolution stopped in Paleolithic times, but this is not necessarily true (Knight 2011). Fourth, Paleo proponents typically hold that hunter-gatherer societies consumed large amounts of protein and little if any starch. However, only a few hunter-gatherer societies, such as the Eskimo, obtained most of their nutrients from animal sources. In most cases plant foods, including starchy plant foods, formed a large part if not the bulk of hunter-gatherer diets (Milton 2000; Mercader 2009). Fifth, direct empirical evidence casts doubt upon the idea that an ideal diet contains large amounts of animal protein. As already discussed, a large amount of nutritional science shows that plant-based diets, when appropriately planned, can meet humans' nutritional needs and furthermore that plant-based diets offer benefits as compared to omnivorous diets concerning cardiovascular disease, body mass index, type 2 diabetes, certain types of cancer, and all-cause mortality (American Dietetic Association 2009; Fraser 2009). These comparative benefits appear also to apply to low-carbohydrate plant-based diets versus low-carbohydrate omnivorous diets (Knight 2011).

Sixth, the underlying logic of Paleolithic nutrition may involve some fallacies. It is not unreasonable to think that the ideal human diet will depend on the nature and limitations of our physiology and furthermore that the nature and limitations of our physiology will in turn depend on the environmental context in which we evolved. However, proponents of Paleolithic nutrition often talk of the diet that humans were "designed" or "meant" to eat (see, e.g., Cordain 2002). This argument seems to confuse evolution with teleology. Evolution does not work towards ideal ends. Certain phenotypic traits and behaviors will be more conducive to survival and reproduction than others, but an organism may survive and reproduce without flourishing; and what is conducive or necessary to survival and reproduction will change with context.

Notwithstanding associated risks, animal protein can be a good source of both macro- and micronutrients, and in an ancestral environment where certain micronutrients such as vitamin B-12 or polyunsaturated fatty acids (PUFAs) were not abundant, animal protein may have helped to protect against risks of nutrient deficiency or poor cognitive development (Finch and Stanford 2004). However, the fact that animal protein is a good source of nutrition in an environment of relative nutrient scarcity does not mean that it is a necessary or ideal source of nutrition in an environment where key nutrients are otherwise obtainable.

The so-called meat-adaptive genes also highlight the importance of environment in determining adaptive value. Meat consumption in the ancestral environment posed risks of infectious disease and hypercholesterolemia. Some evolutionary biologists have proposed that humans evolved certain genes, such as the genes encoding Lipoproteins and Apolipoproteins, to better deal with these risks. For example, the *ApoE4* allele increases inflammatory responses and is thought to have been protective against infectious foodborne illnesses. However, this gene also predisposes persons to certain degenerative diseases later in life, including Alzheimer's disease and cardiovascular disease (Finch and Stanford 2004). Because the average human lifespan in

the ancestral environment was much shorter than we presently enjoy in developed countries, such predispositions to degenerative disease would not have been a significant issue in the ancestral environment, though they are certainly an issue now. Furthermore, now that we have easier means of controlling food-borne illness (through safer production and knowledge about appropriate preparation and cooking), the benefit that ApoE4 provided in the ancestral environment no longer seems as relevant.

Other versions of these genes, which evolved later, are thought to have promoted humans' development of larger cranial capacity and longer lifespan than other species, by enabling the more efficient binding and transport of animal fats (Finch and Stanford 2004). Some commentators who highlight the importance of animal source foods in the human diet point to their "very important role in the evolution of our species" (Popkin 2009). However, the fact that animal source foods played an important role in human evolution, even if accepted as true, does not imply that the consumption of animal products is nutritionally ideal *now*. The genetic adaptations in question have already evolved – humans already have these genes, regardless of what dietary pattern they follow – and furthermore, humans cannot direct their own evolution. There is no reason to expect that the continued consumption of large amounts of animal protein will somehow result in further adaptations that are beneficial to human health or development.

Acceptable Risk and Risk-Potential Benefit Judgments

Though the assessment of nutritional risk associated with plant-based diets may involve contestable value judgments, it is nevertheless true that plant-based diets are associated with *some* risks. Since plant-based diets are also associated with potential benefits as compared to omnivorous diets, i.e., since omnivorous diets are also associated with risks, an ultimate judgment of nutritional adequacy or favorability for each dietary pattern must take into account both risks and potential benefits. These risks and potential benefits should be assessed without bias, but even when bias is absent the resulting judgments are still evaluative in the sense of involving prudential judgments about the goodness or badness of certain outcomes, the magnitude of respective risks and potential benefits, and thresholds for when risks should be considered acceptable. The questions of when dietary risks are acceptable, or when potential benefit outweighs risk, are beyond the scope of this entry. However, it should be emphasized that establishing that plant-based diets carry certain risks shows neither that such diets are not nutritionally adequate nor that plant-based diets are adequate but compare unfavorably to omnivorous diets. Given that appropriately planned plant-based diets can meet all nutritional needs *and* that such diets show health benefits as compared to omnivorous diets, it might be asserted that appropriately planned plant-based diets have a favorable risk-potential benefit profile as compared to appropriately planned omnivorous diets in the ideal.

However, this conclusion may be premature, since the omnivorous diets used in comparisons may need to be differentiated more in terms of the type and amount of animal products consumed. Furthermore, as concerns certain risks and benefits, additional data will prove helpful, e.g., as concerns the relationship between ferritin and cardiovascular disease or the significance of low serum ferritin. Moreover, it may be useful to assess not only the comparative risk-benefit profile of adequately planned diets but also the risk-benefit profile of plant-based and omnivorous diets as they tend to be consumed in less than ideal circumstances. At present, these are open questions.

Summary

Discussions about the nutritional adequacy of plant-based diets often seem to presuppose certain framing assumptions or value judgments. These concern the following: (1) the level of scrutiny of the risks of plant-based diets as compared to the risks of omnivorous diets; (2) framing assumptions in the way plant-based diets are

defined; (3) value judgments in the way dietary risk is defined, for example, as concerns bioavailability, serum biochemical markers, or relative versus absolute risk; (4) value judgments about what is natural being good, or about the ideal nature of ancestral dietary patterns; and (5) value judgments about acceptable risk and overall risk-potential benefit profiles. It is important to be aware of these value judgments, since they condition the nutritional assessment of plant-based diets. Furthermore, the discussion here suggests that in many cases, value judgments or framing assumptions involved in the nutritional assessment of plant-based diets may be contestable and may explicitly or implicitly give the impression that such diets are riskier than they actually are.

Cross-References

- ▶ Carnism
- ▶ Meat: Ethical Considerations
- ▶ Vegetarianism

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Plato and Food

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Synonyms

Gluttony; Hedonic calculus; Socratic ethics; Temperance; Tripartite soul

Introduction

Plato (429–347 BC) is one of the greatest literary and philosophic minds of the Western intellectual tradition. His wide-ranging philosophic legacy includes foundational contributions to the fields of ethics, psychology, political science, aesthetics, educational theory, epistemology, and metaphysics. In an often-quoted statement regarding his philosophic significance, Alfred North Whitehead writes, "The safest general characterization of the European philosophical tradition is that it consists of a series of footnotes to Plato." In light of Whitehead's claim, one should expect that there are significant contributions to the newly emerging field of the philosophy of food to be found in Plato's writings. A summary of these contributions, which will be discussed in this entry, includes the problem of gluttony and the correlate virtue of moderation, the diet of the ideal city, and the harmonious order of the three parts of the soul (appetitive, spirited, and rational).

Interpreting Plato's Work

Plato's unique writing style presents the reader with some of the most engaging works in the history of philosophy, as well as some of the most difficult to interpret. His surviving works include 36 dialogues and 13 letters. There is ongoing scholarly debate whether some of these (especially the letters) may be erroneously attributed to him; that said, scholars are in general agreement about a core list of dialogues as being authentic in light of their stylistic and substantive consistency. The discussion that follows will primarily be focused on Plato's *Republic*, *Gorgias*, and *Protagoras* though there are relevant ideas regarding food ethics that run throughout his works. In particular, the dialogue *Charmides* is especially relevant insofar as it is devoted to an investigation of the virtue of moderation. The references to Plato's works in this entry, as well as in most translations and secondary works about Plato, will be to the Stephanus line numbers rather than to page numbers to facilitate finding a precise passage across different editions.

Unlike other intellectual figures, Plato presents his ideas in dramatic dialogues, whose

literary form poses several problems in their interpretation (see Klein (1965) and Rutherford (2000) for a full account of what is entailed in interpreting Plato dramatically). Some of the problems inherent in interpreting the Platonic dialogue include situating arguments within the dramatic context, interpreting the use of literary devices (irony, character types, myth, and allegory), and assessing the ultimate status of provisional arguments that are either affirmed or rejected in the course of the dialogue. The tendency of older Platonic scholarship was to disregard the literary aspect of the dialogue in order to distill definitive arguments that could be attributed to Plato. In a provocative passage from one of the more trustworthy letters, Plato cautions against this tendency: "No treatise by Plato exists or will exist, but those which now bear his name belong to a Socrates become fair and young" (Plato 1929, 2.314c). Plato is suggesting that if there is a philosophy to be attributed to him, one should pay careful attention to the argument proffered by Socrates; however, there remain several problems with either positing that Plato is simply writing down the ideas of his teacher or that the Socrates who appears in the dialogues is Plato's mouthpiece. Since Socrates wrote nothing, it is impossible to untangle his ideas from those advanced by Plato, though the artistry and philosophic rigor of the Platonic dialogues attest to Plato being more than a disciple of his teacher regardless of the extent to which he was influenced by him. Although Socrates is the principle and most convincing speaker in the majority of the dialogues, several of Plato's most important dialogues (Sophist, Statesman, and Laws) feature principle speakers other than Socrates. Additionally, one must consider the philosophic merits of the arguments proffered by the interlocutors even if these are on the surface rejected. Recent Platonic scholarship has become more sensitive to interpreting his ideas in light of these dramatic and literary concerns. This caution is particularly valuable in an area of inquiry like the philosophy of food that attempts to formulate Plato's contributions to this narrow subject divorced from the larger philosophic project. In this entry, arguments will be attributed to the specific character (Socrates, Callicles, and Glaucon) who forwards them and will only be attributed to Plato when it is warranted by the dialogue read as a whole.

The Problem of Gluttony

While modern culture may regard gluttony merely as a health issue, Plato treats the malady as a central concern throughout his works with widespread implications for his ideas on ethics, psychology, and epistemology. For Plato, individuals whose souls are primarily directed to appeasing their appetites for food, drink, and other bodily pleasures suffer from disordered souls that are incapable of apprehending truth as illuminated by the good and thus are hindered from realizing their own best interests. The problem is epitomized in the famous cave allegory from the *Republic*. Plato's Socrates offers a ruthless diagnosis of the human condition through an analogy to prisoners unaware of their own enslavement: "Picture men dwelling in a sort of subterranean cavern with a long entrance open to the light on its entire width. Conceive them as having their legs and necks fettered from childhood, so that they remain in the same spot, able to look forward only, and prevented by the fetters from turning their heads" (Plato 1969, p. 514a–b). Just after recounting the story, Socrates provides an interpretation of the symbolism of the chains that bind the prisoner:

> Observe then that this part of such a soul, if it had been hammered from childhood, and had thus been struck free of the leaden weights, so to speak, of our birth and becoming, which attaching themselves to it by food and similar pleasures and gluttonies turn downwards the vision of the soul—If, I say, freed from these, it had suffered a conversion towards the things that are real and true, that same faculty of the same men would have been most keen in its vision of the higher things, just as it is for the things toward which it is now turned. (Plato 1969, p. 519a–b)

The following conclusions (which will subsequently be discussed) can be drawn from this passage: (1) Plato considers gluttony or intemperance to be such a pervasive condition that it

typifies most men's souls, (2) the overweaning desire for pleasure prevents individuals from apprehending the rational world of ideas, and (3) there is a complementary passion for knowledge that is accessible to an individual that is able to master his or her appetites for bodily pleasure.

Why would Plato believe that the problem of intemperance is so pervasive as is suggested by the cave allegory when modern psychology regards the food, drug, or sex addict as manifesting extreme behaviors rather than the norm? Although the representation of the gluttons as chained prisoners suggests that the individual is largely passive in the acculturation process by which this psychological disposition has been habituated, Plato affirms that people are rational creatures who intentionally pursue what they believe to be in their best interests. The glutton is thus not intentionally engaging in self-destructive behavior, since as Socrates affirms in *Protagoras*: "no one willingly goes after evil or what he thinks to be evil; it is not in human nature" [. . .] (Plato 1924, p. 358c–d). If people are rationally seeking their own good, then why would gluttons or other kinds of addicts indulge their appetites to the point of endangering their health?

Since Plato assumes that humans are rational creatures, he concludes that self-destructive behavior must arise out of a misperception of the effects of these actions. Most people, in fact, are mistaken about their best interest by overvaluing the pleasure they will derive from immediate gratification without regarding the long-term consequences of their actions. Socrates proposes in *Protagoras* that this problem could be rectified if individuals employed a more objective system for reckoning pleasures and pains than what seems good in the moment:

> Is it not the latter [appearances] that leads us astray, as we saw, and many a time causes us to take things topsy-turvy and to have to change our minds both in our conduct and in our choice of great or small? Whereas the art of measurement would have made this appearance ineffective, and by showing us the truth would have brought our soul into the repose of abiding by the truth, and so would have saved our life. (Plato 1924, p. 356d–e)

Socrates' idea of employing an objective system to weigh the long-term costs and benefits of a desire shows the obvious flaw in the glutton's rationale. Since individuals innately seek their own good, they would not value the immediate pleasure they derive from something if they were able to weigh this against its potentially fatal side effects. Socrates illustrates the point in *Hipparchus* by noting that a dinner of poison, no matter how delectable it may be, is not nourishment: Do you include [as an example of profiting from something] a case where, after enjoying a banquet at which one has had much good cheer without any expense, one acquires an illness? (Plato 1927, p. 231b). Although people believe that they are the best judge of themselves, Socrates argues in several passages that people would need the knowledge of a physician to know with certainty that a food was actually nutritious (Plato 1924, p. 313d; Plato 1925, p. 464d).

Although Plato explains gluttony as resulting from ignorance, he recognizes the rationale that overindulgent individuals employ to justify their lifestyles. In the dialogue *Gorgias*, Callicles argues that the man who is able to satisfy his desires is far from a slavish couch potato – an exemplar of manly virtue and more self-actualized than the common man: "natural fairness and justice, I tell you now quite frankly, is this – that he who would live rightly should let his desires be as strong as possible and not chasten them, and should be able to minister to them when they are at their height by reason of his manliness and intelligence, and satisfy each appetite in turn with what it desires" (Plato 1925, pp. 491e–492a). Callicles goes on to claim that temperance is only promoted as a virtue by those weak individuals who are without the resources and power to fulfill their desires (Plato 1925, p. 492a–b). Nobody would, according to Callicles, restrict his or her desires when he or she had the ability to indulge them without restraint.

Socrates attempts to discredit Callicles' ennobling of the unbridled pursuit of pleasure by arguing that hedonists' insatiable desires actually cause them more pain than individuals who are able to satiate their desires. In a poetic image in

which the various desires are compared to different liquids which the individual is burdened with the task of filling up in their respective jars, Socrates contrasts the temperate individual with the gluttonous and licentious: "One man, when he has taken his fill, neither draws off any more nor troubles himself a jot, but remains at ease on that score; whilst the other finds, like his fellow, that the sources are possible indeed, though difficult, but his vessels are leaky and decayed, and he is compelled to fill them constantly, all night and day, or else suffer extreme distress" (Plato 1925, pp. 493e–494a). Although Callicles retorts that individuals who are constantly filling their jars will derive greater pleasure through the continuous activity of inflow, Socrates notes that this sense of pleasure is only achieved by the simultaneous feelings of pain caused by the deprived state of hunger or thirst: "you say one enjoys oneself, though in pain at the same moment, when you say one drinks when one is thirsty?" (Plato 1925, p. 496e). In a similar discussion in *Republic*, Socrates clarifies that the pleasures and pains associated with the appetites are only a result of their oscillation from the opposing state; consumption of food regardless how delectable it may be is not as pleasurable when one is not hungry. He then contrasts the ephemeral quality of bodily pleasure with the pleasures to be derived from filling the soul with unwavering knowledge: "If, then, to be filled with what befits nature is pleasure, then that which is more really filled with real things would more really and truly cause us to enjoy a true pleasure, while that which partakes of the less truly existent would be less truly and surely filled and would partake of a less trustworthy and less true pleasure" (Plato 1969, p. 585d–e). In several passages, Socrates attempts to redirect the desire for bodily pleasure into a desire for learning and truth.

Socrates' most ruthless condemnation of the glutton comes in his examination of the individual who is diagnosed as suffering from a tyrannical disposition of the soul. In the previously examined passages, gluttonous individuals are considered only insofar as they torture their own souls by engaging in a ceaseless pursuit of desire. In contrast, the over indulgence in food and drink in tyrannical souls acts as a gateway to their complete disregard for all decency in an unabandoned pursuit of illicit activities:

> When under the tyranny of his ruling passion, he is continuously and in waking hours what he rarely became in sleep, and he will refrain from no atrocity of murder nor from any food or deed, but the passion that dwells in him as a tyrant will live in utmost anarchy and lawlessness, and, since it is itself sole autocrat, will urge the polity, so to speak, of him in whom it dwells to dare anything and everything in order to find support for himself and the hubbub of his henchmen, in part introduced from outside by evil associations, and in part released and liberated within by the same habits of life as his. (Plato 1969, pp. 574e–575a)

Although this might at first seem to be an extreme description of an individual who is as depraved as the one described by Socrates, Plato is actually providing a subtle understanding of how addiction afflicts the soul in such a manner as to subvert all respect for common decency.

The Diet in the Ideal City

In the previous section, Plato's treatment of the psychological and ethical implications of the vice of gluttony was examined. The core argument of Plato's *Republic* will now be examined to understand the complementary virtues of temperance and justice. Since the inner workings of the soul resist direct apprehension, Socrates proposes that he and his discussion partners investigate the order and disorder of various political regimes under the notion that an individual and a state are similarly constituted. The subtleties of normal and abnormal psychology are thus made manifest by comparison with an ideal regime and several deviant regimes that correspond to different psychological types. The diet of the citizens in the various regimes that are proposed will turn out to be a crucial part of the overall discussion.

Socrates begins his project of political theorizing by imagining a city that is devised solely to satisfy the conditions of utmost necessity. He designates this city as healthy since the citizens in it will only consume those goods that are necessary to preserve their lives. With particular

focus on their diet, Socrates describes the healthy city in the following manner:

> First of all, then, let us consider what will be the manner of life of men thus provided. Will they not make bread and wine and garments and shoes? And they will build themselves houses and carry on their work in summer for the most part unclad and unshod and in winter clothed and shod sufficiently? And for their nourishment they will provide meal from their barley and flour from their wheat, and kneading and cooking these they will serve noble cakes and loaves on some arrangement of reeds or clean leaves, and, reclined on rustic beds strewn with bryony and myrtle, they will feast with their children, drinking of their wine thereto, garlanded and singing hymns to the gods in pleasant fellowship, not begetting offspring beyond their means lest they fall into poverty or war? (Plato 1969, p. 372a–c)

As Socrates notes at 373c, this first city is completely vegetarian (Dombrowski 1984). In one of the most famous lines of the entire dialogue, Glaucon vigorously protests against the diet that Socrates proposes for the city as being too bland: "No relishes apparently, for the men you describe as feasting" (Plato 1969, p. 372c). Socrates ironically responds to Glaucon's demand for more appetizing and indulgent cuisine with relishes and desserts that are just as nutritious as the city's staple diet of barley cakes:

> I forgot that they will also have relishes—salt, of course, and olives and cheese and onions and greens, the sort of things they boil in the country, they will boil up together. But for dessert we will serve them figs and chickpeas and beans, and they will toast myrtle-berries and acorns before the fire, washing them down with moderate potations and so, living in peace and health, they will probably die in old age and hand on a like life to their offspring. (Plato 1969, p. 372c–d)

Interestingly, Socrates seems not only to identify the citizens' diet as being responsible for their physical health but also the city's political stability.

Socrates refers to this first city as healthy and true; however, its ultimate significance in the argument is disputed by both readers and scholars alike. Many find in the description a Utopian ideal of individuals living in harmony with nature and cooperatively sharing in a mutually beneficial community in which all the citizens' needs are met even if this be at a minimal standard of living. McKeen (2004) notes that this sort of harmonious living without any formal political institutions is an impossible ideal. In contrast, Bloom (1991, p. 346) notes that the absence of philosophy from the city makes it ultimately undesirable as a Platonic ideal. Finally, Reeve (1988, pp. 176–178) notes that the city does not share its consumables in the manner of a family or a commune but rather is an association of self-interested moneymakers who exchange their wares in the marketplace solely for their own advantage.

Glaucon certainly does not regard the healthy city to be any sort of ideal (Bloom 1991, p. 346; Burnyeat 1999). He is not in the least humored by Socrates supplementing their diet with nutritious desserts and denounces the entire city on account of its cuisine as beneath what is fitting for humans: "If you were founding a city of pigs, Socrates, what other fodder than this would you provide?" (Plato 1969, p. 372d). Like Callicles, Glaucon identifies consumables as signifiers of one's social status and thus is genuinely offended that a city that is supposed to exemplify virtue would have its citizens eating nuts and berries while lying in a pile of leaves. His original request for relishes is really the demand for the comforts of civilized living: "They must recline on couches, I presume, if they are not to be uncomfortable, and dine from tables and have made dishes and sweetmeats such as are now in use" (Plato 1969, p. 372d–e). This time Socrates does indulge Glaucon's request as he introduces luxuries into the first city that transform it into a second regime known as the feverish city: "For there are some, it appears, who will not be contented with this sort of fare or with this way of life; but couches will have to be added thereto and tables and other furniture, yes, and relishes and myrrh and incense and girls and cakes—all sorts of all of them" (Plato 1969, p. 373a). Recognizing that desire without restraint will be insatiable, Socrates continues to introduce more and more luxury goods into the feverish city culminating in the declaration that they will now need physicians to attend to the diseases that will inevitably arise from the city's unhealthy diet and, even

more troubling, they will now need warriors to wage war on their neighbors in order to pillage their neighbor's resources and expand their own borders (Plato 1969, p. 373d–e).

The introduction of the warrior class and their ultimate assumption of a ruling position within the city will transform the feverish city into a third regime, which represents the ideal for which Socrates was seeking. Socrates establishes order within this city by enacting a three-class structure consisting of rulers, auxiliaries, and craftsmen that each has a role in contributing to the overall harmony of the city. The immoderate and insatiable citizens of the feverish city will now be restrained by laws that are imposed by the philosopher-kings and enforced by the spirited auxiliaries. This three-class structure reveals the analogous three parts of the soul: "One part, we say, is that with which a man learns, one is that with which he feels anger. But the third part, owing to its manifold forms, we could not easily designate by any one distinctive name, but gave it the name of its chief and strongest element; for we called it the appetitive part because of the intensity of its appetites concerned with food and drink and love and their accompaniments, and likewise the money-loving part, because money is the chief instrument for the gratification of such desires" (Plato 1969, pp. 580e–581a). As was evident in the feverish city, the appetites are incapable of discerning one's best interest since they know no restraint and only seek to pursue additional pleasure. This condition allows individuals to be easily seduced in choosing the culinary artist's delicacies even when they are in need of the physician's medicine. Internal harmony is only achieved when individuals are able to regulate their appetites by the rule of reason aided by the spirited faculty (Plato 1969, pp. 443d–444e).

Although the healthy city's vegetarian diet and moderate lifestyle may, at first glance, seem to be the most appealing regime presented in the *Republic*, especially when compared with the immoderate and bellicose feverish city, the true order of the soul only is revealed by the third regime in which the unhealthy excesses of the second regimes are purged.

Summary

As may be seen in this entry, the vice of gluttony and its complementary virtue of temperance are featured prominently in Plato's writings. Individuals that are afflicted by gluttony not only suffer physical harm as a result of their diets and lifestyles but also from a psychic disorder that is further responsible for instigating illicit behaviors and ultimately a complete disregard for all ethical standards. As long as the individual remains afflicted by a gluttonous soul, he or she is prevented from apprehending the true reality and thus hindered from realizing his or her own best interest. Although Plato considers the physical, psychological, and ethical merits of a vegetarian diet, he ultimately endorses the city that is ruled by philosopher-kings and not the healthy city as his ideal polity. Moreover, it is through the class structure of this third regime that the three parts of the soul are revealed. Just as the city achieves justice and moderation through the rule of reason, so too will the individual achieve psychic harmony when his or her reasoning faculty rules over his or her appetites with the aid of the spirited part. In the final analysis, Plato is a harsh critic of the ill effects of immoderation; however, rather than simply restraining desire, he seeks to redirect it to a salutary passion for the love of wisdom.

Cross-References

- ▶ Asian Cuisine: Ethical Considerations
- ▶ Food Addiction
- ▶ Gluttony
- ▶ Gustatory Pleasure and Food
- ▶ Vegetarianism
- ▶ Virtue Theory, Food, and Agriculture

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Political Agronomy

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Synonyms

Agricultural research; Conservation agriculture; Contested agronomy; Political ecology; System of rice intensification

Introduction

Agronomy, in the Anglophone tradition, is usually understood as the application to crop production of knowledge and technology developed from the plant and soil sciences. Through both formal and informal research and practice, new agronomic knowledge and technology are created that can be used to address "technical" problems within existing production systems, develop new systems, and/or to further specific social, political, economic, technical, and/or commercial objectives. Any aspect of this process may be contested, from the identification of a problem or the configuration and performance of a new technology or system through to the vision (implicit or explicit) of a desirable future world that underpins it. With **politics** understood broadly as social relations involving authority or power, the term **political agronomy** refers to the study of relationships and processes which link political, economic, and social forces and factors to the creation and use of agronomic knowledge and technology. Political agronomy studies differ from other studies of agricultural science and technical change within agriculture by problematizing the creation and use of agronomic knowledge and technology in terms of asymmetric power relations, contestation, and struggle. Used in this way, political agronomy relates to and draws from the fields of science and technology studies (STS) (Sismondo 2012) and political ecology (Robbins 2011).

Following Sumberg et al. (2012b), while the creation and use of agronomic knowledge and technology are by their very nature "political," beginning in the mid-1970s, what had been a relatively stable context for agronomy and agronomists began to change. Over the course of the following three decades, this context changed dramatically, making the political nature of agronomy more apparent. The new context for agronomic research can be understood in terms of change in three closely related elements: society (changing ideology, new roles, new actors, new spaces), agriculture and the associated food economy (increasing scale, global consolidation, new systems of regulation), and agricultural science (new foci, new tools, change in where and by whom it is carried out and who it is funded by). For much of the twentieth century in Europe and North America, agronomy functioned as a technical discipline focused on the critically important but largely practical matter of improving crop production. In this context, but particularly following the growth of state planning and

economic management in the 1930s, politics around agronomy and agronomic research was dominated by the state, which set policy priorities, funded research, and promoted the uptake of resulting technologies. With the state as "principal" and research agronomists in universities and state-funded institutions as "agents," there was a strong unity of purpose, with modernization at its core, between the state, the discipline of agronomy, and farming communities. This unity of purpose and the practical, problem-solving orientation of agronomy meant that as a discipline it experienced little of the heated debate that shook some other academic fields to their cores (cf. Harwood 2013). However, the position of agronomy began to change with the rise of the neoliberal agenda and emergence of the environmental and participation movements in the 1970s.

A faith in the role of "free markets" and a desire to "shrink the state," combined with new intellectual property regimes and emergent biotechnologies, opened the way for a much expanded role for private capital in agricultural research and technology development and promotion. At about the same time, in some quarters, there was increasing concern about the environmental impacts of modern farming practices, while in others, the notion gained ground that in the developing world, poor farmers were not benefiting from – or were even being harmed by – new agricultural technology, leading to calls for more "participatory" and empowering approaches to research. Taken together, these changes represented a fundamental shift in the context within which agronomic research was prioritized, funded, managed, implemented, and evaluated. With agronomists still acting as agents (although now working in a wider array of organizational and institutional settings), the principals had become more numerous and their institutional imperatives, agendas, and motivations more diverse. An unintended consequence of this restructuring of agronomic research has been the opening up of new spaces for contestation both within the discipline and about the knowledge and technology it produces. While these changes and their effects have been evident to varying degrees in different settings, there is enough of a common thread to warrant systematic study. Active and wide-ranging intradisciplinary and interdisciplinary debate and public contestation and activism around agricultural technology have coincided with renewed concern about the ability of agriculture to deliver both global food security and natural resource sustainability. Political agronomy studies are more relevant now than ever.

Scholarship on agriculture and food policy contains an important strand that explores the political economy aspects of agricultural research in specific national contexts and in relation to specific crops, technologies, and global research initiatives such as the centers of the Consultative Group on International Agricultural Research (CGIAR). Political agronomy draws from this literature but highlights both the rapidly changing social, economic, and technological contexts within which agronomic research takes place and the fact that these changing contexts have significantly reduced the state's ability to use traditional policy instruments to affect the direction and rate of technical change within agriculture. Thus it is the changing political economies of agronomic research, their interaction and coevolution over time and space, and the associated debates, contestations, and struggles that "frame" political agronomy analysis. From a political agronomy perspective, the questions of interest relate to the drivers of processes of framing and reframing; the actors and relationships involved; and the impacts of different framings and narratives on the conception, practice, and presentation of agronomic research and what it can deliver.

In the remainder of this entry, this argument is developed using examples of knowledge and technology developed through agronomic research.

Knowledge and Technology at the Center of Political Agronomy

Political agronomy analysis necessarily focuses on and revolves around efforts to generate and

promote the use of new agronomic knowledge and technology. While any number of different schemes could be used to classify research, innovation, and technical change within agriculture, cases of technology generation can be assigned to two main groups. The first, encompassing perhaps the bulk of "everyday agronomic research," includes the countless examples of incremental innovation, each meant to address a specific "technical" problem within a given production system or context or to provide the user ("farmer/producer") with some marginal advantage. New crop varieties, new pest control products or strategies, and new fertilizer application rates or methods might typify this kind of incremental innovation. By definition, there is little that is radical in these examples: rather, they are about maintaining, stabilizing, or incrementally improving existing systems. In agricultural economies where innovation is largely in the hands of private sector actors (e.g., seed, chemical and fertilizer companies), the dynamic of incremental innovation is driven in large part by a desire to maintain or increase market share and profit margins. Contestation around examples in this first group tends to be limited; focused on technical performance, benefit-cost, etc.; and has limited public profile.

In contrast, in the second group are examples of the generation and promotion of agronomic knowledge and technology that are more radical and transformative. Here the direction of agronomic research is set by an objective of transforming the social, political, economic, technical, and/or commercial orders and is underpinned by both an analysis of "problems" or "constraints" and a vision of a desirable future which might encompass either a continuation of existing trends toward increasingly mechanized farming or a radical break toward smaller-scale "postindustrial" agriculture (Woodhouse 2010). Examples in this transformational group include the agronomic research that facilitated the mechanization of the California horticulture industry (Hightower 1972), the Green Revolution approach to the modernization of smallholder farming, the organic and agroecological farming movements, and the Millennium Villages program and the Sasakawa Global 2000 program in Africa. In these examples, agronomic research is used as a direct instrument of either government policy or the interests of other powerful (and sometimes less powerful) actors. The research agronomist may still work on varieties, fertilizer, soil management, etc. but perhaps even less constrained by the "real-world" limits faced by the current population of farmers. With examples in the second group, the potential for contestation is greater, including the analysis of the problem, its causes, and associated outcomes; the vision of the future agrarian society they are seeking to create, including expectations of who wins and who loses from the proposed change; the technical performance of the new technology or system; and the issues associated with the other policies, measures, and institutions needed to support it. Contestation and public activism may coalesce around a number of social, political, economic, and environmental concerns (Table 1), many of which are outside the traditional disciplinary bounds of agronomy. For example, the protracted debates about the poverty, labor, and

Political Agronomy, Table 1 Domains and areas of contestation

Domain	Areas of contestation
Environment	Biodiversity
	Water use/quality
	Carbon emissions
	Soil fertility/soil health
Economic/social	Productivity
	Labor
	Gender
	Poverty
	Health
	Equity
	Food security
Political	Agrarian structure
	Power/control
	Scale
System	Integration
	Resilience
	Robustness
	Stability
	Sustainability

Source: Authors' own compilation

equity effects of the Green Revolution in Asia in the 1970s and 1980s primarily involved social scientists and economists (Orr 2012), not agronomists or plant breeders, and had little profile in mainstream agronomy journals. In contrast, recent debates about GM varieties, conservation agriculture (CA), and the System of Rice Intensification (SRI) are much more in evidence in these same agronomy journals.

Both incremental and transformative innovation may be associated with unforeseen and unintended consequences, and both the possibility and reality of these may change the focus, nature, and/or intensity of contestation. This highlights the interplay of different understandings of and approaches to risk, uncertainty, and ambiguity in the politics around agricultural technology and the associated dynamics of contestation. Debates and activism around the potential effects of GM crop varieties on human health and weed populations illustrate how these different understandings can be used tactically to affect both the public mood and regulatory outcomes.

Another widely used tactic in contestation around agricultural technology involves framing and reframing, based on the observation that in some situations, small changes "in the presentation of an issue or an event produce (sometimes large) changes of opinion" (Chong and Druckman 2007, p.104). For example, a technology such as GM crop varieties can be framed as an incremental innovation (simply the latest in a long line of improved varieties) or as "technology for the poor" (Glover 2010) or be reframed as a transformative technology in either a positive (allowing significant reductions in pesticide application or improved nutrient content through "biofortification") or negative (facilitating even greater concentration of corporate control over key agricultural and biological resources) sense. Similarly, an apparently innocuous incremental innovation can be reframed as a shortsighted "technical fix" because it neither acknowledges nor addresses what the reframer considers the underlying structural issue, while potentially transformative innovations such as organic agriculture are reframed as idealistic and impractical.

Closely related to the question of framing is another important dimension of the new politics of agronomic research and technology in the developing world – the heightened imperative to demonstrate impact and "value for money." This imperative operates at many levels, from the individual research agronomist, program, and institute through to the research funding agencies (public, charitable, or private), development ministries, and so on. In addition, agricultural development actors, from local community groups and district-level extension services through to international NGOs and UN agencies, are under increasing pressure to justify their continued funding by demonstrating the success of their actions. The multiple and overlapping levels at which agronomists work, from experimental plots and farmer's field to production systems and landscape, provide fertile ground for this element of the new politics of agronomic research. The stakes can be quickly raised – from "promising results" to the promise (or claim) of "impact at scale" – during which situated agronomic knowledge and technology become progressively "silvered" into the next universal technology bullet. The Internet and other media that are less constrained by the ethos of peer review are critical to the dynamic of "success making," the act of proclaiming a particular project, program, innovation, technology, policy, or organization a success in a way that may shelter the claim from normal scrutiny and critical evaluation (Sumberg et al. 2012a).

To summarize, the building blocks of political agronomy analysis emerge from addressing questions in four related domains:

The agronomic problem being addressed: How is it framed, at what scale, and by whom? How high a priority is it, for whom, and in what situations? How are risk, uncertainty, and ambiguity understood and addressed, and by whom?

The agronomic solution being proposed: How is it framed, at what scale, and by whom? How effective it is, by what criteria, at what cost, for whom, and in what situations? What benefits does it generate, for whom, and in what

situations? How are risk, uncertainty, and ambiguity understood and addressed, and by whom?

The socioeconomic problem being addressed: How is it framed, at what scale, and by whom? How high a priority is it, for whom, and in what situations? How are risk, uncertainty, and ambiguity understood and addressed, and by whom?

The socioeconomic solution being proposed: How is it framed, at what scale, and by whom? How effective it is, by what criteria, at what cost, for whom, and in what situations? What benefits does it generate, for whom, and in what situations? How are risk, uncertainty, and ambiguity understood and addressed, and by whom?

These questions situate political agronomy studies firmly in time and space and in a social, political, and economic context, all of which are prerequisites for meaningful analysis of the relationships and processes linking political, economic, and social forces and factors to the creation and use of agronomic knowledge and science and technology.

Contemporary Examples

Three contemporary examples of agronomic technology – conservation agriculture (CA), GM crop varieties, and the System of Rice Intensification (SRI) – help to illustrate many of the elements discussed above. While these technologies have very different origins, address different problems, and are supported by different interest groups and coalitions, they have all been (and continue to be) the subject of heated debate and contestation both within agronomic research circles and beyond.

Conservation Agriculture (CA)

The technology of CA as promoted in the developing world is defined by (i) minimal soil disturbance or tillage, (ii) maintenance of soil cover through crop canopy and mulch, and (iii) crop rotation. Proponents claim that the CA is both productive and profitable and that its practice brings economic, agronomic, environmental, and social benefits (Kassam and Brammer 2012). Increased levels of soil carbon, improved soil structure and in-soil water conservation are the most often cited agronomic benefits. Contestation focuses around the universality of these claims and the effects of differences in soil type, rainfall regime, farming system, mulch availability, planting method, weed control method, and fertilizer application on the presence, level, and variability of any benefits (Giller et al. 2009). Despite evidence of site and context specificity, the transformative potential of CA as the basis of sustainable, pro-poor agriculture everywhere is heavily promoted. It is framed as a technology that can stimulate increased investment on the part of poor farmers, especially in Africa, and result in much needed productivity gains. CA is increasingly being framed as the prime example of "climate-smart agriculture" (CSA), sustainably increasing productivity and resilience (adaptation) and reducing greenhouse gases (mitigation) while enhancing the achievement of national food security and development goals. The promotion of CA in Zimbabwe, with its links to national politics, the global political economy of development and humanitarian assistance, and Christian faith groups, provides the case for a particularly compelling political agronomy analysis (Andersson and Giller 2012).

GM Varieties

The technical debates surrounding the development and use of agricultural biotechnology, particularly genetically modified (GM) crop varieties, are reminiscent of debates around the Green Revolution. Proponents of GM crops tend to present them as a technical answer to the problem of global hunger, based on promises of increased productivity, lower input costs, and reduced environmental impact (Bruce 2012). The world's food problem is framed mainly as a matter of supply, the solution to which is GM crops. Critics respond that on the ground GM crops often fail to live up to these promises. Further they raise the specter of crops that can be toxic, allergenic, or less nutritious than their natural counterparts; that can disrupt the

ecosystem through genetic drift to crop and weedy relatives; that can increase rather than reduce pesticide and herbicide use over the long term; and that can lead to herbicide-resistant weeds. Different understandings of evidence, risk, uncertainty, and ambiguity loom large in these debates. One key debate about the transformational potential of GM varieties revolves around their impacts on poverty, hunger, and the livelihoods of poor people. Some advocates have suggested that GM varieties could reinvigorate the stalled Green Revolution, reframed as a "Gene Revolution." Critics charge that this vision overlooks the vital role that political and economic interests and allied institutions play in shaping the outcomes of technological change (see Glover 2010). In other words, delivering the pro-poor promise of biotechnology requires appropriate regulatory and governance procedures which are often lacking in many countries. Another major front in the contestation around GM varieties relates to the fears on the part of some concerning the dangers of even greater corporate control over key biological and livelihood resources such as seeds, thus linking resistance to GM crops to debates around globalization and "food sovereignty."

System of Rice Intensification (SRI)

This technology is defined by its supporters to include the transplanting of single, very young, widely spaced seedlings; irrigation using limited amounts of water during the vegetative growth period, sometimes including short periods when the soil is allowed to dry; and careful control of weeds, ideally by disturbing the soil so as to increase aeration (Stoop et al. 2002). Application of substantial quantities of organic fertilizer is encouraged in order to stimulate microbial activity in the soil. Proponents of SRI suggest that it must be understood as a set of "principles" to be adapted to local conditions rather than a fixed technological package. The main lines of contestation have been around the very high yield levels claimed by some proponents, the physiological effects of different soil water regimes (flooding depth and cycles of wetting and drying) on soil and plant physiology, the validity of measurements of component effects when interactions (synergies) are strong, and the real extent of the differences between SRI and the "best agricultural practices" developed and promoted through formal agricultural research (Glover 2011). The transformational potential of SRI has also been hotly contested in terms of, for example, the rate and extent of adoption by farmers and the power of populist science and "people's movements" to deliver sustainable productivity gains among small-scale farmers more effectively than formal agricultural research institutions. From a political agronomy perspective, the SRI example turns around the contested nature and meaning of knowledge and evidence and the relevance of the Internet as a new site for mobilization and contestation.

Summary

Over the last 30 years, changes in the context within which agronomic research is prioritized, funded, managed, implemented, and evaluated have altered the nature of contestation about and around agronomic knowledge and technology. Because of the importance of agronomy and agronomic research in supporting productive and sustainable agricultural systems, systematic analysis of the implications of these changes – political agronomy studies – should now be given high priority.

The CA, GM crop variety, and SRI examples highlight an overriding imperative to claim universal applicability and the potential of "impact at scale." This is at odds with the understanding of agronomy as a problem-oriented, "situated" science and accounts for the competing claims and much of the acrimony generated by these technologies. Can CA, GM varieties, SRI – or any other technology – provide a universally applicable solution to the problems of sustainable agricultural production? Centuries of agronomic knowledge accumulated through both practice and formal research refute any such suggestion. The challenge for political agronomy studies is to analyze the forces that are driving claims to universality, the actors and coalitions that are making and contesting these claims, and the

implications for agricultural producers, consumers, the environment, and the discipline of agronomy itself.

Cross-References

- ▶ Food Security
- ▶ Intellectual Property Rights and Trade in the Food and Agricultural Sectors
- ▶ Transgenic Crops

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Political Consumerism: Consumer Choice, Information, and Labeling

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Synonyms

Antibranding; Boycotts; Buycotts; Labeling schemes; Lifestyle change; Problematic nature of political consumerism; Standardization

Introduction: What Is Political Consumerism?

The concept of political consumerism identifies instances when people evaluate and choose producers and products because they want to change ethically, environmentally, or politically objectionable institutional or market practices. Practices within political consumerism are informed

by attitudes and values regarding broad issues of sustainable development that can even include beliefs about the responsibility of different actors involved in production and consumption and the role of government in using the market as an arena for politics (for interesting discussions on this, see Young 2006; Forno and Gunnarson 2010). Political consumerism can be practiced by individuals, civil society groups, and governmental, not-for-profit, and for-profit organizations. In different ways and for different reasons, political consumers understand producers and products as well as consumers and consumption as embedded in a complex social and normative context that has been called the "politics behind products" (Micheletti 2010). Research points to both self-interest (e.g., personal and family health) and other-oriented interests (e.g., climate change, social justice) as important explanations for the rise of political consumerism particularly for individuals and civil society. Governmental and corporate engagement in political consumerism remains understudied.

Four Forms of Political Consumerism

Scholars identify four basic forms of political consumerism that can be studied through different methods and empirical material. Perhaps the oldest form is boycotts (or negative shopping decisions), which are defined as deliberate or conscious choice not to purchase a commodity, brand, or even a good from a particular country. Some boycotts are well-organized activities that mobilize considerable numbers of consumers even cross-nationally into a particular cause. In certain cases, boycotts have a political effect on governmental politics and corporate policy, though it is difficult to find good measures of effectiveness here (for more information on the strategies, success, and effectiveness of boycotts, see Friedman (1999) and Stolle and Micheletti 2013). Examples of influential boycotts are the decade-long Nestlé boycott against marketing infant formula in developing countries, which led to a new international agreement (Sikkink 1986) and later some corporate change; the green boycotts organized by environmental groups in the 1980s and 1990s that convinced many do-it-yourself and affordable furniture companies in the wood industry (e.g., Home Depot, IKEA) to reconsider how they procured the tropical wood sold in their stores (Cashore et al. 2004); the boycotts of Nike, Gap, and other global garment corporations now leading to certain corporate change and multi-stakeholder initiatives to help solve the labor problems in outsourced manufacturing (Stolle and Micheletti 2013); and the animal activist and green boycotts against McDonalds and Burger King to change their procurement policies on egg and chicken sourcing. Boycotts of South African goods (particularly fruit) were part of the global anti-apartheid movement (Seidman 2003). Today this boycott is a role model for the "Boycott Israel Today," supported by some trade unions, churches, and countries, which focuses on products from territories occupied by Israel. The European union has even formulated guidelines on this matter (EU 2013; BBC News 2013; Guardian 2013).

Widespread boycotts target well-known and frequently purchased products and offer consumers suggestions about similar goods to replace them. Boycotting is, therefore, reliant on the availability of similar goods considered to be better for various reasons.

Buycott is the term used to identify the practice of deliberate conscious choices (positive shopping decisions) to purchase certain commodities over others, that is, those often considered more environmentally friendly, more ethical, or preferable for other political reasons. Buycotted goods might, for instance, be chosen because they are seen as reflecting better worker treatment (e.g., by shopping at ethical clothing companies or following advice offered by fairtrade labeling), more healthy (e.g., organically labeled food), and generally better for the environment (e.g., ecolabels) (see more in next section).

Discursive political consumerism, the third form, does not directly involve such negative or positive shopping decisions but rather attempts at opinion formation and communicative actions

expressing reflective and critical views held by individuals and/or collectivities on corporate policy, corporate practice, and consumer culture. Good examples here are antibranding and culture jamming, both of which criticize well-known brands and the commercialization of society in humorous ways (e.g., the animal activist Kentucky Fried Cruelty or Murder King campaign targeting the procurement policies of two well-known corporate brands) and performative events (e.g., anti-sweatshop fashion shows) because they illustrate how this form, through innovative measures, seeks to engage consumers, corporations, and political institutions in learning more and thinking reflectively about the politics behind well-known and attractive products (Sandlin 2007).

Lifestyle political consumerism, the final form, is a decision to use one's private life sphere to inform about and attempt to change established production and consumption practices. Its message is that practices in the private sphere have ramifications for politics. Vegans, freegans, and downsizers, for instance, argue that "the personal is the political" and attempt to adapt their lives to their political views on alternative consumption practices. Vegans commit to not consuming animals in any fashion and seek to purchase alternative goods not containing animal ingredients (Cherry 2010). Downsizers "live" their views by wanting and buying less, buying used goods, and choosing green and fairtrade products (Huneke 2005). Freegans are known for diving into dumpsters after food and other goods as part of their alternative food activism that criticizes agribusiness and conventional consumption practices.

The different forms of political consumerism can also be used in tandem, for instance when consumers are asked in holiday campaigning to boycott certain well-known chocolate brands, choose fairtrade or organic labeled chocolate instead (buycott), and send messages to corporate headquarters about their choices (discursive action). Finally, emerging research is showing that social media is increasingly important in innovating political consumerism (e.g., carrotmobs) by facilitating the development of individualized political identification in settings other than the parliamentary and through social and other networks (cf. Calenda and Meijer 2011).

Surveys conducted in different Western countries and other research find that political consumerism is generally increasing as a practice among individuals, public and private institutions, and civic groups in different countries. But it appears that buycotting has gained most in importance. European survey data (see Stolle and Micheletti 2013) reports particularly high levels of buycotting in the Nordic countries, with boycotting showing some decline. In these surveys Sweden stands out as highest; about 56 % of adult Swedes engage in boycotting and buycotting activities. These rises can be explained by civil society's heightened interest in using marketing campaigning for their cause and government's support for labeling schemes and use in its public procurements. Buycott political consumerism is now part of public procurement policy in many parts of the world and even promoted by major transnational corporations, which now have codes of conduct to help govern their relationships and transactions with their suppliers and sub-suppliers. Special ethical and environmental business initiatives in particularly the food and clothing industries have also appeared. Business interest in political consumerism is explained by the influence of the market campaigns run by various civic groups as well as corporate reasoning that profit, competitive advantage, and goodwill can be gained by contributing to the "buycott market" (for more further discussion see Stolle and Micheletti 2013).

What lies behind the rise in political consumerism is societal concern about safeguarding the environment worldwide, protecting global workers in various industries, and finding innovative strategies to establish new regulatory tools to make transnational corporations more accountable. The rises also reflect citizens' efforts to engage in politics in new ways as well as their more self-interested concerns about finding healthy food and keeping harmful chemicals out of their own lives. Research (see Stolle and Micheletti 2013) finds that people with higher education and more political interest/activity and more women than men exhibit higher levels

of political consumerism. The rich Swedish data (see Stolle and Micheletti 2013), allowing for deeper analysis, shows even that dissatisfaction with governmental performance on issues of the environment, human rights, and the war on poverty mobilize people into political consumerism but that, contrary to some theoretical expectations (e.g., on subpolitics), many political consumers (particularly those 30 years of age and older) have high trust in national representative political institutions. However, what makes political consumers different from "nonpolitical consumers" is that they are prepared to take more active responsibility for seeking explanations for societal developments and especially for showing consideration and concern for others. This final result indicates that political consumers (and especially younger ones) can be distinguished by concerns about nonreciprocal and more global aspects of politics and citizenship. These findings also underscore theoretical expectations that younger political consumers are more subpolitical and adopt a more political individualization orientation in that they seek to contribute to society in ways that better conform to their less state-centered and more private life-oriented world view (for references see www.sustainable-citizenship.com). Researches on environmental, religious, international humanitarian, and animal stewardship groups involved in political consumerism even show that civic groups also increasingly frame their campaigns in this fashion and, interestingly, focus more on the self-interest of consumers in their advocacy (for further information see Stolle and Micheletti 2013 and associated references).

Finally, while the concept of political consumerism is rather new, the four forms have been practiced for centuries. Boycotting and buycotting were, for example, part of the grand antislavery struggle in the 1600–1800s with people mobilized into boycotts of cotton, tea, and sugar whose production involved slave labor and into buycotts of substitute so-called "slave-free" products. Boycotts also played a historic role in conflicts between Arabs and Jews in the Middle East, with scholars discussing them as "boycott wars." Moreover, important areas of contemporary political consumerism, including fairtrade, organic food, and socially responsible investments, originated in religious activism from the 1700s and 1800s. Noteworthy is that political consumerism does not necessarily or automatically promote democracy and sustainable development. A telling example is how it became a weapon against Jewish merchants and the Jewish people in Europe in the 1930s and 1940s. This topic deserves much more research attention.

Political Consumerism, Information Systems, and Labeling

Political consumerism is highly reliant on the availability of information and alternative products on sale in the marketplace. In most cases this information and product availability is provided by labeling schemes. In recent decades, ethical and environmental labeling has emerged as a common and well-known way for increasingly mindful or conscious consumers to find "buycott" alternatives in the marketplace. Among the pioneering labeling schemes are the German Blue Angel ecolabel established in 1977 for everyday consumer products, the Nordic ecolabel (the Nordic Swan), the EU Ecolabel (the European ecoflower), and the US Green Seal. Today these schemes cover a broad range of product categories, including household chemicals, paper, paint, beauty care, office equipments, washing machines, toys, textiles, DVD players, computers, furniture, and so on. They also certify service providers such as hotels, restaurants, and cleaning services. Even organic food labeling has a long history, but grew in importance particularly since the 1980s when organic labeling schemes were introduced in a number of countries. Another example is Forest Stewardship Council (FSC), established in 1993 to set standards for sustainable forestry as a way to govern the forestry commons. The FSC label can be found on primarily paper and furniture products and is an important label particularly for institutional consumers. The FSC covers a broad array of social, environmental, and economic aspects

and is often mentioned as a pioneering case because it unites business actors with social and environmental NGOs. For social issues, fairtrade is the most well-known system, aiming at redistributing economic values along the mainstream commodity chain and establishing democratic governance structures for the benefit of small-scale and family-based agriculture in the global South.

Ethical, environmental, and even health labeling has become a commonly used consumer-oriented policy instrument. The Ecolabel Index (www.ecolabelindex.com) as of February 19, 2014 lists 446 labeling schemes, operating in 197 countries and in 25 industry sectors. Some ecolabeling schemes (e.g., the German Angel, Nordic Swan, and EU Ecolabel) cover multiple sectors, while others (e.g., Aquaculture Stewardship Council, Energy Star, Global Organic Textile Standards) are sector specific. Other types of consumer-oriented information tools include shopping guides, red lists, sustainability reporting, and fish wallet cards. Fish wallet cards (information fitting neatly in one's pocketbook) use a "traffic light logic," differentiating between Best, Ok, and Worst/Avoid choices that can be consulted for shopping decisions while also giving consumers the opportunity of retrieving further information about the fish, including recipes and nutritional information from websites. Currently carbon labeling is debated (Upham et al. 2011), with a key issue being if a labeling system should award the most climate-friendly products in relative terms within a product category or if entire product categories with high climate impact (e.g., beef) should be excluded completely.

What is labeling and why is it important? First, labeling is a market-based and consumer-oriented tool, founded on the standardization of principles and prescriptive criteria, and relying on symbolic differentiation (Boström and Klintman 2008; see also Gallestegui 2002; Horne 2009). Producers seeking to use the label for their goods must meet the defined principles and criteria for a fixed period of time and for a given license fee. Labeling relies, at least implicit, on differentiation among products/production in terms of good/bad, friendly/unfriendly, green/gray, safe/risky, and sustainable/unsustainable. This property of symbolic differentiation is essential for understanding the attractiveness, dynamics, and controversies surrounding labeling schemes.

In some countries, consumer information on products is mandatory, such as declaration of contents (e.g., nutrition, GM contents, country of origin) and danger symbols (on cigarette packages). Mandatory labeling appears, according to Horne (2009), to be more prevalent for specific performance issues such as water- or energy-consuming devices. In the area of labeling most schemes rely on voluntary logic and positive information, however. It is less realistic that business would pay a license fee to the labeling and certification organization and voluntarily publish negative information on product packages.

Given the abundance and wide use of labeling schemes, an increasingly important concern is their credibility. Credibility issues concern, for example, how the labeling process is organized (its relative independence from the so-called first-party interests), the inclusion of relevant expertise and stakeholders view, and that judgment and decisions are based on a carefully selected set of principles and criteria which are generally reviewed and strengthened on a regular basis. The issue of credibility relates to a common distinction between first-party and third-party schemes. While the former refers to self-claims done by the producer or seller, the latter refers to an organized system independent of the producer, usually made up of a hybrid constellation of interests/stakeholders that may include the producer and seller. State actors may take part, either as one stakeholder among others or as the chief principal of the labeling scheme. The International Organization for Standardization [ISO] provides a definition and differentiation of environmental labeling schemes, the so-called 14020 series. ISO distinguishes between *type 1* labels, a multi-attribute label developed by a third party; *type 2* labels, a single-attribute label developed by the producer; and *type 3*, an ecolabel whose awarding is based on a full life-cycle assessment. It is important to remember that *type 3* labels, or any other kind of "environmental product

declaration" scheme, are not labeling in the theoretical sense that emphasize *symbolic differentiation*. It is qualitatively different to disclose details and measures about environmental impact compared with adding the valuation that something can be defined as "good" or "better than."

Why has labeling become quite widely used? Its simplicity is the simple answer. From a concerned consumer perspective, labeling can be a way to handle the information asymmetry existing between the producer and consumer on the environmental and social performance of production (Gallestegui 2002; Koos 2011). Labels seek and attempt to provide consumers with credible and concise information on these matters and even function as choice editing, that is, framing and narrowing the range of products available for the concerned consumer. The simplicity also has communicative advantages that link well to sustainable marketing efforts among producers and retailers as well as with the campaigning activities of consumer, environmental, and social NGOs. The latter groups also see an advantage in these *type 1* hybrid arrangements (see ISO definitions above) as they provide an organized forum to voice their concern in business matters (see Boström and Klintman 2008 for an extended discussion).

Labeling has had hugely varying market impact in different sectors: strong within the area of food, chemicals, energy (household products), and forest (paper) products and weaker (although growing) within the area of clothing, toys, and cosmetics. These variations concern both demand (harder to make people aware and motivated in relation to some types of products) and supply factors related to technological, organizational, economic, political, and geographical matters. How well labeling functions and whether or not it has a significant market impact varies considerably among countries. Scholars focus on a number of contextual factors to explain these variations, among them are market structures including retailing structures, general income levels, civil society engagement, political cultures, level of state support, and type of trust relations in society (e.g., institutional or family based) (e.g., Cashore et al. 2004; Boström and Klintman 2008; Sønderskov and Daugbjerg 2011; Koos 2011).

Yet despite these variations, the general trend is growth in the number and scope of labeling schemes. From the consumer perspective, the problem is, however, that the multitude of labeling schemes, including even the presence of all kinds of eco-claims and green nature-like symbols on product packages, has been found to create a so-called "second-order" dilemma. Consumers not only need information about the content of products and which products are "good" or "bad" but also on which information providers (labeling scheme/organization/corporation) are credible and not. The issue of credibility or trust has, therefore, been of central importance in the labeling debate and literature (e.g., Boström and Klintman 2008; Sønderskov and Daugbjerg 2011). The use of "independent" third-party labeling schemes and other arrangements to assure credibility has not resulted in a closure of such debates but rather their accentuation. How are consumers to navigate in this jungle of labels and green symbols? Standardization of credible standardization is one solution. ISEAL Alliance, an umbrella organization of labeling and certification organizations, has established codes of good practice of setting sustainability standards and thereby tries to define and protect what a credible system of labeling consists of. Consumer navigational tools are another, e.g., ecolabel iPhone apps.

In addition to this credibility debate related to the abundance of green marketing and proliferation of "fake" labels, the labeling literature also discusses a number of other challenges associated with the development and functioning of labeling and certification system, including the balancing of input from science with other stakeholder demands (e.g., inclusion of consumer representation); balancing the need of simplicity (concise consumer information) and complexity (taking into account all important sustainability matters and dimensions); considering the entire life-cycle and achieving traceability of raw material and products; the issue of labeling and barriers to trade, barriers to entry, and labeling as a disguised form of protectionism; balancing the need for universal principles and criteria with the

need for sensitivity to local cultures, rules, and ecosystems; challenges in monitoring the compliance of labeling principles and criteria and requiring corrective measures; economies of scale in certification and labeling that result in difficulties for small- and medium-sized enterprises (SMEs) to accept the costs involved in the compliance of criteria (conversion costs, license fee, administrative costs, etc.); and the issue of how to keep a sharp political consumer identity of the labeling programs while facing mainstreaming (market growth) tendencies (examples from Gallestigue 2002; Boström and Klintman 2008; Horne 2009; Koos 2010). More research is necessary of all these challenges.

Summary: The Rise of Political Consumerism in Critical Perspective

Political consumerism in the four presented forms – boycotts, buycotts, discursive, and lifestyle – has risen dramatically as a consumer practice as well as a mechanism to provide information and alternative products and habits globally. Consumer demand has both relied upon the presence of labeling schemes and promoted their further development. Over time political consumerism has become a more mainstream activity. Yet this rise of political consumerism has met with some rather fundamental criticism. Among early supporters, the tendency to advocate buycott and lifestyle political consumerism for self-interest reasons and for mobilizing NGOs to employ emotional arguments is seen as going counter to the historical ideological current that focused on solidarity and the ethics for a small green planet. These critics fear that dedication and commitment to the cause of global solidarity and green living is threatened when it is turned into a shopping event. Even the rapid development of certification and labeling has been criticized for similar reasons. Here the issue is co-optation of the values underlying the labeling initiatives by profit-seeking business. In the wittily entitled article "Unveiling the unveiling," Guthman (2009) warns that the ethically labeled commodity can result in a kind of ethical fetishism, because of the many unveiled aspects of the labeling process. Labeling was initially established to reveal the unwanted social and environmental side effects of production and products invisible to consumers so that they could make more informed purchasing decisions. But if such critical side effects also remain in the products symbolically espoused as "good" at the same time as business makes new profits in this new "green" or "social justice" sector, then, she argues, it is valid to claim that consumers are cheated in a double sense. One possible path out of this new dilemma is the very same phenomena that gave rise to much contemporary political consumerism, namely, reflexivity (Boström and Klintman 2008). Here the argument is that even the promoters of political consumerism, including mobilizing NGOs, labeling schemes, and governments, should be more critical and reflective about their own and other actors' knowledge claims. They will need to consider the consequences of using emotional arguments and appealing to self-interest for the goals that they want to reach through political consumerism and, more generally, whether it is truly possible to reach their goals by selling products.

Cross-References

- ▶ Agricultural Ethics
- ▶ Animal Welfare: A Critical Examination of the Concept
- ▶ Corporate Social Responsibility and Food
- ▶ Environmental Ethics
- ▶ Environmental Justice and Food
- ▶ Fair Trade in Food and Agricultural Products
- ▶ Food Boycotts
- ▶ Food Labeling
- ▶ Sustainability of Food Production and Consumption

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Population Growth

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Introduction

Debates about population, environmental quality, and resource adequacy stretch back to classical writers but are usually identified with Thomas Malthus's *Essay(s) on Population* (Dietz and Rosa 1994; Malthus 1803/1992). The basic argument is that human population will grow at a pace faster than increases in the production of food or other resources. This leads to poverty, disease, malnutrition, and other social and environmental ills. Concern with population pressure on natural resources also underpinned Garrett Hardin's much cited but problematic analysis of the tragedy of the commons (Dietz,et al. 2003; Hardin 1968). Hardin argued that common pool resources, such as fisheries or pastures, cannot be managed by communities because continuous population growth will increase demand for resources and encourage self-interested rather than altruistic behavior. The commons collapses. The argument that population growth will lead to problems has been applied to many resources, but

it is food, and thus agriculture, that has been at the center of most debates about Malthusianism.

The logic of the Malthusian argument – ever increasing human population will lead to food shortages – may seem compelling. Populations of living organisms can increase exponentially, doubling at a pace that is roughly equal to 70 divided by the percentage growth rate. (Formally, the doubling time is $\ln(2)/(\ln(1 + r))$ where r is the growth rate.) Thus, a population growing at 2 % per year doubles about every 35 years and one growing at 4 % per year doubles about every 17.5 years. Nonlinear systems such as exponential growth are difficult for humans to understand, so the speed at which populations can grow is often startling. Growth of the total human population over the last century has been unprecedented in human history. In 1900, world population was estimated at 1.7 billion. By 1950, it had grown to 2.5 billion, an increase of less than 1 billion in 50 years. By 1975, it had increased to 4 billion, an increase of 1.5 billion in 25 years. By 2000, there had been an increase of 3 billion for a world population of 6 billion. As of this writing (November 2013), world population is estimated at 7.1 billion and is projected to reach 9.4 billion by mid-century (U.S. Census Bureau 2013). This rapid growth, and its exponential character, underpins concerns about the likelihood of increasing production of food and other resources at a comparable pace.

Malthus's argument was primarily about the pace of population growth, not about population size. In particular, he argued that if population growth is rapid, it will exceed the rate of increase in food production. In contrast, some have expressed concern about the size of the human population, arguing that we have, or will, exceed the earth's carrying capacity – the population an ecosystem can support over the long term. However, human use of resources and the stress humans place on the environment depend not just on the size of the human population but also on what is consumed and how it is produced, including how waste from production and consumption is disposed. Because both consumption and the technology used for production can change quite rapidly, thoughtful analyses have questioned the utility of the carrying capacity concept when applied to humans (Cohen 1995). While both the size and the rate of growth of the human population warrant serious ethical consideration, they cannot be considered in isolation from thinking about what is consumed and how what is consumed is produced.

What causes population growth? Putting migration aside, population grows when the number of births exceeds the number of deaths. Improvements in public health, including better nutrition and reduction in infectious disease mortality, have substantially lowered the death rate in most nations in the twentieth century. Initially, birth rates remained higher than death rates, leading to rapid population growth. In many countries of the world, lower infant mortality rates; the education, employment, and empowerment of women; better access to contraception and abortion; and improved old age security eventually led to reduced birth rates. In time, and after substantial population growth, death rates and birth rates came into coarse alignment and population growth rates slowed to roughly zero. The overall process is called the demographic transition. It occurred in Western Europe in the nineteenth century and in Asia and Latin America in the last half of the twentieth century but has not yet played out in Africa or the Middle East.

After World War II, the start of the demographic transition – declining death rates – led to rapid population growth in what are typically labeled the developing nations. Concerns about Malthusian outcomes from this growth were motivated in part by a perceived link between rapid population growth, poverty, and the potential for political instability and Communist revolution (Hoff 2012). Influential analyses of economic development suggested that while population growth would not prevent increases in affluence, slower population growth would facilitate economic development. The result was substantial efforts to promote family planning and lower fertility in the developing world. By the 1960s, concerns with whether or not food production could keep pace with the demands of a growing population were at center stage in discussions of population. In the mid- to late

1960s, stress on the environment from both consumption and population growth also became a major part of public debate about population growth. At about the same time, US conservative support for family planning and population limitation shifted to opposition as free market ideology and alliances with antiabortion religious groups became part of the conservative agenda.

The dynamics that link population size to food production, consumption, and environmental impact are complex. First, throughout history, most human populations have taken steps to limit fertility through a variety of mechanisms, including contraception, abortion, extended nursing, infanticide, abstinence, and delay in age at marriage. Unrestricted population growth of the sort anticipated by Malthus seems more the exception than the rule. So the scale of human population, and thus food demand, is subject to human agency, although there are substantial time lags between changes in fertility and shifts in the dynamics of population size. Second, consumption matters. Much of the demand for food in the contemporary world comes from people seeking food stuffs that are harder to produce and have greater environmental consequences than would be required for a nutritionally adequate subsistence diet. Patterns of consumption have varied tremendously over time, across societies and across social groups within a society. But in recent decades, there is a general tendency for increasing per capita affluence to shift demand towards foods, especially animal products, that are harder on the environment than the diets of the less affluent (Steinfeld et al. 2006). Thus, food demand and the impacts of food production are driven by the composition of consumption as much or more than by the sheer number of people. Finally, the techniques used to produce food also vary tremendously over time and across societies. Malthus assumed that increases in food production could only advance linearly. But changes in agriculture, including changes in the social and economic organization of food production, have led to increases in global and regional food production at a pace much more rapid than Malthus had anticipated – the "Green Revolution." Increases in production since about 1950 have generally outstripped increases in the size of the human population, so on average, per capita food production has increased since the middle of the twentieth century (Food and Agricultural Organization 2013). Of course, some of these changes in agricultural technique have had problematic environmental and social consequences.

Even with an increase in global per capita production, there have been tragic incidences of starvation and famine, and a substantial fraction of the world's population continues to be malnourished. But most analysts acknowledge that malnutrition and starvation are more of a function of how food supplies are distributed than to any absolute lack of food at the global or even regional scale (Ravallion 1997). Whatever ethical problems arise around malnutrition and even starvation, the causes are not primarily increases in overall human population size, but rather problems of food access among the poor, the displaced and the disadvantaged. Tragically, violent conflicts and natural disasters can create a "population explosion" of refugees in areas that are not well suited to provide sustenance for them. But the underlying cause of these tragedies is not population size per se, but rather inadequate arrangements to cope with such situations.

Analyses of population and food now acknowledge that links between population and food cannot be considered in isolation from climate, water, energy, biodiversity, and many other factors. Current thinking considers food and agriculture as part of a set of complex interactions between humans and the biosphere, often called coupled human and natural systems (Rosa and Dietz 2010). Food production is only one stress humans are placing on the environment, and how ecosystems and the biosphere respond to multiple stresses is undoubtedly more complex than simply the sum of the individual stresses. For example, increased demand for grains might be met by more intensive cropping. But that in turn will require more fertilizer, pesticides, and water, and each of those inputs places stress on the environment. In parallel, environmental change, including climate change, may make it difficult to

provide those inputs. In many regions of the world, climate change induced by human use of fossil fuels, in part to support food production, is changing hydrological regimes so that in the future the water needed to increase food production may not be available. The discourse has moved from a Malthusian concern with population and food supply to a concern with population, consumption, and technological choice as interacting stressors. The conceptual shift has been from a concern raised by Malthus – whether food production could keep up with human population growth – to an acknowledgment that for the first time in planetary history, humans dominate earth systems process. The resulting changes are dramatic and problematic and perhaps even catastrophic. Population alone is not the cause of these impacts; rather, they are driven by the joint effects of population, consumption, and technology.

Of course, slower population growth makes it easier to enhance human well-being, including the provision of an adequate food supply, and easier to protect the environment. So this entry begins with a discussion of the interplay between population, consumption, and technology. This sets a context for the discussion of the ethical issues that arise around efforts to slow the rate of growth and/or the size of the human population. The final section examines efforts to define an optimal population size.

Balancing Human Population with Resources and the Environment

Slowing the pace of human population growth is only one strategy to provide adequate food to the world's population. Other complementary approaches include increasing food production, shifting consumption patterns, and reducing waste. Thus, the ethics of population, food, and agriculture inevitably entrains broader discussions.

Increasing Food Production. The Green Revolution substantially increased food production in the later twentieth century, and the dire shortfall in food availability in many mid-century projections was avoided. However, the environmental and social stresses that accompanied the Green Revolution raise questions about whether or not a continuation of this strategy is an acceptable option for the future, even if it is technologically feasible. Agriculture and other human activities have come to have a major influence on many biogeochemical cycles and are otherwise transforming the planet (Rosa and Dietz 2010). Thus, increasing food production as a strategy for keeping food supply in balance with human population engages ethical issues that are discussed in much of the rest of this volume.

Shifting Consumption and Reducing Waste. Shifting consumption and reducing food waste can complement increased production as a means of meeting the needs of a growing population. For example, approximately one-third of the global cereal production is fed to animals, converting large amounts of grain to modest amounts of animal protein (Erb et al. 2012). With growing affluence, the proportion of the diet in meat products tends to increase sharply. So one response to food shortages could be for the affluent to move away from diets heavy in animal products to those more reliant on plants, along with a continued emphasis on plant-based foods for those already consuming modest amounts of animal based foods. This response to the food needs of growing human populations thus entrains the ethics of consumption and, in particular, of vegetarianism and veganism into the discussion of the ethics of population growth (Fox 2013). In addition to dietary shifts, the current system involves considerable food waste. Best estimates indicated that between 30 % and 40 % of food in developed and developing countries is lost to waste (Godfray et al. 2010). Reducing such waste could help increase the amount of food available for consumption without the need for increased production.

Emerging technologies could yield more food with less environmental stress. Sustainable intensification, such as the integrated management of waste in livestock production or no-till cropping and precision agriculture, may provide methods of production that place less stress on the environment than traditional practices (Godfray et al. 2010).

Biotechnology, including genetic modification, could increase yield and nutritional value of what is produced while reducing environmental impacts. Promising as such approaches may seem, many scholars question the ethics of many aspects of biotechnology and wonder whether technological change driven by market motivations will be beneficial overall.

In general, increases in food supply do not necessarily translate into more food for the malnourished when resources are allocated according to a market logic emphasizing profits, as described by neoclassical welfare economics. Some argue that there is a right to the food needed for an adequate diet, which troubles a utilitarian approach. As Mares and Pena put it, food is not a commodity, but is instead, "a relationship that forces us to stretch our understanding of what it means to grow and eat food justly" (Mares and Pena 2011, p. 199). A virtue ethics stance would implicate high levels of consumption and waste whether or not they were profitable and also interrogate food systems that encourage inequity among producers, harm to the environment, and adverse effects on the well-being of domesticated animals (Thompson 2010). Most work on virtue ethics has focused on the local to national level, so analysis of how it may provide insights into the global food system is much needed.

Clearly, concerns with population, environment, and agriculture are intertwined with issues of consumption and production in ways that touch on nearly every other entry in this encyclopedia. However, there are two topics that are nearly unique to population ethics: concerns with the control of human fertility and concerns with optimal population size.

Concerns with Fertility Control: Cultural Norms and Individual Rights

Many cultural traditions, and especially religious traditions, include norms about gender roles, contraception, ideal family size, child gender preferences, and abortion. They thus offer an ethical framework for thinking about human fertility control. Of course, official policy of a religious institution may not be followed by all laypeople in that faith (e.g., for generations, many Catholics have used birth control methods proscribed by the Vatican). And official doctrine may be more progressive than public images and common practices would indicate (e.g., a fatwa issued by Iranian clerics after the Revolution approved the use of family planning as long as the husband consented). However, religious norms have a strong influence on ethical decisions for many individuals and governments and sometimes may trump concerns regarding the effects of increased human population on the environment. In other cases, where religious norms raise concerns with the welfare of the poor or with environmental protection, they may encourage concern with population size and growth.

Of particular importance are religious teachings and cultural practices about gender and fertility behavior. One of the best established findings of decades of research on human fertility is that increased education, equality, and empowerment for women, coupled with access to family planning services, including abortion, lead to reduced fertility (World Bank 2012). But moves to promote gender inequality and access to contraception may contradict religious teachings and cultural norms that call for women to adhere to traditional roles, including a major emphasis on childbearing and proscriptions on some means of fertility control.

A parallel ethical conflict can arise with libertarian views that reject the legitimacy of a collective influence on individual decision making. Such a position would suggest that the collectivity, whether in the form of the state or the community, has no justification for suggesting how many children an individual or couple may have. In contrast, some have argued that strong policies and even coercive measures are justified in slowing the rate of population growth and limiting human population size (Derringhi 2001). While many governments in the developing world have instituted policies intended to slow population growth, the most notable is China's one-child policy, which sanctioned urban couples who had more than one birth, a policy China reversed in 2013.

Concerns with the Optimal Size of the Population

Classic utilitarianism argues for maximizing total population welfare defined as the sum of the welfare of each individual in the population. Derek Parfit noted the "Repugnant Conclusion" that can follow from this logic (Parfit 1984; Arrhenius et al. 2010). A very large population in which everyone has minimal quality of life may provide a larger "sum of welfare" than a smaller population with higher average quality of life but smaller aggregate quality of life. Under the "sum of utilities" logic, substantial population growth may be warranted, as long as every member of the population could be provided with sufficient resources so that the aggregate well-being remains greater than it would for a smaller but better off population. The original argument about the repugnant conclusion considered only human populations, but the logic could be expanded to utilitarian formulations that take seriously the well-being of nonhuman species (Frey 2011).

The repugnant conclusion is predicated upon the concept of welfare as a single additive scale. However, there are alternative ways of aggregating welfare into a measure of value. For example, maximizing the average, rather than the sum, of well-being could favor small populations with very high welfare. Another strategy is to introduce a variable value principle, so that the value of adding worthwhile lives to a population varies with the number of already existing lives in such a way that additional population has more value when the number of these lives is small than when it is large. This is an elaboration of Bernoulli's argument that well-being increases proportionally to the logarithm, not the raw value, of income. Another way around the problem is to introduce a minimal well-being standard, so that a person's life only contributes positively to an outcome if the quality of the person's life is above the standard, although what constitutes an appropriate critical level is subject to debate. Still other ethical theorists argue that we should focus on frustrated and satisfied preferences, with a frustrated preference counting negatively whereas satisfied preferences having a neutral value. This could be extended to Nusbaum's capability argument – larger populations are not to be preferred to smaller populations unless that increased size enhances the ability of all to realize their capabilities (Nussbaum 2006). Finally, some philosophers assert that Parfit's conclusion is not so repugnant after all. For example, it is argued that while a life barely worth living stands in stark contrast to a privileged life, a life barely worth living is not ipso facto unethical.

Summary

The ethics of population, food, and agriculture inevitably engages a wide variety of other ethical issues related to the environment, social justice in the allocation of resources, the role of cultural and religious institutions in society and individual choice. The question of optimum population size leads to deep inquiries into the problem of aggregating across individuals in ascertaining the collective good. Thus while an important topic in itself, population ethics is also an inherently complex and interdisciplinary area of inquiry.

Cross-References

- ▶ Climate Change, Ethics, and Food Production
- ▶ Ecofeminist Food Ethics
- ▶ Environmental Ethics
- ▶ Environmental Justice and Food
- ▶ Food Waste
- ▶ Sustainability and Animal Agriculture
- ▶ Sustainability of Food Production and Consumption
- ▶ Vegetarianism
- ▶ Virtue Theory, Food, and Agriculture

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Pork Production: Ethical Issues

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Synonyms

Animal welfare; Ethical issues; Ethics; Pork; Pork production; Pork supply chain

Introduction

The following general description of the pork supply chain is from the perspective of a farmer beginning with no farming operation to decisions concerning scale, housing, feed, processing, and so on, ending with an economically viable operation and pork products available for the consumer. Within each of these decision points, the authors have included key value domains where there are choices or trade-offs in tension between economic viability, social equity, environmental

or ecological integrity, or animal health and welfare.

What follows appears as a linear description of the decision tree for someone interested in getting into the pork supply chain; however, many of these choices are not linear in nature but rather are nested or interconnected in how one must weigh the trade-offs involved with the overall farm plan. Complicating the ethical issues embedded in the supply chain is the dynamic nature of the various decision points and the associated risk, such as volatility of feed costs or global market pressures.

Choice of Production Approach or System

A farmer who is considering pork production for his or her farm enterprise will consider the type of pork production system that best fits with their skills, resources, philosophy regarding animal agriculture, and desired economic outcome. It is likely that the first choice our farmer must face is whether he or she would like to be an owner or to be a contract grower. Ownership of a pork production reflects various levels of investment in land and buildings, labor, mechanical skills, and marketing skills. Pigs may be raised very intensively (controlled environments and proven technologies) or very extensively (outdoors, using crop fields post-harvest, pastures, and buildings in various combinations) or with some mix of these approaches. Owned enterprises may be of various scales, but in general intensively managed farms are the largest.

The benefits of intensive, highly coordinated production have been discussed for decades. Hurt and Zering (1993) were one of the first to study industrialization in pork production and discuss the reasons for the growing adaptation of the intensive approach. For owners of swine farms, technology improvements in genetics, nutrition, disease control, and facilities led to increased production efficiencies and significant return on investment. Significant gains from scale economies were also realized by the implementation of a highly coordinated production-processing system. Hurt and Zering's suggestion at that time has been realized; that there would be further movement toward large production units which are more highly coordinated with the packer and the domestic and foreign consumer. Indeed, consumers have been the beneficiaries of the intensive pork businesses which produce and market at lower costs and with acceptable quality, extreme safety, and consistency.

There are significant economic advantages with increasing size and specialization in pork production. Advantage may come from economies of scale (MacDonald and Ollinger 2000; Marchant 2007) or scale efficiency (increasing returns with the same production technology as operation size increases; Key et al. 2007). When a farmer elects to operate within or outside of the intensive commodity supply chain, there are significant consequences associated with the economy of scale. These forces will only continue to grow as the global population continues to grow to the projected nine billion people by 2050 (UN 2004). Compounding these forces of scale is the changing diets of developing nations to mirror that of the developed world with increased meat consumption. This "feed the world" ethical stance is often in tension with a regional food system approach. More extensive pork producers who choose to operate outside of a coordinated or integrated pork chain may make this choice based on an ethical stance of freedom to make on-farm production decisions more closely guided by regional sensitivities to place, community, terroir, animal welfare, or niche markets.

The substantial increases in farm productivity with large, specialized farming systems are associated with the use of production contracts. In 2009, just over 70 % of US pork sold was raised using production contracts (McBride and Key 2013). Contract production is a formal agreement whereby the owner-contractor of the pigs pays the contract grower to care for the pigs in the grower's facilities with inputs furnished by the owner-contractor. Contract growing in the pork industry has an interesting history that traces back to entrepreneurship; relatively lenient environmental regulations; few alternative economic opportunities; familiarity with production contracts in the poultry industry; less expensive land, labor, and capital; and lenders willing to finance new grower facilities.

Contract growing initially took hold in the southeast part of the USA. The decline in US tobacco production in the 1960s and 1970s was a contributing factor (Hurt and Zering 1993). Here contract growing was a welcome relief for many of these farmers who were facing severe financial hardship and lack of knowledge to support the transition to an alternate farm product. Contract production provides farmers with a farm plan, resources, and a contract securing income if they fulfill the agreement to care for the pigs. Production contracts absorb risk in the form of a low-interest loan to the farmer. Contract growing is critiqued for creating greater concentration of power, knowledge, and revenue in the owner-contractor thereby decreasing the diversity or pluralism of farm practices lending to a so-called democratic food system. Alternatively, these contracts provide a co-benefit that forces the farmer to comply with an animal welfare audit (Grandin 2010).

Labor

One concurrent and confounded part of the decision whether the farmer has the capacity or desire to engage totally or in part in an intensive farrow-to-finish system or to participate in some form of specialized, part or all extensive, swine farming enterprise may involve an ability and liking for managing hired labor. This decision about the scale of either intensive or extensive farming is driven largely by how much land is accessible and how much labor can be successfully overseen. When considering labor, one looks at whether this is a farming family with some percentage of farm labor coming directly from the family and what percentage of labor will come from outside of the family. Labor and treatment of the laborers come with a unique set of ethical issues relating to wages, labor practices, employment of migrant labor, and the management of family income. Intertwined are ethical issues concerning worker safety and health, low pay, immigration status, and impact of significant cultural change in a traditional, rural community (Honeyman 1996). Although a serious prospect 15–20 years ago, it has now been realized to some degree that the changing labor demographic does not have to be as great a concern as initially thought (Hassan 2011).

Feed Procurement

Whether large or small scale, intensive or extensive, organic or conventional, all pork production systems require provision of feed for the nourishment of their swine. Pigs are monogastric omnivores and require energy, essential amino acids, vitamins, and minerals in their diet. It takes approximately 1,000 lb of feed to raise a pig to market weight. Traditionally, corn and soybeans have been the primary feedstock used in blending a nutritionally balanced diet for pigs in intensive production systems in the USA. Assuming a whole herd carcass feed efficiency of 4.0, an average carcass weight of 200 lb, soybean meal yield per bushel crushed is 79.2 %, and all feed (all diets from all production phases combined proportionally) is comprised of 78 % corn and 17.5 % soybean meal, then about 21.7 % of the corn and 20.3 % of the soybeans grown in the USA in 2012 (NASS 2013a, b) were utilized for pork production. Alternative feedstuffs and the grazing of pastures and fields are more likely used in extensive production.

For a given desired production approach and scale, feed may be procured via crop production within the system. Another series of decisions must be made concerning crop production for the farm if the farmer will be growing their own feed. If the farmer is growing under a contract agreement, the feed is grown or purchased; it is manufactured off-farm by the owner-contractor. Embedded in decisions about crop production inputs are decisions regarding fertilizer application, tillage, weed control/management, insect control/management, implement use, transportation, storage, and environmental impacts. There are ethical stances associated with these practices. For example, there is an inconclusive body of research pointing to the persistent use of glyphosate and declining soil microbial health. Farm implements are powered by fossil fuels which contribute to global atmospheric CO_2. Hundreds of studies have been conducted to assess the impact of atrazine on wildlife and human health. Runoff from the use of agricultural

synthetic nitrogen has been linked to several "dead" or hypoxic zones in coastal waters.

The substantial use of farmland for animal feed is an area where one often sees multiple value stances in tension. The use of federal funds to subsidize corn and soy production for animal feed has been questioned. In 2014, price support programs were eliminated from the Farm Bill. Federal subsidies of corn to support ethanol production further complicates how one might weigh the trade-offs associated with feed for pork production. In 2013 farmers saw corn prices reach an all-time high with some responsibility believed to be a result of the ethanol subsidy. This increased input cost drove up the cost of pork production for farmers, posing the question whether corn should be used for animal feed or a "renewable" energy source.

Over 90 % of corn in the USA is genetically modified (GM) and over 93 % of the soy is GM. Genetic modification of these two crops raises many ethical issues to consider. Central to this debate is whether life should be patented and controlled by private industry. There is concern regarding the long-term effects of GM crops on nontargeted species, soil microbial populations, and gene flow in the ecosystem (UNFAO 2001). The science behind the safety of long-term consumption of GM food and human health is inconclusive (Rich 2004).

The use of alfalfa hay as a feedstuff for gestating sows in outdoor or alternative pork production should not be overlooked. In 2010 the US Supreme Court lifted a ban prohibiting the planting of alfalfa seed and allowing Monsanto Corporation to sell the seed to farmers. This decision and practice of growing GM alfalfa puts organic growers at risk of genetic contamination. Currently only 1 % of the alfalfa grown in the USA is certified organic.

Feed additives such as antimicrobials (commonly referred to as antibiotics), clay binders, enzymes, and flavorings may also be decision points for the farmer. Of these ingredients, the addition of antimicrobials to feed is the most contentious. The use of antimicrobials in animal feed has been linked to so-called superbugs or antibiotic-resistant strains of human germs (Fitzgerald 2012).

Housing

Before the 1960s, most pork in the USA was raised in outside lots or on pasture systems. With the development of slotted floors, automated feed systems, ventilation, gestation and farrowing stalls, and liquid manure handling equipment, it became possible for producers to more easily care for larger numbers of animals and to do so provide protection from variations in environmental factors including temperature, precipitation, sun, parasites, and predators. Enclosed buildings also made it practical to farrow year-round, rather than seasonally. This was the beginning of intensive production systems also known as concentrated animal feeding operations or CAFOs used for over 75 % of pork production in the USA and by a rapidly increasing number of producers globally. This system of production also allowed farmers to minimize labor per unit of product, obtain year-round production for maximum use of facilities, and allow for increased profitability of the farm enterprise (McBride and Key 2013). This decision point for the farmer is tightly bound to instability in feed prices. In recent years, it has become increasingly difficult to afford keeping pigs outdoors due to the high price of corn and other feedstuffs, possibly a contribution of expanded efforts to use increasing amounts of biofuels.

Most swine today are raised in "all-in, all-out" (AIAO) systems, where each room or building is completely emptied and sanitized between groups of pigs. Each new group of pigs enters a freshly disinfected environment and stays there for this phase of their life. The facility has a separate room or building for each group of pigs weaned, with extra space if needed to allow workers time to clean the room before the next group of pigs. AIAO animals in each room are of a uniform age and size and are isolated to the extent possible to decrease the possibility of diseases spreading from older animal groups to younger ones. The primary advantages are that disease spread can be better contained; animals are less stressed because they remain with the same age and social group throughout their development; and complete cleaning and disinfecting between groups is possible. In the last few years,

some producers have constructed "wean-to-finish" barns where pigs go immediately after weaning and stay until market. This combines the nursery and grow-finish phases of production. These barns provide substantially more space per pig than is needed initially, but provide the advantage of only moving pigs once during their lifetime. This reduces stress on the animals and saves labor since buildings are not cleaned until the hogs are marketed.

Twenty to thirty years ago, this approach of housing swine 100 % of the time was called "confinement"; today is called "controlled environment." Keeping swine in barns all of the time has significant ethical issues related to the welfare of the animals. Included is the housing of swine in stalls and densely populated pens. There are competing value domains and differing forms of expert knowledge and assessment utilized to measure the welfare of pigs in confinement. A common concern in this type of housing is the denial of species-specific behaviors, freedom of movement or animal agency, group housing (pigs are highly social), or enrichment (cognitive enrichment with pigs reduces stress and aggression). Pigs in extensive systems, with access to fields and/or pasture, may spend more, depending on the season, than 50 % of their life rooting/seeking. The denial of this species-specific behavior in intensive systems is considered a cause of stress, boredom, and stereotypic behavior in pigs. Farmers must weigh the trade-offs between perspectives concerning the welfare of the animal and economic viability of the farm enterprise.

Protecting the Environment

Large-scale, intensive animal production, including pork, is viewed as a serious environmental concern. Disagreement in value domains and expert knowledge exists between producers, government, advocacy groups, and consumers. In tension is the economic viability of the farm enterprise with the risk for negative environmental impacts. USEPA's 2004 *National Water Quality Inventory* indicates that agricultural operations, including animal feeding operations (AFOs), are a significant source of water pollution in the USA. States estimate that agriculture contributes in part to the impairment of at least 94,182 river miles, 1,670,513 lake acres, and 792 estuary square miles. Agriculture was reported to be the most common pollutant of rivers and streams. Potential sources of manure pollution include open feedlots, pastures, treatment lagoons, manure stockpiles or storage, and inadequately managed application to fields. Ammonia, nitrogen, phosphorus, pathogens, and odorous compounds are the pollutants most commonly associated with manure. Manure is also a potential source of salts and trace metals and, to a lesser extent, antibiotics, pesticides, and hormones.

These pollutants can impact surface water, groundwater, air, and soil. In surface water, manure's oxygen demand and ammonia content can result in fish kills and reduced biodiversity. Solids can increase turbidity and smother benthic organisms. Nitrogen and phosphorus can contribute to eutrophication and associated algae blooms which can produce negative aesthetic impacts and increase drinking water treatment costs. Turbidity from the blooms can reduce penetration of sunlight in the water column and thereby limit growth of sea grass beds and other submerged aquatic vegetation, which serve as critical habitat for fish and other aquatic organisms. Decay of the algae can lead to depressed oxygen levels, which can result in fish kills and reduced biodiversity. Eutrophication is also a factor in blooms of toxic algae and other toxic estuarine microorganisms.

These organisms can impact human health as well as animal health. Human and animal health can also be impacted by pathogens and nitrogen in animal manure. Nitrogen is easily transformed into the nitrate form and, if transported to drinking water sources, can result in potentially fatal health risks to infants. Trace elements in manure may also present human and ecological risks. Salts can contribute to salinization and disruption of the ecosystem. Antibiotics, pesticides, and hormones may have low-level, long-term ecosystem effects.

One must also consider the detrimental impacts to environmental and public health

through the airborne emissions sourced in pork production. Significant research has been done on the air quality surrounding pork operations, yielding varied negative effects in adjacent communities. Researchers have described serious respiratory reactions such as chronic obstructive pulmonary disease (COPD) in some swine farm laborers working in enclosed swine housing, with positive health effects in those who wear respirators (Monso et al. 2004; Dosman et al. 2000). This is due primarily to the chemicals found in the air, manure, and dust (Cole et al. 2000). Hydrogen sulfide, carbon monoxide, and methane are the significant gases of concern to the safety of pigs and people. Methane is a product of anaerobic digestion in the depths of the stored manure and is released into the air above the manure. It provides a risk of barn fire or explosion. The health of the workers and community also brings to light the issue of environmental justice, as typically the facilities are located in low-income areas and employ low-income individuals, who often happen to be minorities. This environmental injustice often adds to the existing social imbalance and the stigma attached to these communities (Wilson et al. 2002).

The use of hormones to regulate the estrus cycle of sows and gilts allows for more efficient use of gestation and farrowing facilities, thereby improving the overall economic viability of the farm enterprise. However, increasingly the use of hormones in animal agriculture is being challenged. Estrogens, progestogens, prostaglandins, and other hormones and/or their metabolites, from human and animal use, disposed of into surface and groundwaters have been implicated in the reduction in sperm counts among Western men Luconi et al. (2002)) and reproductive disorders in a variety of wildlife (Safe 1995).

Also of note is the water usage involved in the production of pork along the entire chain. An estimated 41.3 billion gallons of water is used annually in the USA alone for swine production, most of which (62.2 %) goes toward swine finishing. The remaining nearly 38 % is used in farrowing (33.4 %) and nursing (4.4 %) the swine, with 80 % of the total usage being animal drinking water. This consumption not only adds to the growing crisis of water shortages but, from the perspective of the farmer, can also increase costs drastically. Reducing water usage by only 5 % can save upwards of 35,000 gal of water (assuming a 1,000-head operation) and $420 annually, with both numbers growing as water conservation increases (Pork Checkoff, 2011).

Market Access

Pork is the most widely consumed meat in the world, 43 % of world meat consumption by species (pork, beef, poultry, other). When deciding on the system and scale of the farm enterprise, potential farmers must consider the market conditions in their region and what type of market (direct to packer, spot-collection point, custom butcher, direct to restaurant, farmer's market, CSA, or other arrangement) is currently available, could be developed, and is most desirable to work with. Market access is pivotal for success. The need for consistent, reliable sources of a particular quality is seen at all scales. What and who defines "quality" is certainly an ethical issue to be considered. Embedded in pork quality are variances in fat, flavor, market weight or size, curing, fresh, frozen, or use of growth-securing antimicrobials.

In intensive production, nearly all of procurement by packers and process is direct, with marketing agreements (Grimes and Plain 2007). In 2007, 60 % of independently produced hogs were sold through some form of market formula or purchase arrangement; 33.4 % of hogs marketed were packer-owned or packer-sold. Procurement managers are willing to pay a price premium to secure the quality and number of hogs they need. The fact that less than 10 % of hogs are sold in spot or markets involving bids has led some to question whether enough hogs are sold on the spot market to sufficiently represent actual supply and demand conditions and derive an accurate price for hogs.

Here too one must consider time as a constraint or a value stance. Does the farmer value the efficiency and speed of production or rather a slow food ethic (Paxson 2005) where

speed and efficiency are replaced with slower-growing breeds, longer time to market, and slower pace of farm family life? It can be demonstrated that reliance and reduction of off-farm inputs is favored by small- to mid-scale independent farm systems. Small- to midsize-scale pork production is often correlated with USDA-certified organic, pasture-raised, multispecies-integrated, or animal welfare-certified farms. These practices can represent a value stance of the farmer or can be an economic strategy to capture a portion of the growing niche market for this type of pork. This demonstrates how one value domain, economic viability, can drive other value domains such as animal welfare or ecological integrity. Coupled with this driving force is again the need to produce to scale with consistent quality.

Transport

Market weight or finished hogs are then transported to slaughter. The 28-h law was first enacted in 1873 and applied exclusively to rail transportation of cattle, sheep, swine, and other animals, requiring that animals not be confined for more than 28 consecutive hours without being unloaded for feed, water, and rest. This law was amended in 1994 and further clarified by the USDA in 2006 that livestock transported by truck are subject to regulation requiring that they be off-loaded for feed, water, and rest after 28 consecutive hours in transport. This decision of transport is tightly wedded to the location and availability of USDA-inspected slaughterhouses. For the small- to midsize farmer, the lack of processing facilities within a 2-h drive severely limits their ability to choose especially if seeking to grow certified organic or certified humane pork. There is a small but growing movement to provide mobile abattoirs for processing.

Harvest

Once the animals have arrived at the processing facility, they are unloaded into the lairage (holding pens) where preslaughter welfare conditions should be optimized. The ideal condition for both meat quality and welfare of the animal is short transport time and a sufficient lairage rest. Good lairage conditions give pigs a time to rest and rehydrate. The amount of lairage time may vary from 0.5 to 24 h, as it is dependent on climate, time in transit, quality of transport, and conditions in the lairage (e.g., separate pens to avoid comingling of animals from different farms). After resting, the animals are then brought to the slaughter line or kill floor. The Humane Slaughter Act of 1958 is a federal law designed to reduce pain and suffering of animals during slaughter. The law is enforced by the USDA Food Safety and Inspection Service. Compliance to this federal regulation is often an area of concern and has paved the way for the adoption of Temple Grandin's humane slaughter auditing process. Grandin's work over the past two decades has dramatically changed slaughterhouse conditions, process, management, and self-regulation with the development of her welfare audit protocol (Grandin 2003). The audit is an objective scoring at critical control points in the process. This has now become a voluntary industry standard with corporations such as McDonald's, Burger King, and Wendy's requiring the audit of their suppliers.

Processing and Distribution

From the cooler, carcasses may be managed in several different ways. They may be sold for wholesale or restaurant distribution. More often the whole carcasses of niche swine find their way into restaurants and neighborhood-operated butcher shops. Carcass may be split into primals (major portions of the animal) and shipped to other plants for further processing, exported, or shipped to stores for customized cuts. Some restaurants may buy primals. At issue here is identity preservation as well as consistently providing customers the product the seller claims to provide 100 % of the time. Identity preservation is important for enhanced food safety, but it has been a cause for concern when incorporated into enforcement of country of origin labeling. Vertical integration has allowed for the expeditious and affordable distribution of large amounts of meat through large grocery chains. The processing of the meat is the responsibility of the company all the way to

the branded productions in the meat case at the store. Finally, it is important to some to remember that the harvest of swine results in more products than just pork. Several valuable products or by-products, in addition to meat, come from swine. These include insulin for the regulation of diabetes, valves for human heart surgery, suede for shoes and clothing, and gelatin for many food and nonfood uses.

Summary

Ethical issues exist throughout the pork supply chain for both producers and consumers. They are very important and must be addressed using deliberative skills, patience, and humility. Knowledge and investigation of the complexity of the trade-offs involved in pork production along with an increased understanding of what is actually taking place during production, harvest, processing, and distribution are essential to the full discussion.

Cross-References

- ▶ Agricultural Ethics
- ▶ Agricultural Science and Ethics
- ▶ Animal Agriculture and Welfare Footprints
- ▶ Animal Welfare in the Context of Animal Production
- ▶ Animal Welfare: A Critical Examination of the Concept
- ▶ Biofuels: Ethical Aspects
- ▶ Centre for Animal Welfare and Ethics
- ▶ Climate Change, Ethics, and Food Production
- ▶ Corporate Farms
- ▶ Economy of Agriculture and Food
- ▶ Ecosystems, Food, Agriculture, and Ethics
- ▶ Environmental Ethics
- ▶ Environmental Justice and Food
- ▶ Farm Management
- ▶ Farms: Small Versus Large
- ▶ Food Animal Production, Ethics, and Quality Assurance
- ▶ Humane Slaughter Association
- ▶ Industrial Food Animal Production Ethics
- ▶ Industrialized Slaughter and Animal Welfare
- ▶ Meat: Ethical Considerations
- ▶ Resource Conflict, Food, and Agriculture
- ▶ Sustainability and Animal Agriculture
- ▶ Sustainability of Food Production and Consumption
- ▶ *Telos* and Farm Animal Welfare
- ▶ Trade Policies and Animal Welfare
- ▶ Water, Food, and Agriculture

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Poverty and Basic Needs

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Synonyms

Basic human needs approach; Human needs approach

Introduction

Dissatisfaction with purely monetary measures of poverty led to the development of the basic needs approach (BNA) during the 1970s. Its main foundation is a consequentialist ethic that argues that a good society is one in which all people will be able to meet their basic needs. A person is said to be poor if he or she is unable to meet his or her basic needs. In general, the BNA is more concerned with poverty experienced in the present than with long-run growth per se and more concerned with inequality in the distribution of growth's benefits than its absolute speed.

Beyond this basic foundation, however, there is a great deal of debate and disagreement within the movement. As discussed below in greater detail, some practitioners contend that basic needs are confined to a minimal set necessary for the sustenance of human existence, while others focus on ensuring complete well-being and a list of needs that is ever expanding by design. While the BNA is inherently multidimensional, there is disagreement over how to deal with this multidimensionality in quantitative analysis. These internal disagreements shortened BNA's brief prominence in development thinking. It has since been growing in importance, thanks to the Millennium Development Goals (MDGs) and Latin American practitioners.

History

Some of the roots of the basic needs approach can be traced as far back as Aristotle, who identified four groups of needs. The two most relevant groups are "that which must be if life or existence is to be" and "that which must be if some good is to be achieved or evil avoided" (Reader 2006, p. 339). Rowntree measured poverty in early twentieth-century England based on calculating an income level necessary to meet the "human needs of labor" (Glennerster 2004, p. 25). Wiggins (1998) attempts to give the most concrete definitions of having an "absolute" need for a particular object – a need which would cause

significant harm if unmet and can only be met by that particular object. Absolute needs are "entrenched" when it is exceptionally difficult to imagine a reality where the person in question did not have an absolute need for that object. Lastly, entrenched, absolute needs are "basic" if it is a reality on par with a natural law that makes it so the person has an entrenched, absolute need for that thing.

Maslow's (1943) famous hierarchy of needs also doubtlessly played a role in the BNA's early development. The original hierarchy identified five levels of needs, ordered from the physiological and safety and security needs which are necessary for existence to the social, esteem, and self-actualizing needs requisite for human growth and development. Tay and Diener's (2011) test of Maslow's hierarchy finds that while each of the needs Maslow identified is significantly correlated with happiness worldwide, the expected hierarchy is not supported by their data. Türkdoğan and Duru (2012) determine that the five basic needs from psychology's choice theory (survival, love and belonging, power, freedom, and fun) are significant predictors of subjective well-being among university students. Even though survival was the need that was least fulfilled, they suggest that freedom (or self-autonomy) and fun were the most important drivers of variation in subjective well-being.

US President John F. Kennedy's Alliance for Progress was established in 1961 explicitly "to satisfy the basic needs of the [Latin] American people" (Dixon 1987, p. 129). During the same period, the US monetary poverty line was based loosely on the cost of obtaining a minimum, emergency diet (Chambers 1982). In other countries, simple poverty lines were also based on the ability of a household to obtain enough food. However, this was often limited to the ability to obtain the primary staple (e.g., rice, maize, wheat, potatoes, or cassava). Very little attention was paid to nutritional adequacy or intrahousehold food distribution in the earliest measures. This tendency was seen again during the 2006–2008 food price crisis when governments that took action primarily focused on staple crop access rather than on nutrition and dietary diversity.

There was increased focused on basic needs during the 1970s in part because of the world food price crisis of 1973–1974. Soaring food prices led to hunger and brought to the fore the need to address this most basic need, particularly since the same amount of money would not purchase as much food. BNA was often couched within a discussion on the ability of societies to provide their citizens' basic needs within environmental constraints. The development of the BNA was therefore intimately related to the development of environmental consciousness.

Basic needs as a development paradigm were fostered by a series of influential publications supported by major donor organizations. These included the Cocoyoc Declaration (1975, p. 896) by UNCTAD and UNEP which forcefully contended that "any process of growth that does not lead to their [basic needs'] fulfillment – or, even worse, disrupts them – is a travesty of the idea of development"; the 1975 Dag Hammarskjöld Report (p. 27) which contributed the notion that meeting physical needs allows people the ability to fulfill social needs, such that "the basic needs of men emerge as social needs"; the Latin American World Model (Herrera et al. 1976) which constructed a mathematical model of how developing countries could satisfy their citizens' basic needs without endangering environmental sustainability, acting as a direct challenge to the Club of Rome's *Limits to Growth* that fulfilling basic needs was primarily a sociopolitical challenge rather than an environmental one; and the ILO's report for the 1976 World Employment Conference which marked a dramatic shift from promoting growth-led development strategies to explicitly proposing that each country adopt a BNA that included not only physical needs but access to public services, employment with appropriate pay, environmental quality, and participatory governance. The ILO report was particularly noteworthy in part because of its foundation of country studies across developing

regions of the world and from its political acceptance. At the 1976 World Employment Conference, 121 governments agreed to this new framework, albeit with significant reservations from both developed and developing countries.

By 1978, the World Bank, ILO, UNEP, UNICEF, and USAID were the chief proponents of the BNA among development organizations with Latin American governments providing the chief political support from developing countries (ODI 1978). During the 1980s and 1990s, however, the BNA suffered significant setbacks. Recessions in Latin America reduced those governments' ability to fight for basic needs at home and abroad. The rise of the Washington Consensus refocused development thinking on more growth-oriented policies through political retrenchment. In addition, new intellectual challenges emerged from within the community of scholars that had been most likely to support BNA, such as Amartya Sen's capabilities approach and the human rights framework.

Criticism focused on a handful of challenges in applying BNA (Rudra 2009). The primary concern was the lack of agreement among scholars on which needs were basic. The core basic needs group focused on a minimal set of needs essential for sustaining life. This core principally included food, shelter, water and sanitation, education, and health and sometimes included employment or political participation. The expanding basic needs group, in contrast, believed that human development should focus on ensuring individual well-being and recognized that once one need was satisfied, additional needs came to the fore. Rather than ensuring a minimum lifestyle, the real goal was nothing less than the full physical, mental, emotional, and social development of all people, with lists of needs that included "democracy, marriage, recreation, religion, and furniture" (Rudra 2009, p. 134; see also de Campos 2012). Among the latter group are the World Health Organization, which defines health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity," and the UN's Universal Declaration of Human Rights (UDHR), which states in Article 25.1 that "everyone has the right to a standard of living adequate for the health and well-being of himself and of his family" (De Campos 2012). The World Bank, ILO, USAID, and most governments tended to favor the former group, preferring a smaller set of clearly identifiable targets, limited political accountability, and finite budgetary expenditures.

In addition to disagreement on which needs were basic, there was quantitative disagreement over how much of any particular need was basic and how to deal with the generally accepted fact that different people require different amounts of these basic needs at different times and places depending on a range of factors (Reader 2006). Cultural differences add to this complexity. While part of the moral appeal of the BNA is that these human needs are universal, many of them may differ in form or quantity across societies or over time. Examples include different caloric needs depending on lifestyle and different food choices depending on culture, different shelter requirements based on climate, different perceived social needs by gender or age, and different perception of the relative worth and necessity of different needs depending on cultural factors. This lack of agreement on focus and the challenge to be simultaneously universal and sensitive to local differences reduced the BNA movement's policy relevance and made it easier for other conceptualizations of human development to gain prominence.

Despite the theoretical schism between the minimum basic needs and expanding basic needs camps, in practice measures of basic needs focused on easily measurable baskets of minimally necessary commodities. Often, the commodities were not only measurable but monetizable, making it possible to construct cost of basic needs (CBN) poverty lines as the United States did in the 1960s (Chambers 1982; Arndt and Simler 2010). Sen (1984) criticized this as "commodity fetishism," insisting that freedom was a basic need in itself for human development. If participants do not have the freedom to voice their own needs, it was argued that BNA was too

patronizing and incomplete (Sen 1984; Rudra 2009). Reader (2006, p. 338) indicates that "the emphasis on the 'basicness' of needs caused offence, suggesting helper-groups believed poor people 'really need' water, but do not 'really need' goods subserving other dimensions of human life like religion or relationships."

The BNA has had a resurgence since the Human Development Index (discussed below) and the Millennium Development Goals (MDGs) were established by the United Nations in 2000. As the culmination of over a decade of international conferences on human development, the MDGs represented a significant consensus on what needs were considered basic across the world and how to measure them. The presence and signatory support of most governments served to weaken the criticism that developing people did not have a voice in the process. There has been a marked increase in attention paid to fulfilling the basic needs embodied in the MDGs and whether or not economic growth and development assistance were successfully fulfilling those basic needs. Alkire (2005) notes, however, that the MDGs relate to states of being or functionings people need (avoiding premature death and chronic hunger) rather than the intermediate goods/capacities people need in order to achieve those states of being as Wiggins (1998) lays out.

In Comparison

While basic needs are most likely to be advocated as a measure of absolute poverty, there is no a priori reason that one's basic needs might not be relative to what other members of society have. Needs are likely to become increasingly relative as average incomes rise and as needs take on increasingly social dimensions. For instance, the physiological need for a particular number of calories is an absolute need, while the need for types of food that are culturally appropriate depends heavily on the surrounding culture by definition.

There are three primary methods for measuring poverty that may significantly overlap the BNA. These are the monetary, capabilities, and human rights approaches. Monetary poverty lines based on the cost of obtaining basic needs (CBN) can follow much of the spirit of the BNA while focusing more on the means people have to meet their basic needs than on their actual fulfillment. Constructing CBN monetary poverty lines requires a number of assumptions that BNA purists would find rather strong, such as placing specific monetary values on a year of life or the probability a child will die, valuing purchased inputs to health processes that are sold in markets rather than the experience of being healthy which is not, and ignoring basic needs that have neither marketable price nor reliable shadow price estimates. On the other hand, most BNA measures of poverty must make similar judgment calls in order to construct a composite index and lack the theoretical rigor that market prices provide. As one example, Guruswamy and Abraham (2006) construct a CBN poverty line based on the cost of obtaining certain basic needs in India: nutrition; basic health measured as the expected value of healthcare expenditure, clothing, and miscellaneous; and access to water and sanitation, shelter, education, electricity, and roads. Looking at just the monetary aspects, that would create a poverty line of Rs. 840 per capita per month. They find that 85 % of rural Indians and 42 % of urban Indians fall below that line, significantly more than official poverty figures.

As in the BNA, Sen's capabilities approach examines a large set of basic needs, but the primary emphasis in the capabilities approach is on whether or not a person has the capability to fulfill a needed functioning rather than whether the need is actually fulfilled in practice. The focuses on means rather than ends and on the individual freedom to choose whether or not to fulfill those ends are the key distinctions. Survey work in South Africa finds that while both utility- and BNA-derived poverty measures do not provide a sufficiently broad space to cover what individuals actually conceive of as their needs, there is at the same time a more significant overlap between the three approaches than adherents of the capabilities approach normally suggest (Clark 2005). Reader (2006) provides

a vigorous defense against many of the criticisms of BNA brought up by capabilities approach proponents. Since fulfilling people's basic needs has a moral force that "acquiring capabilities" cannot have, the replacement of BNA with the capabilities approach may have been premature (Alkire 2005; Braybrooke 2006; Rudra 2009). Wiggins (1998) argues that the word "need" itself has a special meaning that implies some things are required regardless of what one chooses, reducing the moral necessity of the capability approach's focus on freedom. Alkire (2005) attempts to merge BNA with capabilities and the MDGs, producing a notion of basic needs capabilities.

Stewart (1989) argues that the human rights approach evolved in parallel to the BNA, though the work was done by different agents from different disciplines to create separate conceptual frameworks and policy spaces. The 1976 International Covenant on Economic, Social and Cultural Rights established that most of the core basic needs were also human rights. As very similar approaches from the outset, they shared many of the same strengths and criticisms, particularly over which needs are rights and to how much of a needed commodity or functioning one has a right. The rights dimension adds several important concepts absent from BNA. Most important is the notion that for every right holder, there is also a duty bearer who must fulfill the right, while there is no such legally recognized "needs provider" in BNA. Thus, declaring something, a human right adds a greater sense of obligation to governments as the entity most likely to be declared the duty bearer. The right to human development brings the concept of rights well beyond the core basic needs into the realm of expanding needs.

Applications

One of the greatest challenges in applying the BNA is dealing with the inherently multidimensional nature of poverty. Numerous papers have described the theoretical problems that need to receive greater attention across multidimensional poverty approaches (e.g., Thorbecke 2005). When practitioners gather information on dozens of basic needs indicators, they need a simple means of combining them that is informationally relevant yet readily comprehensible for policy makers and the general public. Any and all attempts at doing so, however, are by nature ad hoc and involve making strong ethical and statistical assumptions that are difficult to defend. Following are brief summaries of some of the more prominent attempts at actualizing the BNA and a brief comment on how well each embodies the main goals of the BNA.

The UNDP's Human Development Report was begun in 1990 with the express aim of pushing back against the Washington Consensus using the BNA and capabilities approach fostered by its founding editors (e.g., Paul Streeten and Frances Stewart for BNA; Amartya Sen for capabilities). The Human Development Index (HDI) constructed by the UNDP (UNDP 1990–2013) (hdr.undp.org) combines countries' ranks in educational attainment and life expectancy with their per capita GNI. Before 2010, the HDI combined the three measures by finding the mean of the three scores. After 2010, they were combined geometrically instead. This change significantly increased the weight on the lowest score of the three and reduced the substitutability between the three dimensions of development which were seen as improvements in the methodology. However, it also created other unusual ethical assumptions, such as that the monetary value of an extra year of life in a country like Zimbabwe went from being 1/70th of the value of an extra year of life in the United States to being valued only 1/17,000th (Ravallion 2010a). Across countries, the weight of longevity and education has significantly decreased for most countries, putting greater focus on income, which may not have been the intention and has certainly brought the HDI further from BNA ideals. The HDI has also tended to more closely follow the capabilities approach manner of thinking of about the possibilities people have using aggregated national data rather than on the results individuals face.

At least 13 Latin American countries use a form of unmet basic needs index (NBI) to

measure poverty and identify where greater expenditures and intervention are needed. The modal country uses five indicators. The four factors most countries have in common are: crowding, access to sanitation, access to safe water, and school attendance (Hicks 1998). The dependency ratio, the education level of the household head, housing quality, illiteracy, access to electricity, and malnutrition are also popular indicators. These indicators are generally chosen based on their availability in population census data. The World Bank's Poverty Assessments and Poverty Reduction Strategy Papers have also typically drawn on multiple basic needs dimensions, though relying on them to varying degrees and making limited explicit use of BNA terminology and theory.

The Multidimensional Poverty Index (MPI) was developed for the same UNDP Human Development Report that altered the HDI (Alkire and Santos 2010). Multiple indicators of the standard of living (six), health (two), and education (two) are combined into a ten-item index, eight of which directly correlate with MDGs. Households are classified as poor if they are deprived in at least three of the ten indicators. The MPI's greatest strength lies in its ability to identify patterns of poverty – clusters of unfulfilled basic needs that are correlated with each other within a population subgroup – to enable decision makers to target interventions to address those specific patterns. However, by giving each basic need equal weight, the MPI implicitly argues that the death of a child in the family is morally equivalent to having a dirt floor or owning a radio while lacking a telephone or a mode of transportation.

Ravallion (2010b) provides a thorough critique of the MPI and of similar poverty measures that aggregate deprivations. He mostly defends the notion that multidimensional poverty work should avoid making single "mash-up" indices that combine all the dimensions into a single number, preferring the "dashboard" method because it is in general the joint distribution of those shortfalls that are of interest. He also notes, however, that poverty lines generated from household consumption based on hundreds, or in some cases thousands, of items are multidimensional even though they are typically called unidimensional. Ravallion (2010b) further notes that while using market prices relates the poverty measure to human choice and human welfare, the aggregation weights assigned by researchers do not reflect local choices and are rarely updated. Particularly from a policy standpoint, it is important to differentiate between ends and means. For instance, people have a basic need for food and nutrition; access to some form of food stamp program may be one means to ensure people are able to fulfill their basic need for food, but lack of access to food stamps is not itself an indicator of poverty. Hicks (1998) debates whether access to water and sanitation are needs in themselves or merely means to the end of health and whether access to education is a need or merely a means to the end of literacy. Hicks (1998) also warns against using indicators of poverty that correlate too closely with income to ensure that each indicator provides useful, independent information.

Summary

The basic needs approach was designed to focus greater attention on nonmonetary aspects of poverty that are absolute, entrenched needs, vital for human welfare. Though its initial success during the 1970s was short-lived, a revival has been underway in both theory and application since at least the Millennium Development Goals. It also served as a foundation for the growth of the capabilities approach.

There is still a gap between theory and empirics in BNA. Theory acknowledges a number of difficulties – such as identifying complete sets of basic needs based on local feedback and the difficulty of assigning meaningful weights to each factor – that are often ignored in practice in favor of the exigencies of what data are available and creating single indices that make it easy to communicate simple policy messages. There is much work yet to do to reconcile practice with theory and to combine the insights of the basic needs, capabilities, and

rights approaches into a more unified and powerful development paradigm.

Cross-References

- ▶ Access to Land and the Right to Food
- ▶ Cosmopolitanism, Localism and Food
- ▶ Extraterritorial Obligations of States and the Right to Food
- ▶ Food and Poverty in High Income Countries
- ▶ Food Security
- ▶ Human Rights and Food

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Pregnancy and Food

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Introduction

Western medicine provides the dominant discourse surrounding pregnancy and birth management throughout much of the world, a view endorsed by the World Health Organization and countless aid agencies, displacing indigenous understandings of pregnancy and its relationship to food in particular.

Until the 1960s, Western medicine viewed the pregnant woman as a body with an insulated, parasitic capsule growing inside it. The capsule within was seen as virtually omniscient and omnipotent, knowing exactly what it needed from its mother-host, reaching out and taking it from her – taking vitamins, minerals, protein, and energy, at her expense if necessary – while protected from all that was bad or harmful.

The pregnancy in this model was almost entirely a mechanical event in the mother, who differed from the nonpregnant woman only by the presence of this thing growing inside her. Differences other than mechanical changes, such as the enlarging of the uterus, were accordingly seen by physicians as symptoms to be treated so that the woman could be kept as "normal" as possible throughout the "stress" of pregnancy. (For a discussion of the medical and midwifery models, see Rothman (1982) and Simonds and Rothman 2007.)

Working with this model, obstetricians did not consider pregnancy as necessarily unhealthy, but pregnancy is frequently associated with changes other than the mechanical growth of the uterus and its contents: these changes the doctors *did* see as unhealthy. For example, the hemoglobin count, which is lower in pregnant women than in nonpregnant women, makes pregnant women appear (by nonpregnant standards) to be anemic. The result was that doctors treated this anemia with iron supplementation. Water retention, or edema, is greater in pregnant than in nonpregnant women. Obstetricians treated this "condition" by placing limits on salt intake and prescribing diuretics. Pregnant women tend to gain weight in addition to that accounted for by the fetus, placenta, and amniotic fluid. American obstetricians then treated women for this weight gain by putting them on strict diets and sometimes prescribing "diet pills." Knowing that these changes were very likely to occur in pregnant women, American doctors set out to treat all pregnant women with iron supplements, limits on salt and calorie intake, and diuretics, all in the name of "preventative medicine."

With the advent of thalidomide, a drug obstetricians prescribed for morning sickness, that passed through the placenta and caused dramatic limb reduction birth defects, an epidemic of "German measles," and the observable fetal consequences of radiation exposure following the bombing of Hiroshima and Nagasaki, the image of a protected fetal parasite was no longer tenable. The fetus is now understood as a vulnerable "patient" trapped within the confines of the woman's body.

Medicalization of Women's Lives

Bordo (2003) argues that the surveillance of women's eating and drinking preferences during pregnancy is an inevitable flow from the medicalization of women's health in life more generally. From a Foucauldian perspective the moment a pregnant woman steps into the hands of the health professionals, the disciplinary gaze and surveillance of her nutritional status and control over her pregnant body commences. Weight gain, the most obvious indicator of food consumption, comes under immediate medical scrutiny. During the first antenatal visit, the pregnant woman is

usually weighed and her weight gain monitored throughout the pregnancy. Weight gain guidelines shift dramatically across time: In the earlier "insulated capsule" model of pregnancy, weight gain was expected to be limited to the actual weight of the fetus, placenta, and amniotic fluid, and women were reproached for additional weight gain. The switch to the "vulnerable fetus" loosened those guidelines and permitted women to – as appears to be biologically normal for women with access to adequate nutrition – gain extra weight, perhaps in storage for prolonged lactation. The current focus on the "obesity epidemic" brings back more stringent weight gain guidelines. While all women, and indeed all citizens, in the Foucauldian sense, are subject to the medical gaze and the health imperative, this has proved particularly problematic in pregnancy.

From a philosophical perspective, matters of health are sometimes found to be in conflict with values such as freedom or autonomy. If health is understood as being extrinsically valuable, people should be able to sacrifice health as we please without any moral justification. However, if health has an intrinsic value (that we should not cause unnecessary damage to self or others), then it could be considered wrong for a woman to behave in a way that may cause harm to her unborn baby.

Critics have suggested that medicalization has become a cliché of critical social analysis. However, the application of this theory to the subject of food is persuasive, and this is particularly so when pregnancy is considered. Women are burdened with information about diet during pregnancy, and much of it is negatively focused on avoiding pathological conditions such as foodborne infections. There is little that extols the health benefits for both women and their babies of taking a health-based approach to eating during pregnancy. In the medical model, the woman is seen as essentially a barrier to fetal care, and her food choices understood primarily in terms of fetal risk.

An appropriate analogy may be that pregnant women are like players in a real-life snakes and ladders game where if they do the right thing – e.g., avoid soft cheese/stay within a reasonable weight gain limit/eat no more than one portion of tuna a week – they can climb up the ladder, but if they do the wrong thing, e.g., eat chilled prepared foods or drink one glass of alcohol, they will slide down the snake and be viewed through the lens of the medical world with concern. In fact the scrutiny would seem to extend far beyond the medical gaze, with the media reporting stories of women perceived to be pregnant by cabin crew on airlines, being refused a requested glass of wine in flight. Yet dietary advice is far from being a constant or consistent form of knowledge but is consistently altered to reflect the changing evidence as reported in the media. One year it is the potato that must be avoided, another year it is peanuts. One year the concern is with fats, another it is with sugars. While all citizens are subjected to this information flux, pregnancy is a uniquely time-bound experience: If this is the year that tuna is switched from the good list to the bad list, and this is the year one is pregnant, one faces the potential of lifelong damage inflicted on one's baby.

Food Rules and Social Control

Food rules and taboos in pregnancy are not at all unique to the modern world of course and can be found across temporal space and cultural boundaries. For centuries Western women have been encouraged to eat for two, to avoid spicy foods, and to follow their instinct for cravings (pica) including eating clay and coal (geophagia). In much of the Eastern world, women are expected to adhere to the cultural practice of balancing "hot and cold" foods and observing those and additional specific food practices while "doing the month" following childbirth. In parts of Africa, cultural taboos discourage women from eating specific fruits and vegetables during pregnancy. There are ritual fasts and ritual feasting during pregnancy found around the world. Pregnant women everywhere and always are subjected to larger social forces than their own unique embodied experiences and appetites. Such is the nature of human life – humans are social beings. What switches over time and space

is who holds the authoritative voice, and in the contemporary world, that is biomedicine.

With more space, one could usefully trace the tales of specific foods that have moved in and out of acceptance as appropriate or dangerous for pregnant women: potatoes, tuna, peanuts, red meat, fats, and more, as already alluded to. Here is one specific enduring example of a Western pregnancy food-related taboo and then a turn to the more general issues of *amounts* of food rather than specific food items.

The specific example is alcohol: There is good evidence that women who are alcoholics, eating the nutritionally poor diet typical of alcoholism and drinking large amounts of alcohol on a regular basis, can indeed birth babies with what is known as "Fetal Alcohol Syndrome," or FAS. What there is not is evidence that occasional or what is known as "social drinking" has negative fetal consequences. But with the discovery of FAS, alcohol became entirely taboo for pregnant women in the USA, and its path from a research finding to a state-endorsed social policy is itself a fascinating story (see Armstrong 2003). Without supportive data, women who reached for a glass of wine with dinner, who sipped a beer at a party, were subject to formal and informal social sanctions: denied service in public places, reproached by friends and family. Pregnancy warnings appeared on bottles and on restaurant walls. Refusing a drink became one of the earliest public signs of pregnancy, and having any amount of alcohol while visibly pregnant made a woman subject to sometimes extreme approbation and even threats of social services removing the child from her custody at birth. This particular pregnancy taboo built on the long and uniquely fraught history of alcohol in American public policy; the potential risks of peanuts or tuna could not have achieved such public acknowledgement and endorsement so quickly.

The information that people in Western societies receive concerning what constitutes a good diet in pregnancy is certainly influenced by the food industry, which has its own agenda and is, to this point, less regulated and less suspect than the alcohol industry. So who are pregnant women to trust when it comes to advice relating to what to eat and drink during pregnancy? Far from feeling safe and well informed, it would seem that pregnant women find themselves lost and confused in the dietary maze, as specific foods move in and out of favor.

Too Much or Too Little? The Two Sides of Malnourishment

It is more than ironic that at a point in history where obesity is being flagged as the number one nutritional issue in the world, it is estimated that there are over 800 million hungry people in the world. It would seem that those of us in high-resource-use countries are struggling to keep food energy consumption under control, while in low-resource-use countries, particularly those in sub-Saharan Africa, many are finding it difficult to sustain their nutritional needs and in too many cases are starving. According to the World Bank, 36 countries, mostly in sub-Saharan Africa, are in a food security crisis. This means that globally many millions of women are likely to be grossly malnourished during pregnancy, the major contributor to poor outcomes in terms of both maternal and perinatal mortality. While there is of course food aid, its public face is the hungry baby or child – the pregnant woman is largely absent in the portrayal of world hunger though arguably hunger has its greatest consequences in pregnancy.

Pregnancy and birth are now known to be extremely energy demanding processes with the ingestion of food a crucial part of this process. An increasing body of knowledge around the importance of good nutrition during pregnancy now suggests the adage "you are what you eat" should be "you are what your mother ate." Diet during pregnancy can have lifelong consequences for the fetus.

There is little doubt that a nutritionally rich diet with a sensible balance of both macro- and micronutrients offers the best possible start in life. Micronutrients in particular may hold the key to protecting the developing fetus from the effects of exposure to toxic chemicals including

teratogens and carcinogens. Suboptimal nutrition may additionally adversely affect the growth of the fetus, and impaired fetal growth is associated with increased perinatal morbidity and mortality as well as infant mortality and childhood morbidity. Studies as early as the post-WWII Dutch Famine Study have demonstrated that pregnant women subjected to food shortage appear to produce babies who are more likely over the life course to develop diabetes, obesity, and cardiovascular disease and experience other health-related problems. What pregnant women eat has long-term potential for health and well-being and has impacts far beyond the period of childhood.

The focus in the developing world regarding pregnancy however has largely been on replacing indigenous childbirth practices with Western-trained practitioners, with far too little attention to the needs of pregnant women over the course of the pregnancy and even less into the prepregnant time. If poor nutrition has such easily demonstrable consequences for maternal and infant outcome, from simple survival to healthy adulthood, it would seem reasonable to suppose that the most effective way of avoiding less than positive outcomes would be to ensure that all women were supported in accessing the best possible dietary intake during pregnancy, in the form of good information, education, and where necessary practical help.

What should not ensue is a "mother blame" approach that reproaches women for eating poorly and placing their babies/children at risk as a result. However, some of the issues arising from the areas of food and diet in pregnancy could be construed as adding additional pressure around what women "should" eat and what they "should" not eat. There is an abundance of evidence that shows that heightened anxiety can increase the stress load for women within pregnancy, bringing a further threat of potential insult for the fetus in the form of increased catecholamines and cortisol levels. These can lead to permanent metabolic and endocrine changes influencing health throughout life. This is especially the case where some pregnant women live in poverty and access to nutritious foods is limited or even nonexistent.

Mother blame is most obvious in the other side of the malnutrition dilemma: obesity. The issue of obesity, weight gain, and pregnancy within a conventional weight-based paradigm has attracted enormous attention in recent years. Pregnant women using maternity services receive clear messages that if they are obese, they have a greater risk of developing a range of complications in pregnancy and childbirth. Obesity has become increasingly medicalized, with its relationship to poor infant outcome often misstated as a *cause* rather than a *correlation*. These "authoritative" accounts often contain overstated claims about the damaging effects of body fat on the health of pregnant women and their babies. Increasingly, health professionals are taught to view obese women as "a statistic waiting to happen." Not all obese women will present as problematic; the degree of risk will vary with differences between a well-nourished and an undernourished pregnant woman, and weight/fat alone does not capture that distinction.

There is certainly a lack of knowledge among health professionals of the social, psychological, and economical effects that influence obesity as well as personal well-being. This knowledge deficit adversely influences access to maternity services, quality of care, health equity, and outcomes of care, for women who are more vulnerable and disadvantaged.

The very measure of obesity is complicated in pregnancy: Body mass index has been commonly used as a definition that measures too much body fat in pregnant women. Its use is highly contentious. BMI is a height to weight ratio used to measure the "medically defined" condition of "obesity." In this, a healthy body weight is based on a measure of body fat that falls within a numerical range of 18.5–25. However, this measure has been criticized by both social and medical scientists. It is not consistently applied because there is disagreement among medical practitioners as to what optimum body weight actually is. This has resulted in disagreement on whether obesity should instead be measured by waist circumference although this would seem rather absurd for pregnant women given their growing waist lines.

"Obesing" and fixating on the size of pregnant women's bodies can detract attention from other areas of their lives where they may benefit from additional support. Fat activists have pointed out that a raised BMI alone does not necessarily constitute a threat if the woman is well nourished and is able to access good levels of support. In contrast, the woman with a BMI which sits within the "accepted" range but is undernourished and does not have a good support network in place may be totally overlooked. By focusing on alleged "risk" factors such as BMI, it is possible that health professionals are missing the big picture and making broad generalizations which are all too often translated into judgment about overweight women (Wray and Deery 2008).

The media, health professionals, and general public leap to groundless conclusions that any possible health risks (e.g., hypertension, diabetes, heart disease, and cancers) are *caused* by obesity. Other legitimate forms of evidence simply do not enter into the public domain for discussion and debate; the risks of obesity are asserted without reference to work that demonstrates otherwise or questions the credibility of the findings. This situation has created a powerful and pervasive discourse where the health risks associated with obesity are often communicated as scientifically based fact and obesity is viewed as a dangerous disease. Global obesity pandemics are increasingly referred to, and the dietary habits of Western societies are now being blamed for increasing obesity rates in developing countries.

As well as having health issues blamed on their body size, obese pregnant women are also more likely, than their counterparts, to receive judgmental comments from members of the health professions. When a more accepting and supportive approach to obesity by health professionals does not happen, social discrimination, stereotyping, and stigmatization occur much more frequently. When these negative social responses come into play, the effect on pregnant women is easily ignored or forgotten, and women are judged on the basis of their size and appearance. Internalized views and opinions about "obesity" can easily be transmitted subliminally to women and their families increasing the potential for marginalization and lack of uptake of health services, and so the negative attitudes about obesity itself can cause problems (Deery 2011).

A consensus seems to have emerged in the world of scientific research that has not yet made it into medical practice or social awareness, that being obese is associated with a broad range of social, psychological, and economical effects on a pregnant woman's life. At the same time the failure of the conventional weight-based paradigm has led to a greater consideration of possible risk factors that appear to be correlated with obesity. These include psychological factors, eating patterns, activity levels, family background, and amount of sleep. Associated with discrimination and stigmatization, obese people may externalize a sense of guilt, possibly leading to more negative experiences with health care, a situation exacerbated by pregnancy.

Alternatives to Medicalization

Biomedical reductionism is still the dominant paradigmatic approach in maternity care, with little time or attention paid to a more holistic perspective. In addition and not unrelated, there is an increasingly market-driven approach to maternity care.

Women-centered care following the precepts of the Midwifery Model of Care offers an alternative. In this approach, the individual needs of the woman are assessed and a plan negotiated between the woman and the midwife that enables her to meet her specific needs to optimize the health and well-being of both herself and her baby during pregnancy. Rather than seeing mother and fetus as separate individuals in a potential conflict, midwifery care sees the two as an interconnected whole. Improving the health of the mother, through nutrition as well as other support, is seen as the best way to care for the baby.

During pregnancy women may be more receptive and open to education about food, health, and

well-being. For the first time they may have a sense of their own place in the universe and see a generation ahead. This is a time when further understanding about nutrition and the importance of micronutrients would be useful. Although some midwives have a strong focus on nutrition in pregnancy and can help to educate and navigate women to a healthier or more tailored diet, many midwives – especially those medically trained and in medical settings, such as is the case among many UK midwives and many American nurse-midwives – are actually poorly equipped to assist women to optimize their nutrition during pregnancy. This can be seen to result in a population-based approach to the "management" of nutrition in pregnancy, where women are encouraged to accept a prescriptive one-size-fits-all approach to food and diet which is centered on food safety issues and supplementation of micronutrients.

Supplementing women in pregnancy with a variety of micronutrients from folic acid, vitamin D, and iodine is now common in maternity settings worldwide. However, there is no agreement about what constitutes the correct dosage, when the supplementation should begin, whether it is really necessary, and what are the associated risks of any given form of supplementation. This universal approach may give the message to women that "you are not capable of eating well enough to provide all that your baby needs to grow and develop effectively and here is a medicalized solution in the form of a tablet." The practice has led to a growing "nutraceutical" market. The food/pharmaceutical industry has recognized this and has effectively constructed a niche market. The advertising images are of healthy glowing pregnant women as a result of taking multivitamins, which may be largely unnecessary if the woman was taking a well-balanced and nutritional diet. The power to create a healthy baby is thus moved from the actions of the mother to medicalization.

There is not in the midwifery model a sense that the needs or desires of the mother must be sacrificed for the good of the fetus or that the mother would indeed have needs that are other than good for the fetus. For example, midwives repeatedly state that if the mother gives up "junk food" and eats better food for the baby's sake (less refined, more "natural" foods), the mother will feel better and healthier. There has always been much talk in midwifery and alternative-birth circles about a woman "getting in touch with her body." That makes sense only if pregnancy is viewed as a normal condition of the female body. The introspection, the psychological turning inward and self-absorption which may accompany pregnancy, is seen as an opportunity for the woman to learn more about her body and its needs and rhythms. A woman's pregnant body is still very much her own in this model and is not a host to a parasite. Where the medical model sees pregnancy as a stress and a drain on the mother, the midwifery model sees it is as a period of physical and emotional growth and development for both mother and fetus.

While medicine attempts to maintain the normalcy of the mother throughout the stress of the pregnancy, viewing deviations from normal (nonpregnant) status as symptoms of disease states, midwifery views the changes as demonstrating the health of the mother. Rather than seeking to change the mother back in the direction of nonpregnant normality, midwifery's goal was to provide the best possible environment in which the changes of pregnancy could occur.

In the medical model, prenatal care is the *management* of pregnancy, like the medical management of any (other) disease. Nutrition is not much valued in medical care in general and understood more in terms of risk than of health. Even now the "prenatal care" that obstetricians offer women is basically a screening program. The visits typically take 10–15 min or less, in which the woman is weighed, her blood pressure taken, and her urine tested. Blood is drawn for yet more screening and testing. She lies on an examination table, and the fetal heart rate is noted, as is the position of the baby. If she has symptoms to present, these are noted, and remedies may be prescribed. As is often the case in physician visits, a prescription handed over is a way of resolving questions and terminating the

interview. As heretical as it may sound, it is hard to find any evidence that prenatal care improves birth outcomes.

Midwifery care offers a more individualized, culturally competent and specific, nutritionally thoughtful approach, with demonstrably better outcomes. How much of that difference is due to nutrition, and how much to other aspects of midwifery care is yet to be determined.

Summary

Pregnancy has become deeply medicalized, and in dominant medical discourse pregnant women and their behavior are understood primarily as risks to their contained fetus. As such, issues of nutrition and feeding in pregnancy, including food scarcity and obesity as well as specific food taboos, are increasingly understood and controlled through medicine. Midwifery offers an alternative interconnected approach, encouraging healthy eating in the interests of the mother-fetus dyad.

Cross-References

► Alcohol Abstinence and Sobriety
► Food Security
► Medicalization of Eating and Feeding

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Private Food Governance

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Synonyms

Access to food; Effectiveness; Legitimacy; Private standards

Introduction

Food is essential for sustaining the health status of a population. Currently, almost 870 million people are chronically undernourished, while the number of hungry people remains "unacceptably high" according to the Food and Agriculture Organization (FAO 2012a, p. 8). Yet, already one-third of the earth's surface and 70 % of global extracted water are used for food production (OECD 2010). At the same time, estimates by the World Health Organization (WHO) presently pertain that more than 1.4 billion adults are overweight and 65 % of the world's population live in countries where overweight and obesity kills more people than underweight (WHO 2012). Next to hunger and obesity challenges, an estimated three million people around the world, in developed and developing countries, die every year from food-borne diseases, with millions more becoming sick (Lang and Heasman 2004). Such disease occurrences can easily escalate to a food safety emergency situation, which has the potential to adversely impact national economies and livelihoods and reduce the availability of food for national consumption.

Food provision is often associated with poor working conditions, limited access to social protection, and lack of enforcement of labor legislation (FAO 2012b). Rural labor markets tend to be highly informal, with a prevalence of casual work

arrangements and information asymmetries, as well as gender and age-based inequalities (FAO 2012b). Currently, around three billion people work in agriculture mainly in developing countries, with 43 % of agricultural labor in these countries being women (FAO 2012a). In least developed countries, the share of the total population economically active in agriculture was 66 % in 2009. This accounts to more than double the share of agriculture in GDP (FAO 2012a). Correspondingly to these figures, it is embraced that poverty is concentrated in rural areas since people who work in agriculture tend to have lower incomes. Being at the same time the least organized and least protected by legislative frameworks, rural worker's ability to challenge existing conditions is blatantly limited (FAO 2012b).

Environmental impacts related to food are also problematic and cover all stages of the food chain, from food agricultural production to processing, packaging, distribution, and waste. More specifically, the food sector, via fertilizer applications, manure, transportation, energy consumption, and deforestation, is a major contributor to direct and indirect greenhouse gas emissions. Besides the problem with energy retrieval, common environmental threats like the generation of waste, water pollution, pesticide use, and decline of biodiversity constitute other typical concerns. Moreover, the growing industrialization and intensification of agriculture has been linked to the continuing decline of biodiversity in agricultural areas. Intensive agriculture is also considered responsible for extensive drainage and extraction of groundwater, causing groundwater shortages, decline of groundwater-dependent ecosystems, and poor water quality. Similarly, the capacity of agricultural soils, crucial for a continued supply of high-quality foodstuffs, is endangered due to intensive use of the land.

As the food system approaches or crosses its natural and social boundaries, the need for effective and legitimate institutional responses becomes a challenge for both scientists and policy-makers. In this context, business and civil society institutions are often advocated as a panacea for the development of solutions to various environmental and social problems and externalities. Particularly private governance initiatives in the form of private standards and certification schemes appear to have progressed to a mainstream approach to pursuing sustainable agricultural development.

Drawing on previous research and publications by the authors, this short entry, therefore, aims to give an overview of the most prominent private institutions developed to address environmental and social sustainability challenges in the global food system and to sketch some of the most controversial debates surrounding the privatization of food governance. The transformations that led to the emergence of private food governance are discussed first.

Transformations Leading to Private Food Governance

Today, private actors, particularly transnational corporations (TNCs) and civil society organizations, go far beyond their traditional political role as lobbyists by directly engaging in global food governance (Fuchs et al. 2011a). These private actors create institutions to "govern – that is, [. . .] enable and constrain – a broad range of activities in the world economy" (Büthe 2010, p. 1). State authority is either not present at all or not the predominant form of political authority in these private food governance initiatives. Two sets of transformations fostered and enabled the latter's development: normative and structural material transformations.

Normative Transformations

In the past four decades, a shift in the objectives of agriculture and food policies from food sovereignty and a fair standard of living for the farmers to sustainable development have taken place, particularly in industrialized countries. Indeed, at the end of the Second World War, issues of food security, land reforms, increasing productivity, and technological improvement were favored on the political agenda. The aim to produce enough affordable food for the population led to state-driven policies supporting the

industrialization, intensification, and rationalization of agricultural production at the national level. In a process described as the "Green Revolution," worldwide agricultural productivity increased transforming agriculture from a relatively backward and highly labor-intensive economic sector toward one of increasing technological sophistication.

Although early agriculture and food policies were successful in their objectives, they created numerous environmental and food safety problems. Accordingly, the aims and operation of subsequent policies shifted, and sustainable development became one of the core objectives of agricultural and food policies today, i.e., they increasingly considered environmental and social consequences, in particular food safety, in addition to economic and food security concerns. Environmental, ethical, and health aspects became inalienable for policy-makers realizing that agricultural and food policies should not only concentrate on securing the income for producers and sufficient food for society. Some stakeholders and chain actors, such as consumers, farmers, and retailers, increasingly shared such environmental, social, economic, and/or ethical concerns. As such, the quest for food sufficiency has now become a quest for food sustainability.

At the same time, the general normative environment in the political economy of Western states dominating the global agricultural system was characterized by a highly positive evaluation of market-based actors, norms, and governance strategies. The assumption that positive effects for the market translate into positive effects for society combined with a trust in the expertise, resources, and management capabilities of market actors fostered the attribution of greater governance competence to them. Government actors, in contrast, were frequently described as slow and inefficient if not corrupt, and their limited territorial jurisdiction and failure to reach international agreements used to further highlight their weakness. Encouraged by the end of the cold war, practitioners as well as scientists celebrated the idea of governance rather than government, building on presumptions of shared interests of state and non-state actors (across countries) (Rosenau and Czempiel 1992; for a critical evaluation of these governance discourses, see Fuchs (2007)). Thus, a generally favorable atmosphere for private governance existed.

Structural Material Transformations

Structural material transformations have simultaneously taken place. These changes in the agrifood sector started with the Uruguay Round (UR) (1986–1994) of the General Agreement on Tariffs and Trade (GATT), which focused on reducing barriers to trade in agricultural commodities *worldwide*. The resulting Agreement on Agriculture (1995) continues to weigh in on global agricultural politics until today, with the activities of the World Trade Organization (WTO). The resulting liberal regime to agriculture brought dramatic changes to the global food sector. The pressures for competition in the global market intensified. As a consequence, concentration of production and integration of supply chains took place, initially occurring on the supply side of food chains (Morgan et al. 2006; Josling 2002). Particularly in the USA, conglomerates such as ConAgra and Cargill became big and powerful players in food production and manufacturing.

However, a number of developments in food retailing fostered by new food, communications, and transportation technologies led to shifts in power toward the end of the supply chain, specifically food retailers (Fuchs and Kalfagianni 2010; Henson and Reardon 2004; Nadvi 2004). First, the number of consumers increased globally, strengthening retail chains due to their strategic position between consumers and producers. Second, retailers do not depend on natural constraints which give them advantages in relation to suppliers (Morgan et al. 2006). In case of a draft in one country, for instance, retailers can source their supplies elsewhere. Third, technological changes like GPS control of transportation and deliveries by the minute helped retailers control the supply chain in a "from farm to fork" kind of manner. Last and most fundamentally, capital concentration led to the creation of big multinationals among the (food) retailers. Through global acquisitions and mergers, a diminishing

number of internationally operating supermarket chains have risen to the top. Their market share increased constantly in the last two decades and led to the emergence of highly oligopolistic regional market structures (Burch and Lawrence 2005, 2007; Konefal et al. 2005; Fuchs and Kalfagianni 2010). Currently, the top 10 global retail chains control 40 % of total global sales, with Wal-Mart alone being responsible for 10 % (Clapp 2012).

This shift in objectives of agriculture and food policies and the rise of private actors, particularly food and retail corporations, as dominant players in the world food economy allowed and fostered the emergence of private food governance. They created both the demand for and supply of the pursuit of sustainability objectives on the basis of private – rather than public – institutions. Among these institutions, private standards are the most concrete form of private governance, as briefly discussed below.

Private Food Standards

Private standards are defined as rules of measurement established by regulation or authority (Jones and Hill 1994). Private standards tend to be voluntary in nature and rely on various sorts of certification mechanisms to identify actors complying with the principles defined in the standard.

Most private food standards are developed by the "new food and lifestyle authorities," which is how Dixon calls food retailers (Dixon 2007, p. 30). Via private food standards, food retailers have gained a dramatic influence on market structures and characteristics in recent years. Prominent examples of food retail standards are the British Retail Consortium Technical Standard, the Global Food Safety Initiative, and the GlobalGAP (see Fuchs et al. (2011b) for more detailed information).

Created in 1998, the British Retail Consortium Technical Standard regulates the evaluation of manufacturers of retailers' own brand products. Certification in accordance with this standard today is required for suppliers of the majority of UK and Scandinavian retailers (www.brc.org.uk). The standard itself consists of more than 250 requirements and includes norms for food safety and quality schemes, products and process management, and the personal hygiene of personnel; for most UK and Scandinavian retailers, BRC certification is required in order to consider business with these suppliers (www.brc.org.uk). The BRC Technical Standard was followed by the BRC Packaging Standard in 2002 and the BRC Consumer Products Standard in 2003. Each of these standards is revised and updated at least every 3 years.

A group of international retailers and global manufacturers initiated the Global Food Safety Initiative in 2000 with the expressed aim of improving consumer protection and strengthening consumer confidence. The initiative currently covers 65 % of worldwide food retail revenue setting requirements primarily for food safety. Furthermore, it aims to improve efficiency costs throughout the food chain.

The Global Partnership for Good Agricultural Practice (GlobalGAP, known as EurepGAP until 2007) was developed in 1997 by a group of retailers belonging to the Euro-retailers Produce Working Group (Eurep). Initially, EurepGAP focused only on fruits and vegetables. It soon was extended to meat products and fish from aquaculture as well, however. Producers are certified on the basis of a checklist consisting of 254 questions divided into 41 "major musts," 122 "minor musts," as well as 91 recommendations ("shoulds"). Traceability and food safety are counted as major must practices, while minor musts and shoulds include both environmental and animal welfare concerns.

Next to retailers, processors, producers, and their associations are also engaged in governance activities in the agrifood sector, albeit to a smaller extent. Examples of producer-led governance efforts include the creation of alternative food initiatives, such as roundtables for sustainable biofuels, palm oil, sugar, and cotton, and organizations dedicated to the promotion of organic agriculture, for instance (Morgan et al. 2006).

Many of private governance initiatives developed by retailers, producers, or cooperative arrangements between the two also include the

participation of civil society organizations, such as Oxfam, the World Wild Fund for Nature (WWF), or Consumers International. The degree to which these organizations participate in the governance of the standard setting organizations varies, however (Fuchs et al. 2011b). While a few organizations grant them an active role in decision making, in most initiatives they are restricted to an observational position.

Major Debates Related to Private Food Governance

Importantly, the emergence and proliferation of private food governance is not uniformly regarded as a promising new avenue in addressing sustainability challenges, particularly at the global level. In the literature, three major debates related to private food governance can be identified. They revolve around questions of legitimacy, effectiveness, and access. The following paragraphs sketch the central tenets of these debates.

Legitimacy

According to Scott (1998), legitimacy is the property of a situation or behavior that is defined by a set of social norms as correct or appropriate. As outlined by Fritz Scharpf (1997), in modern (Western) traditions of democracy, legitimacy rests on two pillars, one based on input-oriented arguments, i.e., government by the people, and one based on output-oriented arguments, i.e., government for the people. According to input-oriented arguments, legitimacy derives from democratic procedures and formal arrangements. According to output-oriented arguments, on the other hand, legitimacy derives from the effectiveness of the specific governance institution in designing policies that promote the "public good."

For examining the input legitimacy of private (food) governance arrangements, three criteria have been identified as important: participation, transparency, and accountability (Porter and Ronit 2010). While participation refers to the question of involvement in policy process, transparency refers to the provision of timely, reliable, and comprehensible information. It is an important dimension of legitimacy enhancing public scrutiny and visibility in complex environments, thereby also strengthening meaningful participation and ensuring accountability (Fuchs et al. 2011b). Accountability on the other hand is a crucial idea in democratic governance capturing decision-makers' dependence on the public that ought to have the potential to "vote" them out of office (Porter and Ronit 2010).

The criticism of private food governance addresses these three criteria of democratic legitimacy. In terms of input legitimacy, critical observers draw attention to a lack of transparency and participation that characterizes many private or public-private schemes. Particularly constraints in participation provide a serious obstacle to the provision of equal opportunities to different societal actors to influence the norms and rules that govern the food system (Fuchs and Kalfagianni 2010). Discrimination in access exists especially for civil society actors and actors from developing countries but also smaller business actors and those that are further away from the consumer, e.g., small farmers. A lack of transparency also weakens the democratic legitimacy of private governance mechanisms. If private actors develop their own rules, then at least these rules should be open to public scrutiny. This lack renders (existing) access, meaningless, due to the obscurity of the real options actors can "vote" for. In most cases, this results from the exclusion of civil society in the monitoring and implementation of standards. Finally and in almost the same manner, accountability is problematic when it comes to private food governance. With private governance institutions, accountability and mechanisms to ensure it are not predefined. To the contrary, transnational corporations are at best only accountable to a fraction of the people affected by their activities (Zürn 2004). Moreover, accountability is difficult if not impossible to enforce for efforts such as vague standards and CSR initiatives.

Despite these criticisms, the difficulty of developing measures that provide input legitimacy for private governance institutions does not escape scholars. It is a challenge to create a level playing

field in participation, for instance. First, this would require a definition of who should have the right to participate. Moreover, such measures would require support for those facing resource or collective action problems hindering their participation. Similarly, it is extremely difficult to create conditions of accountability and to decide to whom private actors should be accountable in their standard setting activities and how. While transparency may seem an easy and technical, politically benign issue, the challenge of creating transparent private governance institutions should not be underestimated, either. In the past, requests for more information from business actors have often been met with arguments that such information cannot be provided due to competitiveness concerns (see Fuchs and Kalfagianni (2010) for a more detailed discussion). In short, private food governance not only suffers from input legitimacy shortcomings at the moment, but these shortcomings also seem extremely difficult to overcome.

Effectiveness

For private forms of governance, effectiveness or output legitimacy is frequently identified as a foundation for their legitimacy. After all, private actors are not elected to political office and thus not endowed with electoral authority to set rules and determine the societal allocation of values. Instead, legitimacy claims of private governance initiatives tend to derive from the notion that they can provide certain governance functions more effectively and efficiently than elected public actors (Fuchs and Kalfagianni 2009). Thus, proponents of private governance attribute efficiency and effectiveness to their pursuit of the "public good," in the context of global economic liberalization and increased corporate control of markets and supply chains (Bäckstrand 2006; Glasbergen 2010). In contrast, critics argue that private governance institutions are in many respects analogs to the same things they are purported to resist, and instead of fostering public goods, they extend market fetishism and undermine public national and international law (Clapp 1998; Gibson 1999; King and Lenox 2000; Quilliam et al. 2011). At best, so the critical perspective, private governance is effective only in limited circumstances and, at worst, it preempts more stringent public regulation, undermining basic core democratic values and principles.

The effectiveness of private food governance has been examined in the literature vis-à-vis its ability to address various sustainability challenges. Especially in the field of food safety, various scholars attest a positive influence of private standards (Mazzocco 1996). Moreover, they argue that standards can be a means for reaching more consumers by communicating and reassuring them regarding safety and quality (Reardon and Farina 2002). However, these apparent benefits are likely to exist only for a small subset of the original set of suppliers (Reardon and Farina 2002). Likewise, other evaluations point out the potential of private food standards to provide incentives to modernize production and allow competitive repositioning and enhanced export performance of developing countries (Jaffee and Henson 2004). The question to what extent resources for such measures exist, especially for small- and medium-sized farmers in developing countries, however, remains (Fuchs and Kalfagianni 2009).

With respect to the environmental consequences of private food governance, the jury is still out. Environmental auditing of food-related operations is currently incomplete and covers only specific products or practices rather than the sector as a whole (Lang and Barling 2007). Nevertheless, some observations can be made. In particular, the selected nature and low priority of environmental aspects in the most prominent private food governance initiatives are noteworthy. For the GlobalGAP, for instance, which is currently present in more than 100 countries and covers 94,000 suppliers worldwide with growing membership every year, many environmental conservation practices are only recommendations. In addition, a supplier's noncompliance does not always prevent certification (Bartley 2010). The potential of GlobalGAP is further weakened by the declining emphasis on sustainability within the GlobalGAP initiative from its launch in 1997 until today (Van der Grijp 2008). In general, the question remains whether retail environmental standards are stringent and comprehensive enough to allow

the reaping of significant environmental benefits (Fuchs et al. 2011b).

Finally, the effectiveness of private food governance in terms of social sustainability needs to be discussed. Private standards may include provisions regarding worker welfare, gender nondiscrimination, rules against sexual harassment, and other social provisions. However, such social provisions tend to play a secondary role relative to the current understanding of food quality, as well. Some scholars argue that the presence of these standards can improve labor conditions, raise wages, and increase workers' security (Schaller 2007; Pearson 2007). However, due to their select and weak nature, social standards also suffer from a number of constraints in terms of both their scope and implementation, which severely limit their potential for effectiveness with respect to social sustainability. Fundamental challenges, such as living wages, tend to be excluded.

In short, while private food governance has been effective in addressing some sustainability challenges, specifically food safety concerns, overall its performance is highly ambiguous.

Allocation/Access

The third major debate concerns questions of the global allocation of resources and access to food. Specifically, scholars voice the concern that the ability provided to transnational corporations (TNCs) to exercise gatekeeping control over supply chains on the basis of private standards has also fostered inequality in access to food for some groups (see Fuchs and Kalfagianni 2010). Some studies identify a potentially higher income for food suppliers, as a result of premiums to be gained or increased productivity or quality (ITC 2009). Yet critics argue that such benefits accrue only to a small subset of global suppliers, specifically those who are able to afford the costly investments and the lengthy and expensive auditing and certification processes associated with private standards (Auld et al. 2008; Klooster 2005). In contrast, small- and medium-sized farmers tend to lack the economic ability to take advantage of such opportunities (Amekawa 2009; Guthman 2007). It is estimated, for instance, that a total of over UK £2.2 million has been invested to meet the initial costs of GlobalGAP compliance in Kenya alone, representing, on average, UK £220,000 per participating company (Graffham et al. 2007). Although costs differ for small- and medium-sized companies, small-sized producers tend to depend on donors' willingness to subsidize certification (Graffham et al. 2007). In this context, the most vulnerable and financially weak actors can be pushed out of the supplier market, not being able to comply with private standards (Fuchs and Kalfagianni 2010). Thus, the constraints imposed by private standard on suppliers may affect their access to the market as much as to food, due to the existing oligopolistic market structures (Mayer and Gereffi 2010). Small suppliers in some of the most food-insecure countries have lost their livelihoods as a result of private standards (ActionAid 2005). Considering that a significant segment of the global population consists of small and subsistence farmers, this observation becomes even more dramatic. Out of the approximately 525 million farms worldwide, about 85 % currently belong to smallholders or subsistence farmers who operate plots of land of less than 2 ha (Nagayets 2005). Subsistence farmers constitute over half of the world's rural poor, but they produce about four-fifths of food supplies in developing countries (http://www.fao.org/docrep/u8480e/U8480E08.htm, 16 June 2012).

In short, private food governance receives ambivalent evaluations, in terms of its impact on access to food, with small and subsistence farmers being particularly negatively affected.

Summary

This entry gave an overview on the most prominent private institutions developed to address environmental and social sustainability challenges in the global food system. It outlined the transformations that led to the emergence of private food governance and sketched some of the most controversial debates surrounding the privatization of food governance, particularly related to questions of legitimacy, effectiveness,

and access. Regarding legitimacy, it noted scholarly concerns from the perspective of participation, transparency, and accountability. Regarding effectiveness, it underscored the ambiguous contribution of private food governance to food safety, environmental sustainability, and labor rights concerns. The discussion underlined the especially problematic relation between private food governance and access to food for some groups, specifically the most vulnerable members of the global population. In short, one core message from this entry is that while private food governance carries some promise, it by no means constitutes a panacea for addressing sustainability challenges in the global food system.

Cross-References

- ▶ Corporate Social Responsibility and Food
- ▶ Food Labeling
- ▶ Food Security
- ▶ Private Food Governance
- ▶ Sustainability of Food Production and Consumption

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Provision of Agricultural Ecosystem Services

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Synonyms

Agricultural ecosystems; Conservation agriculture; Ecosystem services; Sustainable agriculture

Introduction

An ecosystem is a community of living organisms, including plants, animals, and microbes, plus the nonliving components of their environment, such as water and minerals, interacting together as a system or an ecological unit (e.g., a pasture or forest). Ecosystems may also be viewed as a form of natural capital, which provides flows of vital goods and services to humans (e.g., Daily 1997). These goods and services are called ecosystem services (ES) and are often defined as the "benefits people obtain either directly or indirectly from ecosystems" (MEA 2005). Many ES are critical to human survival (e.g., climate regulation and nutrient cycling), while others contribute to our well-being (e.g., nature recreation and rural lifestyles) (Kremen 2005).

Scientists and scholars have traditionally focused on natural ecosystems, such as wetlands and ponds, for ES provision (e.g., Daily 1997). However, other scholars are beginning to recognize the crucial role agriculture plays in ensuring humans receive an adequate flow of ES to sustain our quality of life (e.g., Swinton et al. 2007). The reason is that agricultural ecosystems comprise about half of global land that is not desert, tundra, rock, or boreal, which makes farmers the chief managers of the most productive lands on Earth (Tillman et al. 2002). How farmers manage this land greatly impacts human health and well-being, the land's future productivity, neighboring ecosystems such as wetlands and forest, and the sustainability of the world's food supply (Foley et al. 2005; Horrigan et al. 2002). Despite this importance, most farmers face strong incentives to manage their land for the short-term production of food, fiber, or fuel. The long-term health of agricultural ecosystems, however, as well as their ability to sustain food production and to provide society with diverse benefits, requires that farmers expand their management focus to include the provision of ecosystem services (ES) (Goldman et al. 2007; MEA 2005). In fact, some scholars argue that one of the greatest needs in agriculture, if not the greatest, is the provision of nonproduction-related ES such as water purification and climate regulation (e.g., Antle and Capalbo 2002).

Thus, one of the most fundamental ethical issues surrounding the provision of ES is how to encourage farmers to promote, develop, and manage ES – that is, how to encourage them to overlook short-term incentives to focus primarily on production-related agricultural services and adopt a longer-term public interest perspective by considering the provision of ES. Some relevant questions include: What ES ought to be provided? Do people have a right to specific ES, such as water cycling, clean air, or climate control? If so, whose duty is it to provide ES? If it is the farmers' duty to provide agriculture-related ES, should farmers be paid for provision? If so, how much should they be paid, how should their provision be monitored, and how will we know when society has enough ES? If farmers are not paid for provision, what other incentives must be created to ensure enough ES are provided to sustain our quality of life? (For a discussion, see Swinton et al. 2007; Kroeger and Casey 2007; Power 2010).

The importance of understanding incentives in the provision of ES can be illustrated in two ways. First, some traditional agricultural products and ES, such as corn and pest control, can be complementary products, creating a win-win situation for agricultural producers. For example, setting aside a small area of land as habitat for crop pollinators provides a vital ES, which in turn might increase the value of crop production by more than the opportunity cost of the income forgone from not planting the habitat area in crops (Wossink and Swinton 2007). Conversely, many traditional agricultural products and ES are competitive products, creating a win-lose scenario in which the farmer has little incentive to provide the ES (Wossink and Swinton 2007). These competitive ES include flood control, carbon sequestration, and water purification – vital ES that our society highly values, yet which are underprovided (Lant et al. 2008).

Second, agricultural activities that result in harm to the environment, such as intensive livestock or crop production that results in animal wastes or chemical fertilizers seeping into aquatic ecosystems, could become positive ES with the right incentives. Often what is needed is a change in just a few management practices.

Provision of Agricultural Ecosystem Services, Table 1 Selected ecosystem services (ES) and ecosystem disservices (ED) from agriculture

ES type	ES from agriculture	ES used as inputs	ED from agriculture
Regulating services	Soil retention	Soil retention	Soil erosion
	Pollination	Pollination	Competition for pollination
	Pest control	Pest control	Pest outbreaks
	Water purification		Nutrient runoff
			Pesticide runoff
	Habitat provision		Habitat loss
	Atmospheric regulation		Greenhouse gas emissions
	Flood control		Flooding
	Seed dispersal		Loss of seed dispersal
Supporting services	Soil structure	Soil structure	Soil compaction
	Soil fertility	Soil fertility	Soil fertility loss
	Biodiversity	Genetic biodiversity	Biodiversity loss
	Water cycling	Soil moisture	Soil moisture loss
			Competition for water from other ecosystems
	Nutrient cycling	Soil nutrients	Eutrophication of rivers, estuaries, and lakes
Cultural services	Aesthetic landscape		Loss of aesthetic value
	Recreation		Loss of recreation value
	Spiritual well-being		Loss of well-being
	Rural lifestyles		Loss of rural culture and lifestyles
Production services	Food		
	Fuel		
	Fiber		

Source: Reproduced from Stallman (2011)

For example, the siltation of streams resulting from tillage agriculture can become an ES of soil retention with the adoption of conservation or no-tillage practices, grassed waterways, or permanent vegetative buffer zones beside streams and lakes.

Accordingly, this entry articulates the ethical issues of providing ES in agriculture, with a particular focus on the incentives farmers face to do so. Specifically, the objectives of this entry are to discuss ecosystem services and the critical role agriculture may play in ES provision and to discuss the three types of solutions currently being considered to help solve the underprovision of agriculture-related ES.

Ecosystem Services in Agriculture

Although the provision of ES in agriculture sounds complex, it can be viewed simply as the efforts of agricultural producers to enhance the viability and stability of agricultural ecosystems by choosing management practices that jointly produce nonproduction-related ES alongside livestock and crops.

Dale and Polasky (2007) identified three critical ways in which agriculture interacts with ES. First, agricultural ecosystems provide many vital ES. As shown in Table 1, these include production services such as food, fiber, and fuel; regulating services such as soil retention, carbon sequestration, and pest control; supportive services such as nutrient cycling, soil fertility, and water filtration; and cultural services such as spiritual well-being, nature recreation, and rural lifestyles. Although agricultural ecosystems have traditionally been managed to primarily provide production services, they may also be managed to provide other ES jointly with food, fuels, and fiber (Wossink and Swinton 2007; Dale and Polasky 2007). In fact, the type, quality, and quantity of ES that agriculture can provide are directly affected by the management decisions of

the farmers, both individually and collectively (Dale and Polasky 2007).

Second, agriculture requires many ES as inputs to production, especially soil fertility, pollination, genetic biodiversity, nutrient cycling, and pest control (Zhang et. al. 2007; Power 2010). Some of these ES are provided by the agricultural ecosystem itself, while others are provided by nearby natural ecosystems that exist within the greater agricultural landscape, such as woodlots, wetlands, and ponds (Zhang et al. 2007). Whether any particular agricultural ecosystem provides these input-related ES depends on the management decisions of farmers, including the farmer who uses the ES for production and the neighboring farmers (Goldman et al. 2007; Dale and Polasky 2007; Power 2010).

Third, agriculture affects the quality and quantity of ES which other ecosystems, such as forests or estuaries, can provide (Dale and Polasky 2007). If the effects on other ecosystems are negative, they are called "disservices" of agriculture and often lay on the opposite end of a continuum from some important ES. For example, if a farmer practices conservation tillage, the farmer's land may provide the vital ES of soil retention. If a farmer uses conventional tillage practices on sloped fields, however, the land may provide the opposing disservice of soil erosion, plus the resulting environmental degradation caused by stream sedimentation, loss of soil fertility, and the chemical contamination of water. These disservices in turn affect the quantity and quality of ES that the stream or downstream lakes and estuaries can provide (Dale and Polasky 2007; Zhang et al. 2007). For example, a lake that is contaminated with phosphorus, nitrogen, pesticides, and sediments provides fewer ES and lower-quality ES, such as wildlife habitat, biodiversity, and nature recreation, than a lake that has not been contaminated (Zhang et al. 2007).

As a result of these three ways in which agriculture interacts with ES – the ability to provide ES, the requirement of ES as inputs, and the ability to affect neighboring ecosystems' provision of ES – managing agricultural lands to provide more and higher-quality ES has the potential to greatly increase the sustainability of agricultural ecosystems, to increase the sustainability of neighboring ecosystems, and to decrease the environmental damage which may accompany intensive agriculture (Horrigan et al. 2002; Tillman et al. 2002; Foley et al. 2005; MEA 2005). Most scholars agree, however, that increasing the provision of ES in agricultural ecosystems will not be easy (e.g., Goldman et al. 2007) and will likely require society to change the incentive structure that farmers currently face (e.g., Swinton et al. 2007).

Incentive Structures in Agricultural Ecosystems

Although joint production of traditional agricultural products, such as corn, and nonproduction-related ES, such as wildlife habitat, is both possible and desirable (Wossink and Swinton 2007; Robertson and Swinton 2005), most farmers face strong incentives to manage their land for the short-term production of food, fiber, or fuel, often at the expense of other vital ES (Tillman et al. 2002; Swinton et al. 2007). For example, most farmers manage their land for the provision of production-related ES, such as wheat, because these services are private goods; the farmer enjoys most of the benefits of production (e.g., income from the crop) but does not pay all of the costs (e.g., loss of income in a downstream community due to eutrophication of fisheries from excess nitrogen in the water). Likewise, farmers disfavor the provision of cultural, supportive, or regulating ES, such as water purification, because the farmers pay all (or most) of the costs of provision (e.g., leaving land out of production next to a stream) but only enjoy a portion of the benefits (e.g., better bird watching on the farm). In some cases, farmers pay all of the costs of provision but receive no benefits, either because their efforts have no discernible effect on the ES (e.g., one farmer's effort to improve water quality in a large lake) or because the ES is appropriated by other users (e.g., flood control for downstream communities).

Incentive structures where the provider pays all or most of the provision costs but only receives a portion of the benefits are associated with public or quasi-public goods, which are how most scholars classify ES (e.g., Swinton et al. 2007). This incentive structure leads to an underprovision of ES because of the free-rider problem; people have little incentive to pay the cost of providing a public good when someone else might pay the cost of provision, and the non-payer or free rider can still enjoy all of the benefits of the good (Olson 1965).

Solutions to the free-rider problem usually involve government provision or a restructuring of incentives to encourage private provision. How to best restructure these incentives, however, is an ethical problem that scientists, scholars, and other stakeholders have yet to solve. Many scholars believe the traditional government and market solutions for the provision of public goods will provide the most effective way to increase ES provision in agriculture (e.g., Kroeger and Casey 2007). A growing number of scholars, however, recognize the potential of a third major approach – cooperative solutions where landowners work together to provide ES (e.g., Sarker et al. 2008). In fact, some agriculture-related ES are particularly well suited to cooperative provision (Stallman 2011). The following sections describe these three major approaches to ES provision.

Market and Government Solutions

In the case of agricultural-based ES, government and market solutions are designed to reduce the free-rider problem by changing the incentive structure that farmers face. This may mean (1) increasing the cost of not providing an ES (e.g., assessing a fine if a farmer fails to create a buffer zone along a stream corridor) or (2) increasing the benefit of ES provision (e.g., creating a mechanism for farmers to receive price premiums on products that are produced in conjunction with ES). These solutions to ES provision may include legal approaches, such as liability laws and property rights; policy approaches, such as taxes and subsidies; educational approaches, such as extension services and public education classes; induced market approaches, such as cap and trade and regulation-driven markets; and free-market approaches, such as eco-labeling, food tracing systems, and marketing cooperatives dedicated to sustainable agriculture (Kroeger and Casey 2007; Bräuer et al. 2006; Swinton et al. 2007).

Although these government and market solutions have the potential to increase ES provision in agriculture, many controversies and barriers to their implementation exist. For example, many government and market solutions may be costly to implement, monitor, or run (e.g., Power 2010; Kroeger and Casey 2007). Measuring and monitoring of ES may be especially problematic because many ES are so interrelated that it is hard to distinguish one from the other or to define them, so double counting becomes a risk (Dale and Polasky 2007; Swinton et al. 2007). Plus, we do not currently have the technical ability to measure some ES accurately enough to monitor provision (Swinton et al. 2007). Other barriers to market and government solutions include (1) the cost of creating and running new markets, such as a carbon exchange market; (2) the cost of creating and running a certification systems, such certified organic products; (3) the costs of regulating the opposing disservice if ES are not provided, such as regulating nonpoint source pollution in streams; (4) start-up costs for farmers, such as the equipment, education, and input costs associated with switching from conventional tillage to a no-tillage system; (5) information costs, such as technical knowledge of the management practices that will provide ES or the knowledge of why ES may be important to agricultural sustainability; (6) lack of trust in the governmental agency responsible for the payment of ES program, such as a state conservation agency (e.g., Raedeke et al. 2001); and (7) social and psychological costs, such as fear of the unknown or the social risk of being different (Carolan 2005, and Koundouri et al. 2006).

Consider a farmer who wants to practice integrated pest management (IPM) as part of a program to improve water quality in a stream

used for municipal drinking water in a downstream rural community. To effectively practice IPM, the farmer must know how to monitor soil, crops, and pest populations in order to target the timing, placement, and amount of fertilizer or pesticide needed to achieve the greatest benefit for the crop without using excess chemicals (Flint and Van den Bosch 1981). This skill set requires knowledge and experience that many farmers and extension personnel lack or cannot find access to, despite increasing demand for the knowledge (e.g., Carolan 2006; Rodriguez et al. 2009; Hayes 2001). In fact, Carolan (2005) found that almost three-quarters of extension personnel and agricultural professionals in Iowa lacked the technical knowledge to assist a farmer in implementing sustainable agricultural practices such as IPM. In addition, many sustainable farming practices such as IPM are proven effective when used together as a management system, but may not be cost- or time-efficient when used alone (Carolan 2006). For example, farmers practicing basic IPM techniques, such as monitoring crops for pests, may also benefit from knowing how to enhance pest control through cultivation techniques, crop rotations, disease- or pest-resistant cultivars, the use of cover crops, or a complete redesign of the farmers' operation to enhance the ecological processes that would make use of pesticides or herbicides unnecessary. Again, information costs for these complementary practices are high, as are the start-up costs for the farmer, especially those who are redesigning their operation, not just making minor changes to conventional practices (Macrae et al. 1993). Farmers who practice IPM may also face social costs in the form of criticism or trust issues with neighbors or landowners who hold traditional beliefs that "weedy" fields and "unkept" hedgerows reflect poorly on the farmer's character (Carolan 2005, 2006). Finally, the full benefits of IPM may be hard to monitor. For example, IPM not only may provide the ES, such as water quality, but may also provide or enhance other vital ES, such as soil fertility, soil structure, soil retention, nature recreation, water cycling, natural pest control, and pollination services, some of which are so interrelated that it would be hard to monitor them separately (Barrios 2007; Dale and Polasky 2007; Swinton et al. 2007). How the farmer or a government agency responsible for payments for ES will recognize and monitor these changes is uncertain.

Although farmers and government officials face many implementation barriers to government and market solutions, many scholars believe these solutions may help encourage the provision of agriculture-related ES (e.g., Kroeger and Casey 2007). Some scholars, however, question if these traditional approaches to the free-rider problem are enough (e.g., Goldman et al. 2007). The goal of most government and market solutions is to entice enough farmers to manage their land for the provision of nonproduction-related ES so that a socially desired quantity of ES is achieved. One potential problem with these approaches, however, is that they often ignore the fact that many ES require landscape-level management to provide optimal benefits (Goldman et al. 2007). In other words, individual incentive approaches ignore the potentially large and important incentive of a collective benefit which only may be achieved if most of the farmers in the region cooperate in their effort to provide ES (e.g., Sarker et al. 2008). It is in this context that cooperative solutions become important.

Proponents of cooperative approaches often point to the spatial scale mismatch between ES and agriculture as justification for its necessity (e.g., Goldman et al. 2007). This mismatch occurs because the spatial scale of management in agricultural ecosystems (e.g., a 500 acre farm) often does not match the spatial scale of ecosystem processes necessary to provide ES (e.g., a tri-county watershed), making cooperation necessary (Cumming et al. 2006; Pelosi et al. 2010).

The Collective Benefit of Collective Management

Ostrom (1990) argues that collective management is a viable, yet commonly overlooked, third solution to the underprovision of a natural

resource such as ES. Collective management often involves a group of citizens who jointly manage a community-owned property, such as a group of herdsmen who manage a common pasture. It may also involve a group of citizens who jointly manage individually owned properties such as members of a neighborhood association who jointly make and follow rules regarding noise levels in order to better enjoy their neighborhood.

When people work together, they often achieve a collective benefit that could not be achieved by the group members' individual efforts. In the collective management of a natural resource, most participants hope to achieve the collective benefit of a stable resource base, although other collective benefits may be achieved. For example, an inshore fishery in Alanya, Turkey, was threatened by hostilities, harvest uncertainty, and lost productivity because fishers were fighting over the most productive fishing spots (Berkes 1986). In response, members of the local fishing cooperative devised a set of rules which assigned fishing spots on a daily basis, giving each fisher an equal chance to fish highly productive spots and less productive spots. This collective management regime, enforced by the fishers themselves, created a more productive fishery since better spacing of the fishers optimized production at each site. In addition, fishers no longer wasted resources searching for or fighting over sites, plus they achieved more harmonious relationships within their community. Each of these benefits represents a collective benefit that could not have been achieved by the fisher's individual efforts. These collective benefits were only achieved because the fishers worked together to devise and enforce a set of rules for managing the local fishery (Ostrom 1990).

In the collective management of an ES, participants may hope to achieve the collective benefit of enhanced ES provision, environmental damage mitigation, or the prevention of future regulations (e.g., Lubell 2004). For example, Ayer (1997) describes cotton farmers in Arizona who collectively managed for pest control by practicing collective integrated pest management (IPM) – a management system that requires monitoring pest populations and only applying pesticides when a certain threshold is reached. After devising and enforcing a set of collective IPM rules, these farmers achieved fewer pest outbreaks, drastically reduced input costs, and reduced confrontations with neighboring communities regarding water and air quality issues – benefits that were only achieved when most of the cotton farmers in a region worked together to enhance the ES of pest control (Ayer 1997).

Although some ES, such as pest control, are well suited to collective provision (Stallman 2011), collective solutions also face many barriers to implementation (e.g., Ostrom 1990, 2001). In addition to many of the same barriers that farmers face with government and market solutions – such as start-up costs, information costs, lack of trust in the sponsoring agency, and social costs – farmers who work together to provide ES also face barriers such as lack of trust in other farmers or stakeholders, lack of information about other farmers' past actions, lack of a common vision, or organizing costs, especially with large groups (Olson 1965; Ostrom 1990, 2001, 2009; Pretty 2003).

Consider the previous example of an individual farmer who wanted to begin practicing IPM after joining a government program to help provide higher water quality to downstream rural water municipalities. Now consider twenty farmers who must work together to accomplish the same goal. Water quality is highly dependent on landscape-level processes (e.g., Sarker et al. 2008) and is well suited to provision through collective management (Stallman 2011). In fact, encouraging farmers and other stakeholders to work together may be the only way water quality may be significantly improved. However, farmers working together must agree on a common vision for their work. They must come up with a set of rules and guidelines to follow, and they must trust that other farmers in the group will follow through on their commitments (Ostrom 1990, 2001). Additionally, the farmers face the same start-up costs, information costs, etc. that each would face individually if they wished to provide ES.

Summary

Because agriculture has such an enormous effect on the environment, farmers are in a unique position to provide ecosystem services. They can do this through the farm, ranch, and agricultural management practices they adopt. However, farmers face short-term incentives to focus on production-related services, often at the expense of providing longer-term benefits of ES. For this reason, the underprovision of ES can be defined, as Lant et al. (2008) did, as the "Tragedy of Ecosystem Services," in honor of Hardin's (1968) analysis of the "Tragedy of the Commons." The tragedy results from the overconsumption of common pool resources, such as pasture lands, and from the underprovision of public goods, such as carbon sequestration. Thus, one of the most important ethical issues that surrounds the provision of ES in agriculture is similar to the problem of providing any public good or managing any common pool resource – which is how to identify and encourage the provision of ES by those most capable of doing so.

Since the ethics of providing ES revolve around the problem of incentives, this entry described the role agriculture plays in providing ES and the types of solutions currently considered and adopted to help solve the underprovision of ES.

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Public Institutional Foodservice

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Synonyms

Public food; The public plate

Introduction

The term "institutional foodservice," which is increasingly a topic of interest among policymakers and advocates, hinges on a convenient but slightly misleading term: institution. At first consideration, institutional foodservice may be thought of as only including food served through large institutions like schools, jails, hospitals, and employers. However, the term is also increasingly being used to refer to food paid for by public dollars (New York City Council 2010; Public Plate Working Group 2014), sometimes called "the public plate" (Morgan 2006). This definition extends institutional foodservice beyond these often large bricks-and-mortar institutions to potentially include soup kitchens, home-delivered meals for seniors, and snacks given out in public child-care settings, among other types of food. At the same time, because of the public nature of the funding, this latter definition may exclude many private employers, colleges, universities, and hospitals, which are some of the institutions that have been at the forefront of institutional food systems change (Barlett 2011; Eldridge 2012).

Institutional food has been a part of city life for decades if not centuries, but in recent years, it has attracted renewed attention from policymakers and advocates as a possible and important site of food systems change. In this entry, several key features of contemporary institutional food in the United States will be briefly discussed. While many of these concepts may apply both to public and private organizations providing food, there is an emphasis in this entry on the concepts most relevant to the public provision of food. New York City, which currently provides more than 270 million meals and snacks per year (City of New York Mayor's Office of Contract Services 2012), operates a complex and increasingly innovative institutional food system, which is the source of many of the examples provided in this entry.

Key Features of Contemporary Institutional Foodservice

Institutional food, especially in the public sphere, is typically the product of several forces that are often challenging for institutional food managers to balance and reconcile. These forces include (1) the usually limited and sometimes complex financing of institutional food, (2) consumer preferences, and (3) compliance with institutional food quality standards (Public Plate Working Group 2014). Several other factors relevant to these forces and critical to understanding institutional food are (1) the structure of purchasing, (2) the location of preparation, (3) institutional food labor, and (4) trends in institutional food systems change like attention to the health impact of institutional food, attention to sustainability, and attention to local economic development. Each of these topics will be discussed in turn.

Financing

Financing of food varies from institution to institution, though public agencies or publicly funded organizations often find themselves having to provide institutional food on extremely limited budgets. In the case of a senior center being contracted by a city agency, for instance, the senior center may bid to provide all of the services that senior centers provide, including foodservice. Food would be part of the bid, and while there may be specific characteristics of the food that the city can specify (e.g., being served a certain number of times per day or meeting certain nutritional requirements), the senior center is likely to try to bid the lowest amount possible for the provision of this food in order to help keep their overall bid low, so that they remain a viable candidate in procurement systems that typically must prioritize the lowest bidder in contract decisions. When a city provides food directly – for instance, through a city-run homeless shelter – a similar logic may be in play through a slightly more streamlined purchasing route. In this situation, the city might contract food providers directly but would likely still be seeking the lowest bid for the type of food needed.

In the cases of some of the largest institutional food systems in the United States, like the primarily federally funded school food system that operates in public and some nonprofit private elementary, middle, and high schools, the challenge of providing food has to do not only with limited budgets but also with addressing consumer preferences that help to determine financing. There are three eligibility levels that organize the funding of food in American public schools. Based on their family income level, students may qualify for free meals, reduced-price meals, or full-price meals, though even full-price meals are subsidized by government funding. The reason that these categories are important is that schools receive different levels of reimbursement for meals served at each of these levels. However, this is not the only factor that determines the reimbursement rate. The amount of money a school receives for each meal served is also determined by the percentage of lunches served at the free or reduced-price rate for the school overall (a proxy for the school's overall level of need) and by whether or not new federal nutrition standards that went into effect in 2012 have been successfully implemented. Students paying for full-price meals are also important to school food budgets. The financing of school

food thus works best at schools that can attract the largest percentage of students at all levels of reimbursement to eat school lunch. This dynamic is amplified by the fact that schools receive a small amount of funding for each lunch served that can be used toward foods provided directly by the US Department of Agriculture (USDA). These supplemental foods are colloquially known as "commodity foods" (Public Plate Working Group 2014). The importance of consumer preferences will be discussed further in the next section.

Consumer Preferences

While consumer preferences are a primary guide for those designing restaurant menus, they may not seem as important in institutions serving food with public dollars to those in need. Though some institutional food settings give consumers choices among foods that are offered and must make institutional eating appealing to keep reimbursement totals high (as in the American school food system), others may offer a single primary meal to all consumers each time a meal is served with relatively little attention to consumer preferences. Historically, this lack of attention has led to institutions like schools and prisons becoming notorious for serving unappealing foods. Food may even be used as a kind of disciplinary tool in correctional settings, a practice that raises ethical questions and that has generated lawsuits in several states. The classic American example of this is the nutraloaf, which continues to be used in many states despite numerous lawsuits. This is typically a starchy product made of a variety of ingredients that have been processed, mixed, and baked into a loaf, which offers basic nutrition in a form that is poor tasting, constipating, and served without utensils (Greenwood 2010).

In spite of these examples to the contrary, however, making sure that consumers can eat the foods that are provided is typically important to institutions both from the perspective of making sure that the basic health and well-being of consumers is maintained through eating and from the perspective of limiting food waste. Many types of institutions offer kosher and halal meals to those who require these for religious reasons, as well as therapeutic diets (low sodium, low carbohydrate, modified protein, modified consistency, etc.) to those who need or have been prescribed them by a physician for health reasons. In stark contrast to the disciplinary use of the nutraloaf, some correctional institutions are attentive to food preferences of inmates. For instance, the New York City Department of Correction has worked to develop vegan meal options as they have noted an increasing preference for this among some inmates (Public Plate Working Group 2014).

As discussed briefly above, schools are an arena in which the choice by consumers to eat institutional food has the potential to dramatically affect the funding of institutional food. Because of this, over the last few decades, schools have worked to provide foods that are appealing to students, which has resulted in school food that often looks as much like commercial fast food as possible (Poppendieck 2010), creating ethical tensions for many school food directors. More recently, however, both government and civil society efforts have sought to improve the quality of school food in terms of nutrition, freshness, and taste, and there are small signs that student preferences in some areas may be starting to shift toward healthier fare as well. As an example, in 2013 in New York City, a public elementary school adopted an all-vegetarian menu due to student demand, seemingly one of the first schools in the United States to do so (New York City Department of Education 2013).

Compliance with Institutional Food Quality Standards

When receiving services or participating in some institutional settings, it may be difficult for people – especially those of limited financial means – to access other forms of food. Additionally, many people eating regularly in public institutions are considered vulnerable populations when it comes to health (for instance, populations who are poor, sick, young, and old). For these reasons, government agencies and institutions in the United States and other countries often

pay special attention to certain aspects of the quality of institutional food.

First among these compliance priorities is usually basic food safety. Most places serving food in the United States, including but not limited to institutional settings, are required to develop and adhere to systems based on Hazard Analysis and Critical Control Points (HACCP) principles, which comprise "a systematic approach to the identification, evaluation, and control of food safety hazards" that is internationally used and recognized (National Advisory Committee on Microbiological Criteria for Foods 1997). In institutional foodservice settings, as in other foodservice settings, implementing these principles typically involves hazard analysis and control throughout the receiving, storage, cooking, cooling, warming, portioning, and serving phases of meal production (Federal Institute for Risk Assessment 2013). In institutional settings, compliance with these is often ensured via monitoring by local health departments and by the requirement that someone on staff holds a certificate demonstrating training in safe food handling.

In the United States, basic nutritional soundness is also encouraged in many institutional settings and is monitored primarily by government programs that fund institutional food. Often attention to nutrition standards is incentivized by linking compliance with reimbursement. One example of this type of nutrition-oriented reimbursement is the Child and Adult Care Food Program (CACFP), which is funded through the Food and Nutrition Service of the USDA. CACFP reimburses for meals provided to children, youth, and adults through public and nonprofit child-care centers, afterschool programs, and adult day-care programs and for meals provided to children and youth residing in emergency shelters (Child and Adult Care Food Program 2013). Institutions seeking reimbursement from CACFP for meals must comply with meal patterns that are determined separately for infants of different ages, children of different ages, and adults. Breakfast for a child between the ages of 3 and 5, for instance, must include the following three components: (1) three-quarters of a cup of milk, (2) half a cup of fruits or vegetables, and (3) a serving of a grain product made from whole-grain or enriched meal or flour (Child and Adult Care Food Program n.d.).

In addition to these nutritional standards tied to reimbursement, some cities like New York have begun experimenting with improving the nutritional quality of publicly funded food even further. The New York City Food Standards created nutrition standards for all meals and snacks that city government institutions serve or purchase (New York City Department of Health and Mental Hygiene n.d.). These standards were first instituted in 2008 and include standards for purchased food, standards for meals and snacks, nutrition standards for certain foods served, population-specific standards and exceptions (for groups with possible special needs like young children and seniors), and sustainability recommendations to support foods served to better comply with overall health and environmental sustainability. Some of the major changes resulting from the implementation of these standards – many of which were later adopted nationally for school food – are requiring whole wheat bread instead of white, two servings of fruits and vegetables for each lunch or dinner served, and low-fat or skim milk in lieu of whole milk (except for children under two). The standards are monitored in some cases by nutritionists employed by city agencies through site visits and interviews and in other cases by the contracted organizations serving food through self-report.

Structure of Purchasing

The purchasing of food is a key concept in the institutional arena because it influences both the types of foods that are available to be prepared and eaten and the affordability of those foods. Government agencies may directly contract for food or distribute funds to contractors to purchase their own food. Direct purchasing may allow agencies to better monitor the quality of food, to better negotiate low prices because they tend to purchase larger quantities of food, and to ask vendors to develop particular products made to particular specifications. For example, in the case of the New York City Department of Correction, which purchases food centrally, these factors

have allowed the agency to work closely with vendors, experimenting with different product formulations until they reach one that complies with nutritional goals, is easy to cook, and has the desired color, texture, and flavor (Public Plate Working Group 2014).

In other institutional arenas, however, each site might do its own purchasing. For instance, in New York City, child-care centers overseen by the city do not purchase foods centrally. Instead, subsidized child-care providers are selected and contracted by the city and then are responsible themselves for providing food to children who enroll (Public Plate Working Group 2014). In these situations, purchasing of food by individual sites may discourage lower bulk pricing and typically does not allow for the development of specific products. However, these smaller-scale purchasing systems may allow sites greater ability to tailor menus to their particular consumers, greater flexibility to change vendors for particular products or prices, and the ability to develop their own relationships with vendors.

Recognizing that economies of scale can be useful to institutional settings that do purchasing in this less centralized way, umbrella organizations and associations of institutions often seek out group purchasing options. New York City, for instance, now enables and encourages child-care organizations and other institutional sites that contract for food to purchase a wide array of goods and services together through a company providing this service (Public Plate Working Group 2014).

Location of Food Production/Preparation

Institutional food may be prepared primarily at the site where services are provided, primarily at a central kitchen serving multiple sites, primarily by food manufacturing companies, or primarily by a catering company that delivers chilled or frozen meals. The option that is used depends on a number of factors, including many of those discussed in this entry. Institutional food financing and scale, for example, may determine whether there is funding for staff, training, and equipment to prepare food on site. The need to monitor certain aspects of institutional food quality may also influence where food preparation takes place. For large public school systems, for instance, which must meet nutritional standards on strict budgets, and which can be liable if food safety issues arise, it may be easier to meet standards for nutrition and hygiene when foods are produced using more centralized and standardized processes as in a central kitchen or via food manufacturing companies.

Institutional Food Labor

Relatively little is known about who institutional food workers are, how they have been trained, and how they do the daily work of making food for at-risk groups, though they may strongly influence the types and quality of institutional food (Tsui et al. 2013). The members of the institutional food workforce who have received the most attention thus far are school food workers who come into view occasionally via portrayals on television shows, analyses of school food worker contracting (McCain 2009), and, more recently, news of their union protests in Chicago (Eng 2012). However, throughout most of the literature that deals with institutional food, the figure of the worker is almost invisible. This is particularly the case in institutional settings that tend to be less centrally controlled than school food and more community-based, like child-care and senior-care settings. What can be said about institutional food workers is that they are part of the larger sector of foodservice workers who are typically low paid and receive few benefits (Tsui et al. 2013) (Restaurant Opportunities Centers United 2011).

Trends in Institutional Food Systems Change: Health

As this entry suggests, basic food safety and healthfulness have been important goals in many but not all types of institutional food settings for decades. More recently, however, a trend toward actively using institutional food as a lever for improving public health has emerged. This trend toward "Healthier Food in Public Places," as the Center for Science in the Public Interest calls it, has been embraced by numerous cities and government agencies.

The rationale for adopting policies and practices to improve the healthfulness of institutional food (and other forms of publicly funded food) that is commonly articulated by these groups includes that these efforts can potentially (1) serve as a low-cost strategy to reduce obesity and diet-related disease, (2) influence social norms around food, and (3) alter how food manufacturers operate and the nutritional value of what they produce (National Center for Chronic Disease Prevention and Health Promotion 2010). With these ideas in mind, cities often begin, as Philadelphia and Chicago did, by working to change nutrition standards in vending machines in particular settings like city buildings, schools, and recreation centers (Philadelphia Department of Public Health 2010; Press Office 2012). Cities often then tackle applying nutrition guidelines to food served in meetings at city agencies and then may expand to developing nutrition standards for all food that is purchased or served to consumers by city agencies, as has happened in New York (Center for Science in the Public Interest n.d.).

It is also worth noting that the mission of many institutional food programs includes working to ameliorate **food insecurity**, which also threatens health. Addressing food insecurity through institutional food provision can be done in a targeted way, as in soup kitchens and homeless shelters that provide meals, or via a broader approach where larger meal programs are developed in part to help reach food-insecure populations. Universal school meal programs that feed both students who are food insecure and those who are not seek to address food insecurity in this way.

Trends in Institutional Food Systems Change: Sustainability

Health is not the only rationale in play, however, when it comes to changing institutional food. Institutional food has the potential to influence environmental sustainability through the distance food travels, the types of transportation and routes that are used to deliver food, and the waste created in the production and serving of food, among other factors. Efforts to increase the sustainability of institutional food often come packaged with initiatives to improve health, as in the American Centers for Disease Control's "Health and Sustainability Guidelines for Federal Concessions and Vending Operations" (National Center for Chronic Disease Prevention and Health Promotion 2010). These guidelines apply to many foodservice concessions and vending machines managed by the federal government in the United States. In addition to nutrition and food selection guidelines, this document recommends a variety of sustainability measures including participation in recycling and composting programs, promotion of reusable beverage containers and tap water consumption, use of green cleaning practices and pest control, and use of compostable materials when disposable serving items (like trays) are used. Guidelines pertaining to the seasonality, local procurement, and organic labeling of food are also discussed.

Sustainability efforts in institutional food also may emerge separately from health improvement efforts. For instance, Rikers Island in New York City, which is home to the majority of inmates in the city's jail system, hosts a composting site that was originally put in place in 1996 as a way to help manage large quantities of organic waste concentrated on the small island (New York City Department of Sanitation n.d.-a). Institutional composting pilot programs in public schools and through other city agencies have also been launched in New York (New York City Department of Sanitation n.d.-b).

Trends in Institutional Food Systems Change: Local Economic Development

Lastly, economic development also frequently serves as a rationale for changing institutional food systems, especially when shifting toward more **local** (defined in a variety of ways) and regional purchasing and processing of food is a focus. This was very much the case in a 2010 report entitled "FoodWorks: A Vision to Improve NYC's Food System" published by the New York City Council. This report sought to "identify ways to move from an unsustainable food system to one that promotes health, environmental sustainability, and a thriving economy" (New York City Council 2010). While this report was not focused only on institutional food, it strongly highlighted the purchasing power of New York

City's government and public institutions and the effects this could have on regional and local economies. Similarly, in Michigan, economic development has been used as a tool for framing the need for institutional food systems change. As the state's Good Food Working Group wrote in 2010, "We envision new approaches to food purchasing in which these Michigan institutions provide local, good food to consumers and create new markets for products grown, raised and processed in Michigan" (Michigan Good Food Work Group 2010). Initial steps that can be taken to increase local purchasing of foods include policy changes like Local Law 50 of 2011 in New York City, which allows a measure of preference for local foods in institutional purchasing (Mayor's Office of Contract Services 2012). Many jurisdictions and approximately 10,000 schools across the United States are also experimenting with farm-to-school programs, which help to redirect funds spent on school food to local farms (National Farm to School Network n.d.). Other farm-to-institution programs establish similar programs for hospitals, colleges, and child-care settings (Berkencamp and Mader 2012; Health Care Without Harm n.d.; Community Food Security Coalition n.d.).

Summary

This entry discusses the institutional foodservice sector, focusing primarily on publicly funded food in cities. Dynamics that must be balanced by public institutional food systems are examined, including the financing of institutional food, consumer food preferences, and compliance with institutional food quality standards. Several other factors relevant to these dynamics and critical to understanding institutional food are also introduced including (1) the structure of purchasing, (2) the location of food preparation, (3) institutional food labor, and (4) trends in institutional food systems change like attention to the health impact of institutional food, attention to sustainability, and attention to local economic development.

Cross-References

- ▶ Emergency Food System: Soup Kitchens and Food Pantries
- ▶ Food and Health Policy
- ▶ Food Security
- ▶ Food Standards
- ▶ Punishment and Food

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Punishment and Food

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Synonyms

Food and discipline; Food as a weapon; Food deprivation; Forced feeding

Introduction

Because food is fundamental for the preservation of life, it is a powerful and effective tool for the execution of punishment. This biological aspect, in itself, is reason enough to explain why food is such a compelling weapon. Yet the human

relation to food extends beyond the physical. Individual food habits are profoundly influenced by culture. The act of eating – what, why, how, when, and with whom one eats – is defined by a complex set of social values and rituals that signify one's membership within a specific group and give one's life meaning. The extent to which a person abides by these norms symbolizes who that person is. In this sense, eating is closely linked to an individual's sense of personal and social identity. Food punishments, whether by deprivation or forced feeding, can threaten one's physical well-being as well as one's sense of self when used for harm. When food is used to discipline the body as a means of moral correction – even if it is meant for good – it goes against the human will and thus feels very much like punishment. Whatever the context, punishing with food is a means of exercising control over others or over one's own body.

The sections below will cover the major areas where food punishments occur: in the family, in prisons, in the political sphere, and in the individual body (as in self-punishment). Each of these instances of punishment is influenced by philosophical theory, which also will be considered.

Feeding in the Family

The first place children experience socialization is within the family. This is the starting point of physical and social development, where values and behaviors are formed. Because children are unable to feed themselves or discern for themselves what is good to eat, many of these norms are communicated to them through food – that is, through the variety and quantity of foods they are given, and the manner in which they are fed. This dependency creates an environment in which parents – by withholding certain foods and enforcing the consumption of others – indoctrinate their children with a particular set of ideas concerning what is physically, socially, and morally acceptable behavior.

Two important contributions to educational theory, Plato's *Republic* (Plato 1969) and Rousseau's *Èmile* (Rousseau 1911), provide a philosophical basis for punishing children with food. These works assert that education begins at birth and must involve careful control of the diet. What is good to eat is not merely a matter of health, but also must be considered for its moral quality. A proper diet promotes physical health and develops moral character. Since children are not born with this knowledge, these values must be acquired through dietary education and training. Thus, punishment is intended for moral instruction. It is an act of discipline designed to promote the best interest of the child.

Both the *Republic* and *Èmile* endorse food deprivation within the family as a form of moral education. Withholding food cultivates in children the virtue of temperance (moderation) and discourages the vice of gluttony. The idea is that, if left to their own devices, children's appetitive desires will become insatiable, leading to vice, which in turn causes disease for the body and the soul. As Rousseau says, intemperance must be avoided, as it "excites the passions, and. . .in the long run it debilitates the body" (Rousseau 1911, p. 22). Food intake, therefore, must be carefully monitored, and certain foods must be limited or prohibited altogether to prevent moral corruption and disease. Interestingly, both Plato and Rousseau suggest that meat not be fed to children (Plato 1969, p. 372; Rousseau 1911, p. 119); it would seem to fall into the category of what Plato calls the "unnecessary appetites": foods that are harmful to the body and a "hindrance to the soul" (Plato 1969, p. 559b, c). Through "early correction and training," these harmful tendencies can, and indeed must, be suppressed (Plato 1969, p. 559a–c).

Conversely, enforcing the consumption of particular foods is equally important for a child's moral development. Just as there are foods that should be avoided, there are those that ought to be encouraged in moderation. These acceptable foods belong to Plato's list of "necessary appetites," which are fundamental for life and contribute to a "good habit of body" (Plato 1969, p. 559). The right foods – presumably vegetarian in nature – administered in correct

proportions, make for a healthy body and soul (Plato 1969, p. 372; Rousseau 1911, p. 119). These tendencies are not innate in children, who are so often tempted by unhealthy things; thus, the consumption of good foods and manners must be forced upon them. Rousseau believes the diet of children ought to be simple and natural, so as not to "excite their gustatory pleasure but only to satisfy their hunger" (Rousseau 1911, p. 119). And for Plato, a healthy diet produces a well-ordered individual, and ultimately, a just state.

Sometimes food is used to punish children for wrongdoing. In these instances parents may withhold a substance that is wanted, as in revoking the privilege to eat a treat, or they may force the consumption of something undesirable. While these punishments may not be directly related to children's eating habits, the use of food remains a persuasive technique for shaping their moral character. Plato seems to support these kinds of punishments in his *Protagoras*, where he states, "If the child yield a willing obedience, all is well; if not. . .treat him like a young tree that is twisted and bent, and try to straighten him with threats and blows" (Plato 1888, p. 325). Plato asserts that punishment is to the soul as medicine is to the body – it cures wickedness (Plato 1888, pp. 478–479; Mackenzie 1981, p. 200). Thus, penalties should be carried out directly through habit and conditioning, and the child should welcome rather than shun punishment because it heals the soul. Because food is intricately associated with the body, which must be controlled, it is likely Plato would condone the use of food for various disciplinary reasons.

Rousseau, in contrast, prefers more indirect forms of discipline for children. He insists that, "punishment must not be inflicted on children as a punishment, but. . .as the natural consequence of their bad acts" (Rousseau 1911, p. 65). For example, rather than physically punishing a child for lying, simply allow the ill effects to fall upon them, such as distrust and false accusations. It would seem that Rousseau condones more psychological forms of punishment. Yet when he describes the eating habits of Èmile's future companion Sophie, he suggests a more direct approach. When Sophie took sweets from the pantry as a child, her mother "reproved her, punished her, and made her fast" (Rousseau 1911, p. 291).

Feeding the Confined: Food in Prisons

Throughout history, deprivation, food contamination, and involuntary eating have been common measures of imposing penalties on criminals. Before the nineteenth century in the West, punishments were primarily corporal in nature and often took place in public places. The infliction of physical pain was seen as a retributive measure carried out against offenders in payment for their crimes. Public exhibition was intended to shame and reform criminals and serve as a deterrent to others (Plato 1888, p. 323). The rationale centered on the Platonic notion that control over the body is essential for promoting justice and reducing the incidence of crime (Plato 1888, pp. 504–505; Mackenzie 1981, p. 189). If criminals received any food at all, rations often consisted exclusively of bread and water. Food torture was commonplace. Criminals were deliberately poisoned, malnourished, and even left to starve. Though torture in prisons has been prohibited in recent years, following the establishment of international human rights laws, the use of food for punishment remains a common punitive strategy, affecting prisoners both physically and symbolically.

In *Discipline and Punish*, Michel Foucault examines the emergence of the modern prison system, a phenomenon signaling the shift away from the "public spectacle" of corporal punishment to a more institutionalized, "surveillance-based" system. This new structure, he argues, is not the result of increased humanitarian concern for criminals, but rather a "slackening of the hold on the body" (Foucault 1977, p. 10). While corporal punishment torments the body physically, imprisonment afflicts the body psychologically. The body is now an instrument for depriving the criminal of certain liberties or rights (Foucault 1977, p. 10). At the same time, Foucault questions the total disappearance of corporal

punishment. He suggests that incarceration necessitates a certain level of physical pain. Confinement, food rationing, and forced labor, which are regular features of prison life, certainly affect the body.

Foucault's writings illustrate well the function of what he calls the "punishment–body relation" (Foucault 1977, p. 11). Incarceration is at once both physical and mental punishment. Food works similarly when used for punishment. Even in instances when criminals are fed adequately from a nutritional standpoint, the loss of individual control over their food choices causes them anxiety and robs them of certain liberties. This anxiety is significant. It represents the ability of the institution to exercise power over the criminal through food, with or without the use of nutritional deprivation. For example, in American prisons inmates in solitary confinement are fed with mixed-ingredient compressed foods, resembling meatloaf in appearance and colloquially referred to as "nutraloaf" or "confinement loaf." These feedings are specifically designed to provide hostile inmates with adequate nutrition while simultaneously serving as part of the punishment (they are said to be tasteless and unappetizing). Most, if not all, prison food is rationed and the frequency and location of meals is strictly regulated. This loss of freedom in eating – what Foucault calls a "deprivation of liberty" – is equal, and perhaps even more agonizing, than the physical pangs of withholding food.

As a result of the mental anguish experienced while in confinement, prisoners often use hunger strikes to shift the balance of power. Food refusal is a potent physical and symbolic statement for prisoners and a means of regaining some measure of control over their bodies. It is so effective a weapon, in fact, that prison authorities often retaliate by force feeding the prisoners. This act nullifies the prisoner protest and reasserts "proper" authority within the establishment. Questions surrounding the ethical basis of such actions have been widely debated in recent years, as they are viewed as a violation of universal human rights. Is force feeding cruel and inhumane treatment? If not, does it nevertheless violate a prisoner's right to refuse medical treatment? Consequently, many prison medical practitioners are now required to prove that force feeding is a medical necessity (Lines 2008, p. 30).

Food and Political Punishment

Two treaties drafted by the UN General Assembly – the *Universal Declaration of Human Rights* (1948) and the *International Covenant on Economic, Social and Cultural Rights* (1967) – explicitly state that all humans should be free from hunger and have enough food for an adequate standard of living. Since governments are required to uphold these laws, one of their chief responsibilities is the allocation and protection of food resources. Of the many measures used to secure food supplies, the economic trade of commodities – including agricultural crops and manufactured food products – is among the most powerful and endangering. In the *Wealth of Nations*, Adam Smith asserts that the protection of free trade is "essential to the defense of the commonwealth" and therefore a critical responsibility of the state (Smith 1909, p. 480). Because governments continuously rely on trade with other nations for food supplies, political and economic relations between them are critical. When these relations are strained, food availability often is threatened and social instability ensues. Food thus becomes a stage upon which political and economic struggles for power are acted out. Edible commodities are transformed into political weapons used to punish opposing nations or to manipulate the state's own people.

Defending citizens from the violence of other nations is, for Adam Smith, the first duty of government. He argues that this protection can only be carried out by means of military force; that a well-trained standing army ought to be maintained continuously, not merely during times of war; and that the provisioning of supplies is an obligation of the state (Smith 1909, pp. 468–471). Smith emphasizes the strategic importance of keeping an army fed during battle and encourages the use of billeting for provisions when war is fought at a distance (Smith 1909,

pp. 340–341). He maintains that fleets and armies are supplied not with gold and silver, but with consumable goods (Smith 1909, p. 338). The trouble is many of these goods are often requisitioned from civilian populations. In this sense, food can be used as a punishment against civilians during times of conflict. War theorist Carl von Clausewitz also recognizes how food scarcity can be a "special principle of destruction" during warfare (Clausewitz 1908, p. 212). Historically, armies frequently experienced greater casualties due to inadequate food, illness, and fatigue than from active combat (Clausewitz 1908, p. 212).

Denying enemies access to food in wartime can be as destructive to human life as the use of military arms (Wallensteen 1976, p. 277). These measures may be carried out directly, as in a military invasion, or indirectly, as in trade embargoes and economic sanctions. During active combat, armies throughout history have employed various food strategies, both offensively and defensively, including scorched-earth campaigns, slash-and-burn tactics, blockades, and pillaging. The Union blockade on Confederate ports during the American Civil War is an example of an offensive strategy where food restrictions effectively starved the South into submission. Perhaps the most well known of these defensive strategies is Napoleon's invasion of Russia in 1812, where his *Grande Armée*, who expected to forage for subsistence, were forced to retreat as a result of Russia's deliberate destruction of food resources. Clausewitz rebuked Napoleon for his strategic logistical failure to secure food supplies for his marching armies (Clausewitz 1908, p. 214).

While the deliberate destruction of food resources and forced starvation are now considered crimes of war, governments continue to utilize various food-targeted measures to punish enemies, mostly through trade embargoes and economic sanctions. Even blockades are permissible under international law, so long as they do not impede civilian access to adequate food or destabilize food production in war-stricken areas. The US embargo with Cuba, first imposed in 1960 and still active today, has been among the most long-lasting, severe, and controversial food-related trade prohibitions in modern history.

Governments sometimes assert political power over their own people by limiting access to food. While restricting food availability is not always intended for harm, the consequences can be devastating, especially for the disadvantaged. Food rationing and dramatic price inflation – which may be attempts to protect food supplies – can lead to famine, food shortages, hunger, and starvation. In *Poverty and Famines*, Amartya Sen questions the view that famines are caused by "food availability decline" (FAD). Rather, famines are the result of widespread failures in food distribution and entitlements (Sen 1991, pp. 154, 162). "A person's ability to command food. . .depends on the entitlement relations that govern possession and use in that society" (Sen 1991, p. 154). For Sen, the fact that famines can "thrive" even at times when there is no particular shortage of food is an indication that famines are more directly linked to entitlement inequalities. Conversely, the notion that certain population groups can prosper while others starve, as in the Bengal famine of 1943, provides further evidence of Sen's "entitlement approach." Moreover, governments – in attempting to offset the damages of famines – may inadvertently, or perhaps deliberately, deprive particular population groups access to adequate food.

Occasionally, nations punish citizens ruthlessly and deliberately with food. The reasons for carrying out such measures are various, but some examples are political despotism, forced collectivization, and genocide. The Ukrainian famine of the early twentieth century is among the most notorious of state-sanctioned famines in modern history. Millions of peasants were starved to death as a result of Stalin's forced collectivization of grain production. What had once been the "breadbasket of Europe" became the graveyard of the poor.

As retaliations against the state, hunger strikes can be highly effective social protests. Just as in prisons, self-imposed deprivation wields a great deal of symbolic power. When individuals feel the government has acted unjustly or has violated a personal liberty, they may choose to deprive

themselves of nourishment to generate social unrest and attract attention to their cause. While nonviolent in nature, these protests typically need to be calculated, collective movements in order to have significant impact. Individuals acting in isolation rarely have the ability to manipulate change and shift the balance of power. There have been some occasions, however, when hunger strikes staged by individuals have achieved success, as in the hunger strikes of Mohandas (Mahatma) Gandhi in the first half of the twentieth century. As a well-liked public figure with an established following, Gandhi's political protest played a key role in bringing India independence from British colonial rule.

Feeding Body and Soul: Food and Self-Punishment

As a substance taken into the body, food not only nourishes and sustains, it also becomes a physical part of oneself when it is consumed. In this sense, an individual's relationship to food is quite personal. Furthermore, the particular foods one chooses and the manner in which these foods are eaten serve as a means of distinction, differentiating one individual from another in terms of body composition, cultural background, social class, and so forth. Yet the very eating habits that mark one's individuality are shaped and regulated by culture. In other words, society defines for the individual what is suitable to eat by attributing moral values to foods and eating behaviors – e.g., some foods are good, whereas others are forbidden. These normative standards are constructed to promote physical health and, perhaps even more importantly, to control social behavior. A person must moderate his or her eating habits in order to meet these norms. When one fails to do so – by eating the wrong foods or consuming too much or too little of the right foods – one's physical health, social position, and very character are at risk. Consequently, individuals punish themselves with food through dieting, fasting, and eating disorders in order to correct dietary wrongdoings and conform more closely to social standards.

While dieting certainly addresses matters of health, it is equally concerned with the cultivation of moral virtue. Consider how often dieting is a punishment for "bad" behavior such as poor or indulgent eating. In fact, dietary health itself hinges on one's ability to eat the "right" foods in the "correct" manner and proportion. A healthy person is believed to exhibit the virtue of self-control, whereas one who eats excessively or is overweight is deemed unhealthy and therefore lacks character. Thus, a person diets in order to achieve moral propriety and to exhibit the culturally prescribed qualities of dietary health. Restricting food intake following weight gain or a period of "bad" eating is a self-punishment for wrongdoing, a means of moral correction. Controlling the appetitive desires is a recurring theme throughout the works of Plato, who views the illusory temptations of the body as an enormous threat to the higher, eternal values of rational thought. He argues that the diseases of the soul originate from a disordered body, and the inflated desire for physical pleasure – such as that for food and drink – is the "greatest disease of the soul" (Mackenzie 1981, p. 176). Therefore, the body must be self-disciplined in order to produce the virtue of temperance, which leads to a well-ordered and healthy soul. Aristotle's theory of moderation echoes these sentiments, where control over the appetite is not only virtuous, but also necessary for the good life.

The religious tradition of fasting transforms self-imposed dietary restrictions into a spiritual discipline. Religious fasting is viewed as heightening spirituality and bringing one closer to God, creating more time for spiritual contemplation, improving self-control, and building resistance to physical suffering. Though typically performed as an act of devotion, fasting also occurs during times of mourning or is used for repentance. The religious doctrines of early and medieval Christianity share many of the philosophies of Greek ethics concerning the body. Gluttony is classified as a cardinal sin, and the corresponding virtue of self-control appears among the "fruits of the Spirit" in Galatians 5:23. Tertullian extols the virtues of fasting in his apologetic writings,

where he exclaims, "the temptations which attend upon fulness and excessive indulgence of the belly are stifled by abstinency" (Tertullian 1854, p. 281). He refers to fasting and other afflictions of the body as sacrificial offerings to God (Tertullian 1854, p. 345). St. Augustine's *Confessions* recall his own struggle with dietary temptations, where food was both the "medicine of nourishment" and a snare of lustful wickedness (Augustine 1943, pp. 251–252). The fight against the desires of the flesh was, for Augustine, a daily war where fasting "brings the body into subjection" (Augustine 1943, p. 251). Teachings renouncing the flesh became so prolific in the early church that an enormous wave of men and women devoted their lives to abstinence, giving rise to the ascetic movement. Many of these believers were venerated as saints for their extreme dietary demonstrations, and many of them starved. Nevertheless, fasting for early Christians was seen as a means of achieving salvation. Their deprivation was seen as virtuous, as a victory over the flesh, and a sacrificial example for other believers.

In the age of nutritional science, austere food practices once celebrated for their piety have given way to what are now diagnosed as eating disorders. Individuals suffering from anorexia nervosa and bulimia punish themselves with food (or the lack of it) because of the severe anxiety they feel concerning their physical bodies. Both disorders are centered on issues of control, where extreme eating behaviors – such as self-induced starvation or binging and purging – are attempts to master the unruly desires of the appetite. In *Unbearable Weight*, Susan Bordo argues that eating disorders are the symptoms of persistent cultural pressures on the individual body to achieve idealized forms of beauty. These illnesses are not bizarre psychological abnormalities, but rather the "the crystallizations of culture" – they are characteristic representations of "much that is wrong with it" (Bordo 1993, pp. 35, 141). As an overwhelmingly female phenomenon, anorectics and bulimics suffer from the "tyranny of slenderness" that has become so prevalent in contemporary culture. Fueled by constant multimedia messages, these women are "relentlessly driven by an ideal image of ascetic slenderness" (Bordo 1993, p. 152). Though these disorders have only recently been "discovered," Bordo illustrates that they have existed, in one form or another, throughout history. Anorectics and bulimics typically express an ideology – exhibited by feelings of bodily entrapment and depictions of the body as a prison – that bears remarkable similarity to the mind–body dualism of Platonic and Augustinian ethics, where the spiritual realm is of higher, eternal value and the physical realm is temporary and illusory. The desire to free the soul from the body – which is a common theme in these illnesses – is actually a very old concept. Therefore, eating disorders are extreme representations of a much broader cultural issue concerning food consumption. Society, through cultural norms, exerts immense control over individual eating patterns.

Summary

This entry explores the manifold ways in which human feeding practices may be used – physically and symbolically – for punishment. As both a biological need and a central aspect of personal and social identity, food can be a potent weapon in the control over one's own body and the bodies of others, whether it is used in the family, in the prison, and in the political sphere or is self-inflicted. Throughout the ages, these practices have been supported by philosophical theory, which may account for their continued prevalence. Yet increased interest in human rights has begun to call into question the use of food for punishment. The issues are many-sided and complex and deeply embedded in culture, so the solution to these concerns is not always simple. As societies shift, what was once an acceptable food practice might later become controversial. The same is true for punishment. History has demonstrated that food remains a compelling instrument for punishment – it simply assumes new forms of expression in the midst of change. Nevertheless, it is most ironic that what is supposed to nourish the body is so often used to control it.

Cross-References

- Eating Disorders
- Fasting
- Foucault and Food
- Plato and Food
- Rousseau and Food
- War and Food

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