H

Hazon

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History

Hazon, the Hebrew word for "vision," is North America's leading Jewish food group. The vision of Hazon is to create healthy and sustainable Jewish communities. Hazon is trans-Jewish, so that members of the organization cover the entirety of modern Judaism: Orthodox, Conservative, Reform, Renewal, Reconstruction, Jews who identify as agnostic or atheist, and/or those who are culturally Jewish. Hazon is also open to non-Jews, although most members tend to identify with some form of Judaism.

Nigel Savage began Hazon in 1999 (year 5759 in the Jewish calendar). Savage is a British Jew who studied in the United Kingdom, Israel, and the USA and who relocated to New York. His original vision was to create an inclusive Jewish movement capable of responding to the emerging demands of living in an industrial society that he believed to be harmful to physical bodies, spiritual well-being, and the environment. In 2000 Savage organized a Cross-USA Jewish Environmental Bike Ride, which became Hazon's first public activity. Upon completion of this successful ride, Savage reflected upon his own upbringing and identity as a Jew and became inspired to generate a movement within Judaism that was able to speak to contemporary environmental and food issues based on Jewish tradition and history but that was also inclusive and nondogmatic. The organization and completion of this bike ride is the beginning of Hazon, while environment-themed bike rides in Israel and the USA still remain one of Hazon's main activities. From this bike ride onwards, Hazon has been active in reimagining Judaism by reinterpreting its ancient teachings and rituals in order to make them, and therefore contemporary Judaism, relevant to a world undergoing myriad interconnected social and environmental problems. Hazon's leadership designates some of these problems to include climate change, the perceived ills of industrial agriculture, obesity, and perceived disparities in wealth and health at national and international levels.

Major Activities

The goals of the organization are to generate community change geared towards religious, social, and environmental sustainability. They attempt to create this change through facilitating transformative experiences at workshops and conferences and by creating and supplying educational materials to a variety of contemporary Jewish organizations and interested individuals. They also work on these goals by actively advocating for sustainability and healthier lifestyles

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within North American (Jacobs 2002; Seidenberg 2005) and Israeli Judaism, often through conferences, writings, and lectures. The last area in which they work towards generating and enacting a vision of a healthier, more sustainable Judaism is through capacity building, where they actively network with and support, through grants and other funding opportunities, other Jewish groups in North America and Israel who are working on sustainable agriculture and other sustainability and environmental initiatives.

Besides organizing bike rides in the USA and Israel, Hazon is active in generating a sustainable food movement for and run by Jews, based on Jewish teachings and history. This is done in a variety of ways, including hosting an annual national food conference, typically in California or in the Northeast, with regional food-themed meetings also occurring throughout the year. These conferences are attended by Jews from all over North America, from every variety of Judaism. The themes of and workshops at the food conferences are to generate and embody a progressive, holistic, sustainable food culture based on a mix of Jewish rituals, customs, and teachings, coupled with insights from sustainable agriculture and ecological agrarianism.

Hazon also oversees the Jewish Food Education Network, which is an attempt to understand what kosher (translated as "fit," "proper," or "ritually pure") means for Jews who receive many of their food items from the modern industrial food system (Fishkoff 2010). Through this network, Hazon distributes food-based curricula, source books (Savage and Stevenson 2009), and program ideas and activities. The Jewish Food Education Network also organizes online trainings and webinars that help Jewish community centers, synagogues/temples, and day schools incorporate sustainable food teachings and practices into their curricula and cafeterias.

Another sustainable food program that Hazon organizes and began in 2004 is their community-supported agriculture (CSA) program. This program links interested Jewish temples and synagogues and day schools with local CSA farms, where the produce is typically distributed at the local Jewish institutional building. By 2013, the CSA program had grown from 1 to over 50 partnerships between farms and Jewish communities in the USA, Israel, and Canada. Many of these partnerships include efforts to share produce from the farms with local food shelters, with the goal being to minimize food waste in urban areas.

Other food-related activities sponsored by Hazon include campaigning for a more comprehensive, sustainable US Farm Bill, where they encourage members to contact their representatives and visit Washington, DC, to lobby on this issue. Lastly, through their partnerships with Adamah Farm, Urban Adamah, and Isabella Freedman, Hazon sponsors and encourages the development of the next generation of Jewish sustainable farmers. These farmers are often invited to share their experiences at Hazon's national food conferences.

Landmark Contributions

Savage's personal experience led to Hazon adopting a theory of change, which reads, "We start with the belief that engaging Jews in environmental education, action, and advocacy changes them, their families, their institutions, and the community as a whole" (www.hazon.org, 2013). As an organization Hazon facilitates such engagement through the myriad partnerships they have created, events they sponsor, and their organizational structure. Hazon is overseen by a Board of Directors and an Advisory Board. They also have a Rabbinical Advisory Board. Their key partners include the Adamah, a North American Jewish farming center where young Jews learn organic farming practices (Immergut 2008); the Arava Institute for Environmental Studies, the leading environmental school in the Middle East; the Eden Village Camp, a North American Jewish summer camp themed on sustainability; a popular blog called "The Jew and the Carrot"; the North American Heschel Center for Environmental Learning and Leadership; the North American Teva Learning Alliance; and the Urban Adamah, an urban training center outside of San Francisco, California, where young Jews learn sustainable urban

agriculture. Hazon also supports over one hundred Jewish organizations working on sustainability-themed programs by supplying these organizations with a variety of grants. In late 2012, Hazon officially merged with the Isabella Freedman retreat center, with the goal of increasing the scale of impact Hazon has in reaching and changing North American Judaism.

Hazon is motivated to advocate for a modern vision of Jewish sustainable food habits and practices because of their understanding of Jewish history, traditions, and teachings. These include a traditional Jewish concern with social justice, upon which Hazon advocates for food justice issues in regard to food production and distribution; the Jewish mandate to do no harm/do not destroy (*bal taschit*) (Schwartz 2001); a call to redefine kosher, so that kosher requirements include animal and farm worker welfare; recreating traditional food rituals and holidays so these begin to include sustainable agriculture products; and reinterpreting Torah and the Talmudic tradition from the perspective of contemporary sustainable agriculture concerns.

This reinterpretation, renewal, and recreation of Judaism based upon modern-day concerns about environmental and sustainability issues (Tirosh-Samuelson 2006) reflect the larger ecological reformation occurring within world religions, where many traditions are undertaking an ecohermeneutics of their teachings and practices (Tucker 2003). Hazon's specific focus on sustainable food issues, with concerns about justice, health, and the environment, is also emblematic of the recent emergence of religious agrarianism within some subtraditions within world religions (LeVasseur 2012). Hazon's rapid growth and active partnerships, coupled with the brittleness of the modern industrial agrifood system, suggest that Hazon will remain a leading voice in Israeli and North American Jewish food circles.

Cross-References

- ▶ Ancestral Cuisine and Cooking Rituals
- ▶ Community-Supported Agriculture
- ▶ Environmental Justice and Food
- ▶ Ethnicity, Ethnic Identity, and Food
- ▶ Food Rituals
- ▶ Judaism and Food
- ▶ Urban Agriculture

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Herbicide-Resistant Crops

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Synonyms

Genetically modified; Herbicides; Resistance; Tillage; Transgenic; Weeds

Introduction

Herbicide-resistant (HR) crops have been genetically modified (GM) so that they are not damaged by applications of certain herbicides. Because herbicides are designed to kill plants, they can cause injury to conventional crop varieties. This limits when and how herbicides can be applied, making them less effective. Because many herbicides are effective against only certain types of plants, growers face the complexity of choosing among several chemicals for different weeds. Crops resistant to broad-spectrum herbicides overcome these problems by reducing crop injury and allowing applications of a single herbicide for most (or all) chemical weed control (NRC 2010). Mechanical and hand tillage to control weeds has become more costly as labor and fuel costs have risen relative to herbicide costs (Osteen and Fernandez-Cornejo 2013). There are additional environmental problems with tillage, especially on highly erodible land. Erosion can reduce the long-term productivity of soils and profitability of farming. Sediment from erosion can also reach water bodies contributing to various environmental problems (Fernandez-Cornejo and Caswell 2006).

HR Crop Adoption

Genetically modified HR crops first became available in the mid-1990s. GM HR crop varieties have been developed for a number of crops but require national regulatory approval before they can be commercially planted. Varieties of HR alfalfa, canola, cotton, maize, soybeans, and sugar beets have been commercially planted in a number of countries. In countries where they have been approved, HR varieties have been extensively adopted, with acreage often exceeding that for non-GM varieties. HR cotton and soybean varieties now account for the majority of global acreage of these crops (Frisvold and Reeves 2010). Most HR crop acreage is planted to glyphosate-resistant (GR) varieties. Because the herbicide glyphosate controls more than 300 weed species, growers can control many broadleaf and grass weeds effectively using one herbicide instead of many different ones.

Adoption of HR crops has been rapid despite mixed evidence that they increase farm profits (Bonny 2011; Fernandez-Cornejo and Caswell 2006; Marra et al. 2002; NRC 2010). Researchers have suggested that HR crops provide benefits difficult to capture using standard farm profit estimates such as simplification of weed management decisions, convenience, increased flexibility in timing, reduced crop damage, lower environmental risk, lower management time requirements, and compatibility with conservation tillage. These hard-to-measure benefits may account for rapid HR crop adoption (Bonny 2011; Fernandez-Cornejo and Caswell 2006; Frisvold and Reeves 2010; Marra et al. 2002; NRC 2010, 2012). Weed resistance to herbicides other than glyphosate may also account for the popularity of GR varieties.

GR crops have been credited with two types of environmental benefits: encouraging adoption of conservation tillage and substitution to herbicides with lower toxicity and persistence in the environment (Fernandez-Cornejo and Caswell 2006; Green 2012; Kleter et al. 2007; NRC 2010, 2012; Norsworthy et al. 2012; Price et al. 2011). The empirical support for the complementarities between GR crops and conservation tillage is stronger than for herbicide substitution. Because conservation tillage reduces the number of machine passages over the field, it reduces fuel use. It thus contributes to soil carbon sequestration and reduced carbon emissions from fuel use. Conservation tillage can reduce sediment and chemical runoff, reducing water pollution. The US National Academy of Sciences reports, however, that further research is needed to measure and document contributions of HR crops to area-wide improvements in water quality (NRC 2010).

While HR crops have also been credited with reducing environmental risks of herbicide applications, attributing changes in environmental risks to HR crop adoption is difficult (Bonny 2011). Simple comparisons of herbicide use before and after HR crops became available are not appropriate for assessing the impacts of HR crops on herbicide use. First, many things have

changed since the mid-1990s when these crops were first adopted. These include changes in hectares planted, output and input prices, agricultural policies, and weather. Estimates of the effect of HR crops on herbicide use must control for these factors. Second, growers are not randomly assigned to adopter and non-adopter groups in controlled experiments. Growers choose whether or not to adopt HR crops. If adopters have fundamentally different characteristics than non-adopters, comparing herbicide use across the two groups will suffer from sample selection bias (Fernandez-Cornejo and Caswell 2006). Third, kilograms of active ingredient applied are not good measures of the environmental impact of herbicides. Herbicides vary in their toxicity to different species, persistence in the soil, half-life, leaching potential, and runoff potential, which can have ecological effects as well as impacts on farm workers and consumers (Bonny 2011). A number of studies have attempted to address this issue by weighting herbicide applications by factors such as mammalian toxicity, soil half-life, or the more comprehensive Environmental Impact Quotient (EIQ) (Kovach et al. 1992) that attempts to account for multiple risks (e.g., Bonny 2011; Kleter et al. 2007). Compared to many other herbicides for which it substitutes, glyphosate has lower toxicity and persistence in the environment. This means a switch to glyphosate-based weed management may reduce environmental risks, even if total kilograms of active ingredient applied increase. US herbicide data suggests that kilograms of glyphosate applied have increased substantially since the mid-1990s, while kilograms applied of many other compounds have decreased.

The most widely cited estimates of grower shifts in herbicide use, however, have come from expert surveys of extension specialists, not from actual farm-level data. In these analyses, specialists provided assessments of likely or recommended herbicide treatments that farmers would have made if they did not plant HR crops. Studies have extrapolated expert survey estimates to national changes in herbicide use, weighting herbicide use based on EIQ measures (e.g., Green 2012; Kleter et al. 2007). Studies adopting this approach show a decline in the EIQ attributable to HR crop adoption. The expert-survey approach can be a cost-effective way to conduct an ex ante assessment of the *potential* environmental impacts of HR crops. These estimates, however, do not produce statistically valid estimates of actual herbicide use, let alone estimates of changes in herbicide use attributable to HR crop adoption. In some cases, careful statistical analyses of farm-level HR crop adoption and herbicide use corroborate the expert survey results, but in other cases, not.

Reduced Diversity of Weed Control Tactics Leads to GR Weeds

A fundamental means of delaying the evolution of weed resistance is to diversify control strategies (Duke and Powles 2009; Norsworthy et al. 2012; Vencill et al. 2012). This can be accomplished by using nonchemical control methods (such as tillage, row spacing, and crop rotations) along with chemical control. If herbicides are used, avoiding reliance on herbicides with the same mechanism of action (MOA) is crucial. The widespread adoption of GR crops in the United States, however, has led to a pervasive reduction in the diversity of weed control tactics. Growers have relied less on nonchemical control methods and have relied heavily on a single mode of action for chemical control (Frisvold and Reeves 2010; Norsworthy et al. 2012).

Before the introduction of GR cotton, maize, and soybean varieties in the United States, glyphosate use on these crops was limited. Since the introduction of GR crops, there has been a narrowing of herbicides and herbicide MOAs used for all three crops, which greatly increased the selection pressure for herbicide resistance. From 1997 to 2010, glyphosate's share of total kilograms of herbicide active ingredient applied to maize rose from 1 % to 35 %. For cotton, this share rose from 3 % to 62 % from 1995 to 2010, while for soybeans, it rose from 11 % to 89 % from 1995 to 2006. Three factors contributed to reliance on GR crops and glyphosate. First, there was increasing resistance to MOAs that had been

in general use for a long time, such as acetolactate synthase (ALS – B2) and photosystem II (Cs) herbicides. Second, glyphosate became attractive as a postemergence herbicide because of its broad-spectrum efficacy and reliability. Low cost was also a factor after the patent on glyphosate expired in 2000 (allowing lower cost generics on the market). Third, herbicides with new MOAs have not been registered in the United States since 1998. Phosphinic acid herbicides such as glyphosate accounted for 60 % of hectare treatments for cotton in 2007 and 77 % of hectare treatments for soybeans in 2006. By 2005, triazine and phosphinic acid treatments in maize accounted for two-thirds of hectare treatments.

Evolution of Glyphosate-Resistant Weeds

Increased reliance on GR crops and glyphosate as the dominant means of weed control generated enormous selection pressure GR weeds. Before 1998, there were no reported glyphosate-resistant (GR) weed species in the United States. By 2013, however, glyphosate resistance had been confirmed for 14 species in the United States spread across 36 US states (Heap 2014). GR weeds have proven problematic for cotton, soybeans, peanuts in rotation with cotton, maize, and in California, perennial crops. Resistance to glyphosate has evolved in Palmer amaranth (*A. palmeri*) in GR cotton fields throughout the Southeast United States. Costs of GR weeds can be significant, ranging from $5 to $130/ha (Norsworthy et al. 2012). In severe cases, growers may opt to abandon fields altogether.

Barriers to Resistance Management

Problems with GR weeds have raised questions about the sustainability of GM HR crops. While many growers are adopting many Best Management Practices (BMPs) to manage weed resistance, adoption rates for a number of practices remain low. While resistance management practices for insect-resistant Bt crops are federally mandated in the United States, management of weed resistance for HR crops has been voluntary (Frisvold and Reeves 2010). Bt crops have pesticides incorporated into them and are thus regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The current rate of BMP adoption has proved insufficient to delay resistance in many areas (NRC 2012). Slowing resistance implies economic and environmental trade-offs (Frisvold and Reeves 2010; Norsworthy et al. 2012; Price et al. 2011). For growers, BMPs may entail reductions in short-run returns. No-till and reduced tillage practices have provided a number of environmental benefits that could be lost if growers revert to tillage in the face of weed resistance. Using herbicides with a different MOA than glyphosate may also delay resistance. This, however, may entail using more herbicides and using herbicides with greater persistence or toxicity than glyphosate. Thus, some of the practices to delay resistance to glyphosate may undercut some of the environmental benefits of glyphosate.

As of the mid-2000s, many growers held attitudes and perceptions that would discourage BMP adoption (NRC 2012). A significant share of growers appeared unaware of certain major factors contributing to the evolution of weed resistance. Many growers may attribute infestation and spread of resistant weeds to factors beyond their control such as natural forces (e.g., wind, birds, animals) or poor weed management by their neighbors. If growers perceive that preventing weed resistance is beyond their individual control and requires collective grower action, they will have less incentive to take individual actions that incur additional costs to delay resistance. Growers may also believe that new chemistries or cultivars will soon become available to address resistance problems. Growers have less incentive to conserve the efficacy of an herbicide if they believe substitutes will be available in the future.

Role and Limits of Stacked Trait HR Varieties

One approach to address resistance to GR crops is through plant breeding by "stacking" resistance

traits to multiple herbicides in individual crop varieties (Green 2012). Resistance can, in theory, be delayed by rotating between herbicides with different MOAs and by using herbicide mixtures. This would reduce selection pressure on any one compound. If a particular weed were resistant to one herbicide, it may be killed by another herbicide that relies on a different MOA. Companies are developing new crop varieties that combine glyphosate resistance with resistance to herbicides with different MOAs (Green 2012). One example will be varieties that stack glyphosate resistance with resistance to different ALS-inhibiting herbicides. Varieties resistant to two more herbicides will soon be commercially available (Green 2012). These stacked varieties will be combined with homogeneous blends (herbicide mixtures with different MOAs). Because these blends will be mixtures of currently registered herbicides, they may receive regulatory approval relatively quickly.

Combining herbicide mixtures with multiple-resistant (MR) crop varieties can reduce reliance on a single MOA. This strategy also avoids the high cost and lengthy delays in developing novel herbicides. It raises questions, however. First, how many different MOAs need to be combined in one HR crop variety to delay resistance substantially? How is the potential for delay affected by the fact that some weeds are resistant to the herbicides that are to be combined. For example, some weeds are already resistant to glyphosate, others are resistant to ALS inhibitors, and some are resistant to both. The list of weeds resistant to multiple herbicides continues to grow (Mortensen et al. 2012; Heap 2014). Some have criticized this MR strategy because it may lead to greater herbicide use and negative environmental impacts in the short run and divert attention and resources away from more comprehensive integrated weed management research and extension (Mortensen, et al. 2012).

Summary

Since their introduction in the mid-1990s, growers have adopted genetically modified, herbicide-resistant (HR) crop varieties quickly in countries where they have been approved. Benefits to growers not captured in standard farm profit calculations appear to account for the popularity of HR varieties. HR crops have been credited with encouraging adoption of conservation tillage and causing substitution to herbicides with lower toxicity and persistence in the environment. Evidence for the effect on conservation tillage is stronger than evidence for herbicide substitution. Adoption of HR crop varieties led to a dramatic reduction in the diversity of weed control tactics in US agriculture and the evolution of HR weeds. Grower adoption of resistance management strategies has been limited and insufficient to delay resistance. Development of crop varieties resistant to multiple herbicides is being pursued as a strategy to respond to HR weeds. Debates remain over the potential of this approach relative to a more comprehensive integrated weed management strategy to successfully delay resistance.

Cross-References

- ▶ Pest Control
- ▶ Sustainability of Food Production and Consumption
- ▶ Transgenic Crops

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Hinduism and Food

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Introduction

The concepts of ahimsa, noninjury to all forms of life, and the associated practice of vegetarianism were born on the Indian subcontinent in the sixth century BCE. Initially adopted by the upper castes of society, they became more widespread with the spread of devotional movements starting in the sixth century CE. In the twentieth century, vegetarianism was one of the core teachings of the great political and spiritual leader Mahatma Gandhi. While today a minority of Indians are strict vegetarians, vegetarianism remains an ideal of society.

Definition of Hinduism

Hinduism is the world's third largest religion (after Christianity and Islam), with an estimated 950 million adherents in India and the diaspora. Although some beliefs and practices are thousands of years old, the term "Hinduism" is relatively new. It was first used in the ninth century CE by Central Asians and Persians for the inhabitants of the subcontinent. (The word comes from the Persian Sindh, meaning the land on the banks of the Sindhu, the Indus River). In the late eighteenth century, Europeans began applying it to the followers of indigenous Indian religions. Until then, Hindus (if they called themselves anything) referred to themselves as followers of the *Sanatana dharma*, the eternal *dharma* – a Sanskrit word variously translated as duty, personal path, vocation, law, and religion.

Unlike Islam or Christianity, Hinduism has no founder, no credo, and no scriptures that are recognized by all adherents. It is a conglomeration of various philosophies, beliefs, and social norms that have evolved over the millennia. As K.M. Sen writes in his history of Hinduism:

> Hinduism is more like a tree that has *grown* gradually than like a building that has been *erected* by some great architect at some definite point in time. It contains within it . . . the influences of many cultures, and the body of Hindu thought offers as much variety as the Indian nation itself. (Sen 1991, pp. 4–5)

Nonetheless, there are some attitudes and practices shared by many Hindus, especially related to food. According to ancient Indians texts, of all things created, food is the most

important since it enables a person to use all his faculties and frees him or her from ignorance and bondage. "Purity of thought depends on the purity of food," said the ancient sages, or, to use the modern phrase, "You are what you eat."

Historical Background: The Indo-Aryans

The oldest text revered by Hindus is the *Rig Veda*, a collection of hymns and paeans to the gods, incantations, prayers, and philosophical speculations composed between 1700 and 1100 BCE. This and other works, collectively called the Vedas, were passed down orally and written down in Sanskrit centuries later. Even today, some of the verses are recited during weddings and funerals, making it one of the world's oldest religious texts in continuous use.

It was composed by people known as Indo-Europeans or Indo-Aryans, who migrated in small groups to the subcontinent from the region between the Black and Caspian Seas between the fifth and fourth millennia BCE. The Indo-Aryans were pastoralists, whose main occupation was raising cows. Their gods were forces of nature with counterparts in classical Greece and Rome: Indra, the equivalent of Zeus and Jupiter, ruled over the sky and heavens; Agni was the god of fire; Varuna, the god of thunder; etc.

Life and nature were uncertain, and the main way of placating the gods and winning their favor was by rituals that involved animal sacrifice. Various animals were killed by the priests, called Brahmins, who alone knew the complicated rituals associated with the sacrifice. After the meat was offered to the gods, it was consumed by the priests and worshippers. Similar rites took place in classical Greece, Rome, and Persia.

Although meat eating was condoned, the ancient texts show a certain ambivalence about eating meat, especially cows. Some recommend the offering of effigies of animals made of ghee or clarified butter, vegetables, or rice and barley in place of meat. Cows were held in very high esteem in Indo-Aryan society. A hymn in the *Rig Veda*, "A Glorification of the Sacred Cow as Representing the Radiant Heavens," declares:

> The Cow is Heaven, the Cow is Earth, the Cow is Vishnu, Lord of Life
>
> Both Gods and mortal men depend for life and being on the Cow.

By around 1000 BCE, social divisions had become sharper, and there emerged one of the most distinctive features of Indian society, the caste system. At the top were the Brahmins. Next were the *rajanya* (later called *kshatriya*), the warriors and rulers, followed by the *vaishya*, the providers of wealth through herding, agriculture, and trade. The fourth category, the *shudra*, was artisans and service providers. Later a fifth category was added for people who did jobs that even shudras would not touch, such as tanning hides, collecting garbage, or burying the dead. These were the outcastes, today legally referred to as scheduled castes.

Over the centuries, caste came to have many ramifications, especially for the two most fundamental human activities, sex and eating. People were not supposed to marry, accept food from, or eat with someone outside their caste. Caste also became associated with ideas of purity and pollution, with the Brahmin considered the purest of the pure. Contact with lower castes was considered polluting, and there were elaborate rules governing such contacts.

Reform Movements

Starting around the beginning of the first millennium BCE, the Indo-Aryans moved eastward to the site of modern Delhi and Bihar and westward into present-day Gujarat. They settled down, built towns and cities, and developed a sophisticated urban civilization. Wealth and leisure gave rise to philosophical, moral, and religious speculation, and new ideas emerged that became an integral part of Hindu thought. One is that there is an endless cycle (*samsara*) of death, rebirth, redeath, etc., and that souls are constantly reborn (reincarnation). From this emerged the law of *karma*, a word which means action or deeds, with the connotation of morally charged action, good or bad. The sum of a person's past karma determines how he or she is reborn into his present life.

These ideas were central to two new religious/philosophical movements, Jainism and Buddhism, which arose in the sixth century BCE. Their founders, Mahavira and Gautama Buddha, respectively, were the sons of rulers who abandoned their palaces to seek the meaning of life. Both preached the doctrine of *ahimsa* – a Sanskrit word meaning noninjury or nonviolence – and rejected animal sacrifice. Buddha, who advocated a more moderate path to salvation, allowed his lay followers to eat meat. Buddhist monks had to follow a vegetarian diet in their monasteries, but outside, where they begged for their food, they had to accept anything that was given to them, even meat or fish, provided that the animal was not slain on purpose for the monk and the recipient did not see, hear or even suspect the killing of the animal.

Jainism was much stricter. Five things were and are absolutely forbidden to all Jains, laypeople, and monks alike: meat and meat products, fish, eggs, alcohol, and honey. In addition, monks and nuns and devout Jains were not allowed to eat vegetables and fruits that grew underground or contained the seeds of life, including potatoes, figs, pomegranates, etc.

Both Buddhism and Jainism rejected the authority of the Vedas, the dominance of the Brahmins, the ritual sacrifice, and the caste system. These practices won many followers among common people and rulers alike. In addition to the ethical and moral reasons for avoiding meat, there were economic issues. Some sacrifices required hundreds of animals, which placed a great burden on the farmers who had to donate their animals for this purpose. The rulers' growing administrative and military costs competed for the funds demanded by the Brahmins for their expensive rituals. The stabilization of agriculture made cattle more useful for various operations, such as plowing and making manure, which was used as a fertilizer and, when dried, as a fuel (*gobar*, still a cooking fuel among the poor in India).

The Brahmins recognized the popular appeal of Jainism and Buddhism and co-opted many of their doctrines and beliefs. The eating of beef became taboo, and vegetarianism began to be adopted as a high ideal, a signifier of "purity," and a marker of status. As one scholar notes, "Vegetarianism was far more than an interesting new dietary custom; it was the focal point of what might be called a revolution of values" (Smith 1990, p. 197).

A political boost to vegetarianism was given by Emperor Ashoka Maurya (304–232 BCE), to this day considered the greatest of all Indian rulers, revered not only for his conquests but his efficient administration and tolerant policies. A supporter, if not an adherent, of Buddhism, Ashoka advocated ahimsa, prohibited animal slaughter and meat consumption in his empire on certain days, and virtually abandoned the consumption of meat in his own court. A famous inscription reads:

> Formerly, in the kitchens of the [emperor], several hundred thousand animals were killed daily for food, but now at the time of writing only three are killed – — two peacocks and a deer, though the deer not regularly. Even these three animals will not be killed in future.

Moreover, the climate and fertility of India meant a year-round abundance of fruits and vegetables which facilitated the avoidance of meat. Finally, these trends were no doubt reinforced by an affection similar to that we show towards our domestic pets. The thought of eating dogs horrifies people in the Western world, although most people have little compunction about eating cows.

The Dharma Texts

Between 300 BCE and around 500 CE, Sanskrit texts called the *dharmasutras* and *dharmashastras* laid down rules for all society, so that each person could live according to his or her *dharma*. Many of their prescriptions and proscriptions concern marriage and food. There are lists of permitted and banned foods for the higher castes, including garlic, onions, mushrooms, the milk of cows who have calved, domesticated fowl and pigs, most fish, meat from a slaughter house, alcohol, and cows. Some foods were

proscribed for people at different stages of their lives. Students, for example, should avoid meat, honey, spices, onion, garlic, and sour foods that are supposed to be sexually stimulating. An old man is supposed to retire to the forest as a hermit and live on fruits, vegetables, roots, flowers, and wild grains.

The texts are, however, contradictory with respect to meat. Members of the higher castes were permitted to eat meat under certain circumstances: during certain rituals, for example, or when their life is in danger. The Manusmrti, one of the most influential and oft-quoted shastras, devotes an entire section to the pros and cons of eating meat. The discussion opens and closes with statements defending the ancient tradition of eating meat for sacrifices. But they bracket passages favoring vegetarianism and nonviolence and condemning meat consumption outside of the sacrifice, with the number of antimeat verses outnumbering pro-meat verses by 25 to 3. Manu ends firmly on the fence by declaring "There is nothing wrong in eating meat nor in drinking wine nor in sexual union, for this is how living beings engage in life, but abstention bears great fruit."

These contradictory attitudes reflect continued tensions in Indian society between the traditions of the Brahmans, whose power was based on the sacrifice, and popular support for vegetarianism. That it was becoming widespread is evident in the statement of the Chinese Buddhist Fa Hsien who visited northern and eastern India in the early fifth century CE. He wrote:

> Throughout the whole country the people do not kill any living creature, nor drink intoxicating liquor, nor eat onions or garlic. The only exception is that of the Chandalas [outcastes]. . . . In that country they do not keep pigs and fowls, and do not sell live cattle; in the markets there are no butchers' shops and no dealers in intoxicating drink . . . . . Only the Chandalas [outcastes], fishermen and hunters, and sell flesh meat. (Achaya, p. 147)

As the last sentence indicates, meat consumption had increasingly come to be associated with low status, although an exception was made for kings and chieftains, for whom hunting was a way of life.

The Devotional Movement

By the end of the sixth century CE, a new form of worship emerged, often called *bhakti*, which means devotion. It was based on a personal relationship between the worshipper and a loving deity. The sacrifice was replaced by puja, a ceremony in which the worshipper offers flowers, fruit, and grains to the image of a deity either at home or in a temple. The Bhakti movement was initially resisted by the Brahmin priests, but they eventually adopted the practices and presided over the ceremonies. By the eleventh or twelfth century, the movement had spread throughout South Asia. The two main deities were Shiva, the god of creation and destruction, and Vishnu, the god of preservation, and they remain so today.

Vishnu had many incarnations, including Rama, hero of the Ramayana, and Krishna. Worshippers of these deities are called Vaishnavs. Many Vaishnavs were and are vegetarians, and some even live in monasteries, where they follow a vegetarian diet. Worship of Krishna became very popular in the sixteenth century under Sri Chaitanya (1486–1534) and spread all over northern and eastern India. Born into a Brahmin family of Vedic scholars, Chaitanya rejected the strict hierarchy and cruel discrimination of the caste system and preached a message of equality and love. He drew an enormous following among the lower castes, who emulated his habits, including his vegetarianism.

A modern descendent is the International Society for Krishna Consciousness (ISKCON), known popularly as the Hare Krishna movement, founded in New York City in 1966, whose members follow a lactovegetarian diet, including many sweets made from milk and sugar. This is related to the origins of Krishna (also known as Govinda, the divine herdsman), who was raised by dairy farmers and as a child played with the gopis (milkmaids) and stole butter from the local farmers.

In the *Bhagavad Gita*, considered one of the central texts of Hinduism, Krishna describes three basic dharmas or natures: *sattvic*, which can be translated as lucidity, purity, or dispassion;

rajasic, translated as passion, distraction, or restlessness; and *tamasic*, dark inertia or dullness, which is manifested in sloth, lethargy, anger, and ignorance. He says:

> Foods that please lucid men
> Are savory, smooth, firm and rich
> They promote long life, lucidity
> Strength, health, pleasure and delight
>
> Passionate men crave foods
> That are bitter, sour, salty, hot
> Pungent, harsh and burning
> Causing pain, grief and sickness
>
> The food that pleases
> Men of dark inertia is stale,
> Unsavory, putrid, and spoiled,
> Leavings unfit for sacrifice.

The nature of these foods is described in other texts, especially those associated with hatha yoga, and yogis (practitioners of yoga) are still required to eat sattvic foods. They include rice, barley, wheat, fresh fruits and vegetables, especially green leafy vegetables, green lentils, milk, fresh yogurt, almonds, seeds, sugar candy, dry ginger, cucumber, and ghee. Rajasic foods include fermented foods that have not been freshly made, cheeses, some root vegetables, fish, eggs, salty, sour and hot items, coffee and tea, white sugar, and spices. Tamasic foods include leftovers that have been around more than a day, canned and preserved foods, fast foods, fried foods, and processed foods as well as meat, tobacco, alcohol, and drugs. These categories also had strong associations with caste: sattvic foods were supposed to be eaten by Brahmins, rajasic by kshatriyas, and tamasic by outcastes.

The Influence of Mahatma Gandhi

The great Indian political leader Mohandas Karamchand Gandhi (1869–1948), known as Mahatma ("great soul"), was a very strong advocate of vegetarianism. His extensive writings on food, morality, and ethnics reflect both traditional Indian food theories and practices and modern nutritional science. Gandhi's beliefs about food are inseparable from his philosophy which was based on *ahimsa*, or nonviolence, and *satyagraha*, a Sanskrit word that means "insistence on truth." Translated into political terms, it meant strength and determination in achieving one's political goals – in this case, Indian Independence – by nonviolent methods. Restraint of one's palate was one of the ways of strengthening ones character.

Gandhi was born into a Vaishnav Hindu family in Gujarat in an area with a strong Jain presence. His family was vegetarian and his pious mother often fasted. When Gandhi was a teenager, a friend persuaded him to try meat. At the time there was a popular belief that the British owed their strength and dominance to their consumption of meat and that if Indians followed suit, they could defeat the British and win independence. A popular Gujarati poem went,

> Behold the mighty Englishman
> He rules the Indian small,
> Because being a meat-eater
> He is five cubits tall.

In his autobiography, Gandhi described his first foray into meat eating:

> So the day came. It is difficult fully to describe my condition. There were on the one hand, the zeal for 'reform', and the novelty of making a momentous departure in life. There was, on the other, the shame of hiding like a thief to do this very thing. I cannot say which of the two swayed me more. We went in search of a lonely spot by the river, and there I saw, for the first time in my life–meat. There was baker's bread also. I relished neither. The goat's meat was as tough as leather. I simply could not eat it. I was sick and had to leave off eating.
>
> I had a very bad night afterwards. A horrible nightmare haunted me. Every time I dropped off to sleep it would seem as though a live goat were bleating inside me, and I would jump up full of remorse. But then I would remind myself that meat-eating was a duty, and so become more cheerful. (Gandhi, *An Autobiography* 1940, Part I, Sections 6 and 7)

Gandhi eventually overcame his reluctance (and apparently his compassion for goats) and began to enjoy eating meat. This went on for a year. But eventually he was overcome with guilt and concluded that lying to his parents was worse than not eating meat. He decided that as long as they were alive, meat eating was out of the question.

In 1888 Gandhi left for England to study law. Before leaving, his mother made him swear a vow administered by a Jain monk that he would never touch meat, alcohol, or women. Initially he subsisted on a diet of boiled vegetables and bread until he discovered a vegetarian restaurant in London. Here he bought a copy of the book *A Plea for Vegetarianism* by the British reformer Henry S. Salt (1851–1939), one of the first advocates of animals' rights. The book discussed the moral reasons for being a vegetarian, including the inherent violence in the eating of meat and the nonviolence that could be achieved from abstaining from it – ideas that Gandhi could identify with the Indian concept of *ahimsa*. This led to another conversion. Rather than abstaining from meat because of his vow to his mother, he did so now from moral conviction "The choice was now made in favor of vegetarianism, the spread of which henceforward became my mission," he wrote. Gandhi joined the London Vegetarian Society and became a member of the Executive Committee.

Gandhi argued that remaining a staunch vegetarian requires a moral justification and cannot be done only to improve ones health. "Man was not born a carnivorous animal but born to live on the fruits and herbs that the earth grows," he declared. However, those who became vegetarians purely for health reasons largely fall back. Some vegetarians make food a fetish and think that by becoming vegetarians they can eat as much lentils, beans, and cheese as they liked, although this did not necessarily make them healthy.

Gandhi was not a vegan and always regretted his inability to give up milk, a failing he called "the tragedy of my life." In his book *Key to Health*, a summary of his views on diet and health written in the early 1940s, he traces his milk drinking back to a serious case of dysentery in 1917. He had not drunk milk for 6 years, so when a doctor friend suggested he should consume milk to build up his strength, he initially resisted. However, the friend pointed out that at the time of taking the vow he had in mind only cow and buffalo milk, so that goat milk was permitted. Gandhi eventually yielded while conceding that he was keeping only the letter, not the spirit, of his vow. But drinking the goat milk immediately restored his health. As a result, he recognized the need to add milk to a vegetarian diet to provide protein, although with certain reservations (mainly because of the danger of drinking the milk of diseased cattle), He also accepted the consumption of unfertilized eggs which do not entail the destruction of life.

While Gandhi rigorously followed his own prescriptions, he was not dogmatic about imposing them on others. He notes that prolonged experimentation and observation convinced him that there is no fixed rule for all constitutions. And while vegetarianism, which he called "one of the priceless gifts of Hinduism," is highly desirable, it is not an end in itself. "Many a man eating meat and with everybody but living in the fear of God is nearer his freedom than a man religiously abstaining from meat and other things, but blaspheming God in every one of his acts," he wrote in his publication *Young India* (Gandhi, *Moral Basis of Vegetarianism* 1999).

Despite his affinity and close ties with the Jains, he did not hesitate to kill insects or have snakes killed if they invaded his ashram, nor did he find it necessary to avoid eggplants or potatoes, as the Jains did. If one does follow these practices, he held that it should not be in a spirit of self-righteousness. Ahimsa is not a matter of mere diet; it is the self-denial and self-restraint behind it that matters.

Gandhi's beliefs about food, while stimulated by his encounter with Western vegetarianism, were deeply rooted in ancient Indian traditions. But whether they had any lasting effect on Indian dietary habits is problematic. Seven months before his assassination in 1948, he declared, "Everybody is eager to garland my photos and statues, but nobody wants to follow my advice."

Although today India has the world's largest vegetarian population, vegetarians are far from a majority. A 2006 survey of nearly 15,000 people in 19 Indian states found that only 31 % of Indians eat no meat, another 9 % eat eggs, while 60 % eat meat on occasion (Yadav and Kaur 2006). A mere 21 % of households consist only of vegetarian members. The proportion of

vegetarians is somewhat higher among women than men (34 % vs. 28 %) and people over the age of 55 (37 % vs. 29 %). Growing affluence has led to a rise in consumption of animal products in India, as it has done in other parts of the world, and vegetarianism is still strongly correlated with caste: according to the survey, a majority of Brahmins – 55 % nationwide and higher proportions in southern and western India. Very few Indians are vegans.

Nonetheless, the ideal of vegetarianism as an ethical choice remains an ideal in Indian society, and India has given the world one of the great vegetarian cuisines.

Summary

Hinduism is the world's third largest religion, but unlike Islam or Christianity, it has no founder, credo, or scriptures recognized by all adherents. Still, certain attitudes and practices are shared by many Hindus, especially related to food. The concept of ahimsa, or noninjury to all forms of life, emerged in the sixth century BCE, and avoiding meat, especially beef, became a dietary ideal. Vegetarianism was also one of the cornerstones of the teaching of Mahatma Gandhi. Although today India has the world's largest populations of vegetarians, only about a third are strict vegetarians, with considerable variations by region and caste. This article surveys the historical ideas associated with Hinduism, especially attitudes towards animals and meat, the transformation of these ideas under the influence of Buddhism and Jainism, the teachings and influence of Mahatma Gandhi, and the status of vegetarianism in modern India.

The greatness of a nation and its moral progress can be measured by the way in which its animals are treated. Mohandas K. Gandhi.

Cross-References

- ▶ Agricultural Ethics
- ▶ Buddhism, Cooking, and Eating
- ▶ Fasting
- ▶ Jainism and Food
- ▶ Meat: Ethical Considerations
- ▶ Vegetarianism

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Home Gardening

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Synonyms

Cultivate; Grow; Plant; Propagate

Introduction

Home food gardening is a potential food provisioning strategy that involves utilizing the physical, social, and economic resources of

a household to produce food, particularly vegetables, fruits, berries, and herbs. While the division between farming and home food gardening can be blurred, in contrast to farming, home food gardens are in close proximity to the place of residence and involve smaller plots of land as well as a wider diversity of crops (FAO 2004).

Practically speaking, home food gardening has been practiced as a food provisioning strategy for thousands of years (FAO 2004). In the case of the United States (and its earlier status as a British colony), the practice and prevalence of home food gardening has evolved over time. During the early settlement of the United States, cultivating food was a widely adopted practice necessary for survival. However, innovation and then the gradual industrialization of farming and food production enabled a smaller number of farmers to meet the food needs of an increasingly urban nonfarming, non-gardening population (Schupp and Sharp 2012). In fact, home gardening for many increasingly became a hobby and a form of leisure rather than a survival strategy (Schupp and Sharp 2012). Thus, over the last two centuries, the decision to engage in home food gardening and the reasons for doing so have evolved and changed, often according to geographic location and socioeconomic status. For example, in the nineteenth century lower-income households and those living in newly settled lands continued to rely on home gardening as a survival strategy, while the existence of a home garden in more developed parts of the United States became a status symbol for growing exotic foods among the highest classes. As the urban population surpassed the rural population at the beginning of the twentieth century, the practice of home food gardening further declined as the working classes were able to effectively work for wage labor and purchase needed farm inputs from an increasingly productive farming system.

Two important deviations from the pattern of declining home gardening occurred during both World Wars as "war gardens" and "victory gardens" served as "symbolic expressions of patriotism" as well as important sources of food for the country that needed to dedicate substantial industrial resources to the war efforts (Schupp and Sharp 2012). It is interesting to note that during these time periods, the government played a key role in providing educational information to support the resurgence of gardening as gardening skills had diminished among the increasingly urban society of the United States.

At the start of the twenty-first century, there appears to be a resurgence in the practice of home gardening, in part as a result of increasing concerns with the safety and quality of a progressively more industrialized and globalized agriculture and food system, as well as growing economic hardship associated with the Great Recession (NGA 2009). The United States government, as well as nongovernmental organizations, are once again playing a key role in providing support to overcome lack of knowledge and cultural limitations related to home food gardening. Home food gardening is also being actively promoted as an international development strategy in order to improve nutrition and food access in developing nation-states. Important ethical issues, however, arise from social, economic, cultural, and other barriers that exist that limit the ability of home gardens to fully develop as an effective food provisioning strategy.

Prevalence of Home Food Gardening

Despite the decline of home gardening as a primary food provisioning strategy, there remains a substantial number of home gardeners in the United States. The National Gardening Association (NGA) has estimated that nearly 31 %, or approximately 36 million households, in the United States engaged in home food gardening in 2008, with even greater participation predicted in the future (NGA 2009). In a statewide survey of Ohioans, 47.6 % of households reported engaging in fruit and vegetable gardening in 2008 (Schupp and Sharp 2012). Research has found that contemporary home food gardeners are more likely to be women, be over the age of 45, have incomes greater than $50,000, be married, and not have children living at home (NGA 2009). In addition, living in the

countryside, on a farm, and in a freestanding house all increase the likelihood of a household engaging in home food gardening (Schupp and Sharp 2012). A household experiencing economic hardship also has been found to increase the likelihood of having a home garden (NGA 2009).

Although there is little research documenting the prevalence of home food gardening internationally, it is a practice that has been important in many international contexts. The ongoing pace of urbanization around the globe is likely to impact the character of home gardening in the international context now and in the future. While home food gardening has historically been a food security strategy utilized primarily in rural areas, gardening has become an increasingly significant activity in urban environments (Foeken 2006), particularly as rural populations with agricultural backgrounds move into cities. In urban contexts, home gardening can take a diversity of forms, including gardening in containers or on rooftops.

Benefits of Home Food Gardening

Home food gardening offers a number of potential economic and noneconomic benefits. These include a way for households to address economic hardship, a strategy for households and communities to improve the nutrition and well-being of residents, a tool for international development, a way for consumers to address environmental and social concerns with the agriculture and food system, and a strategy to increase community food security and sustainability. Moreover, home food gardening has long been used as a survival strategy. The recent rise in home food gardening has been linked in part to increasing economic hardship in the United States during the recession between 2007 and 2009 (NGA 2009). Households can enjoy fresh, local produce while saving money on food bills. Home food gardening not only is a potential strategy to provision food more frugally but also can be used as a source of income generation, particularly through the informal economy. For example, in Toronto, home gardens have become sources of produce for Community Supported Agriculture (CSA) projects, acting as a tool for economic development in the inner city (Patel and MacRae 2012).

Home food gardening is promoted by a number of governmental and nongovernmental organizations as a nutrition and community development strategy, particularly for nations with low levels of development and high levels of poverty and food insecurity. The food insecure can experience increased direct access to food by engaging in home gardening, which can act as an important supplement to field crops, providing a diversity of vitamin and energy rich vegetables and fruits (Marsh 1998; FAO 2004). Research suggests that even small mixed vegetable garden plots can provide a considerable amount of daily recommended nutrients. Home food gardening is viewed as a more sustainable strategy for improving food security compared to other forms of food aid or nutrition supplementation. Moreover, home food gardening can enable households to consume culturally appropriate food while reducing the necessity of relying upon food aid. In addition to providing nutrition, gardening can be an important source of income for poor households in less developed nations (Marsh 1998). Further, home food gardening can help alleviate seasonal food shortages and can provide environmental benefits by minimizing problems like dust and erosion, recycling water, and increasing local biodiversity (FAO 2004).

Gardening has the potential to increase food security at the individual or household level in more developed nations like the United States, as well as to increase food security and sustainability at the community level. Using high-yield, bio-intensive methods, home food gardens can produce a significant amount of food for urban communities (Colasanti and Hamm 2010). A potential form of civic agriculture, gardening can be a type of food production that encourages social and economic development, improving community well-being (Black 2010).

Other human health concerns with the agriculture and food system can be addressed through home gardening in more developed nations. Home gardening enables consumers to act

reflexively and practice control in the agriculture and food system by reducing chemical inputs, the use of genetically engineered (GE) crops, or food additives. Home food gardening can serve as a form of moderate physical exercise (Carter 2010). There are therapeutic advantages to engaging in home food gardening, and it can enable individuals to reclaim personal power and demonstrate agency and self-sufficiency (Carter 2010; Black 2010). Further, there are cultural benefits to home gardening (Black 2010). For example, home food gardening can enable immigrants with cultivation backgrounds to engage in practices they are skilled in and produce culturally appropriate foods (Rein and Ross 2009).

Because home gardening is small-scale, it is viewed by some as an environmentally friendly alternative to large-scale, globalized conventional agriculture and food production. Home gardening allows consumers to have greater control over production, processing, and distribution practices. By minimizing application of chemical inputs, home food gardeners can engage in practices that are potentially better for soil, air, and water quality. By planting a diverse assortment of crops, home food gardening can be an effective way to increase biodiversity conservation (Webb and Kabir 2009). For example, home food gardeners can utilize heirloom seed varieties, ensuring the maintenance of biodiversity in agricultural crops. Home food gardeners can help mitigate biological extinctions that may occur with climate change by consciously using native plants in their garden designs (Van der Veken et al. 2008). Reduction of the food miles involved in agricultural production can be accomplished through home food gardening, limiting the ecological footprint of food production. In fact, home gardens create the shortest possible distance between producers and consumers (Mariola 2008).

Limitations to Home Food Gardening

Potential barriers can limit the full achievement of the many positive aspects of home food gardening. For example, while home food gardening can improve ecological conditions in the agriculture and food system, people engaging in home food gardening do not necessarily employ more ecologically sound food production practices (Hinrichs 2003). Home gardening does not correct social problems with the agriculture and food system, particularly issues related to improved food access. Engaging in home gardening requires resources, including time, knowledge, space, and money, as well as motivation and interest. A lack of resources for or interest in home gardening can act as potential barriers to participation in this activity.

While not fully discounting the potential benefits of home gardening, there are demographic factors which could influence the ways in which households experience these barriers, including race and ethnicity, social economic status, as well as geography. For example, socioeconomic status (SES) can act as a barrier to local food system participation. Research suggests that people of lower SES are disproportionately underrepresented in alternative agriculture and food movement activities (Hinrichs 2003), such as gardening. One reason for this might be that low SES households do not have access to resources, especially monetary resources, which are necessary for the purchase of equipment and supplies needed to set up and maintain a garden. The time available for participation in home gardening might be affected by SES. Higher SES households are more likely to experience time constraints based on family or household responsibilities, which are considered more flexible, while lower SES households are more likely to experience time constraints based on work responsibilities, which are less flexible (Inglis et al. 2005). Thus, in relation to time, home gardening is more challenging for lower SES households. It has been asserted that the local foods movement promotes middle and upper-middle class values and promotes certain types of foods traditionally consumed by middle and upper middle class households (Guthman 2011). Marking lower SES households as outsiders can influence the degree of interest lower-income households have in home gardening and thus their motivation

to participate in this activity. Knowledge can be a further potential barrier, given that gardening requires specialized knowledge about subjects such as soil health, the timing of planting, pest management, and harvesting. Informal social networks as well as access to other resources, such as university extension information, can play a key role in providing lay knowledge about how to produce and prepare food (Fonte 2008). This knowledge is not accessible to all equally, with those of lower SES being more likely to report lack of knowledge as a barrier to engaging in home food gardening.

Race and ethnicity can act as a barrier to home food gardening. Inequalities based on race and ethnicity, which are historically embedded in local communities, can be reproduced in alternative agriculture activities, such as gardening, excluding non-white participants (Guthman 2011). Priorities about what and how to eat established by white participants of alternative agriculture and food movements do not necessarily match the preferences or priorities of non-white households (Guthman 2011). As home gardening comes to be defined as an activity for white people, minorities potentially have less interest in or motivation to participate. Race and ethnicity could interact with other barriers, including knowledge, time, space, and money, in so far as racial and ethnic inequalities intersect with social class inequalities. This limits the potential of home food gardening to act as a tool for increasing food security and food sovereignty.

Issues of space and place affect the decision to participate in home food gardening. People living in the countryside, on farms, or in freestanding houses are more likely to participate in home food gardening because they are more likely to have access to the vital resource of space (Schupp and Sharp 2012). Urban agriculture, a potential form of home gardening, is becoming an increasingly popular activity, with cultivation occurring in diverse spaces, including containers, abandoned properties, and public parks. Nevertheless, those living closer to urban centers likely have less space, especially if they reside in multi-dwelling housing units, condos, or apartments, making them more likely to have to confront the obvious challenge of where to garden. These physical factors can interact with race/ethnicity and socioeconomic status. For example, higher incomes enable people to live in a freestanding home, and to own that home, which allows them greater freedom to install and maintain a home garden. For some living in urban areas, the line between private and public property becomes blurred, and individuals will often squat on urban land in order to engage in home food gardening (Rein and Ross 2009). The growth of the community gardening movement is helping pave the way for legal changes in order to expand urban gardening (Hamilton 2011), increasingly allowing gardening on previously abandoned properties. However, as blighted urban properties improve through the efforts of local gardeners, these properties can become attractive for residential or commercial redevelopment (Rein and Ross 2009). Further, social networks have been found to be important in motivating and supporting the practice of gardening (Schupp and Sharp 2012). Therefore, not living in a community which engages in or supports home food gardening can act as a barrier to participation.

The potential benefits of home gardening may be offset by the increased physical and psychological burden of this work, which often falls to women. Internationally, women remain responsible for many aspects of providing food for the household, suggesting that women disproportionally have responsibility for home food gardening. Research suggests that women are more likely to garden for household food provisioning and are more likely to engage in ecologically beneficial production practices (Reyes-Garcia et al. 2010). Women remain predominantly responsible for preparing and serving food for the household. Therefore, the additional labor involved not only in growing food in home gardens but also processing that food for household consumption adds to women's labor. This additional work can add stress and hardship to women's lives.

There are limitations to home food gardening as a tool for international development. While often viewed as a panacea for food insecurity in

less developed countries, for households to engage in home food gardening, they must have access to land, water, seeds, and technical assistance. Thus, home food gardening as an international development strategy is not always as cost-effective as other nutrition intervention strategies. Moreover, development projects promoted by international nongovernmental and governmental organizations utilizing home food gardening are often poorly designed, are poorly managed and monitored, and lack sustainability (Marsh 1998). In addition, the use of gardening as a tool for development is limited by land grabbing. Increasing concern about global climate change is leading to the acquisition of land in developing countries which has previously been used for household food cultivation by the food insecure. Increasing urbanization in developing nations also limits the ability of gardening to act as a tool for increased food security.

Summary

Home food gardening is a longstanding, but evolving food provisioning strategy that provides opportunities for improving social, environmental, and human health outcomes of the food and agriculture system. Yet a number of challenges remain that limit the full achievement of these potential benefits. Sociodemographic factors such as social class, race/ethnicity, gender, and geography all influence the degree to which home food gardening can be a viable strategy for improved agriculture and food system health and well-being. Nevertheless, there are a number of development opportunities which can help mitigate the barriers to home gardening, enabling the potential benefits of home gardening to flourish. Governmental and nonprofit organizations are working to improve access to the resources necessary to engage in gardening. Growing Gardens in Portland, Oregon, Denver Urban Gardens in Denver, Colorado, and the USDA's The People's Garden are all examples of organizations which are building and installing gardens in communities, often for low income households. These organizations provide technical expertise, networking, gardening materials such as seeds and transplants, secure land, and are working to create policy change in order to make gardening a more accessible activity for all. Such activities provide the support necessary to make home gardening a successful strategy for improving social, environmental, and human health and well-being both domestically and globally.

Cross-References

- ▶ Biodiversity
- ▶ Civic Agriculture
- ▶ Food and Class
- ▶ Food Security
- ▶ Local and Regional Food Systems
- ▶ Public Institutional Foodservice
- ▶ Sustainability of Food Production and Consumption

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Homesteading

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Synonyms

Back to the land movement; Self-sufficiency; Simplicity; Sustainable living

Introduction

Homesteading originally refers to the Homesteading Act of 1862

> which provided public land grants of 160 acres to any adult citizen who paid a small registration fee and agreed to live on the land continuously for 5 years, after which they would be granted a deed to the land. The program formally ended in 1976 under the Federal Land Policy and Management Act. But its unofficial end was in 1935 when President Franklin Roosevelt withdrew the public domain lands in order to institute a nationwide land conservation program. During the life of the Homestead Act, 783,000 men and women 'proved up' their claim and were granted title to the land. (Hunt 2007)

In the 1970s the term "homesteading" became synonymous with self-sufficiency, and since then homesteading has come to be seen as a self-sufficient mode of life where individuals attempt to provide for themselves by growing, raising, and preserving their own food, making cleaning supplies, in some cases providing their own sources of energy, and living completely off the grid. This movement is heavily linked to the "back to the land movement" of the 1970s which was characterized by Thoreauvian simplicity, environmental awareness, and the rejection of consumerism. Modern homesteading embraces not just self-sufficiency but also sustainability.

Major Players in the Homesteading Movement

John Seymour published *The Self-Sufficient Life and How to Live it* in 1976. The book is a guide to gardening, animal husbandry, hunting wild, foraging, cooking and preserving, self-sufficient energy, and other skills like basketry, carpentry, woodworking, etc. Seymour was born in London in 1914 and was a writer, environmentalist, and activist until his death in 2004. Seymour promoted a simple and self-sufficient lifestyle and denounced consumerism, genetically modified organisms, and automobiles while advocating personal responsibility and self-sufficiency as well as care for the soil. Seymour himself wrote

of his treatise in 2003, "Since [writing] the first edition of this book back in 1975. . .there is a far more urgent reason for it. Very few people today can fail to see that the present course that man – and woman-kind is embarked upon is unsustainable". (Seymour 2003).

The Storey Publishing Company has offered similar volumes about aspects of homesteading, like raising chickens, beekeeping, rug making, log home building, gardening, knitting, candlemaking, composting, etc. They have been publishing these volumes since 1983, claiming that

> Storey is at the center of a vast revival of do-it-yourself lifestyles, a movement that has been fueled by an awareness of environmental responsibility, an appetite for the homegrown and locally raised, an appreciation for one-of-a-kind items, and a passion for nature. Whether picking up a needle and thread for the first time, or nurturing a decades-old passion for horses, readers know that they can turn to Storey for no-nonsense advice and new ideas – every time. (Storey Website 2012)

The company hires experts to write these guides and have the goal of "provid[ing] dependable, nuts-and-bolts advice to spirited readers seeking to become more self-sufficient" (Storey website 2012). The company was founded by John and Martha Storey, a couple from Charlotte, Vermont, who bought the Garden Way imprint in 1983 and first published Dick Raymond's classic volume *The Joy of Gardening*. Storey Publishing has "sold over 35 million volumes and has more than 400 active titles, 70 of which have sold more than 100,000 copies" (Storey Website 2012). Storey published *The Backyard Homestead* by Carleen Madigan in 2009. That particular volume shows that you can produce a wealth of your own food on one-quarter of an acre of land. That wealth of food includes 50 lb of wheat, 280 lb of pork, 120 cartons of eggs, 100 lb of honey, 25–75 lb of nuts, 600 lb of fruit, and more than 2,000 lb of vegetables (Madigan 2009).

Kelly Coyne and Erik Knutzen published *The Urban Homestead* in 2010. *The Urban Homestead* serves as a treatise for just that. Coyne and Knutzen illustrate that one can become more self-sufficient through rather simple means and still live in a metropolitan area. Coyne and Knutzen are a married couple living in Los Angeles. Their book shows ways to grow vegetables in small spaces, compost, forage in urban areas, raise animals on a city lot, provide your own power, and make and preserve many of your own foods and cleaning products. Coyne and Knutzen describe their project as a shift "from being consumers to being **producers**." They still "buy stuff. Olive oil. Parmigiano reggiano. Wine. Flour. Chocolate" and are "no strangers to consumer culture, not above experiencing a little shiver of desire when walking into an Apple computer store" (Coyne and Knutzen 2010).

Why Self-Sufficiency Has Become a Concern

Self-sufficiency has become a concern for many in the face of (1) dependence on foreign oil, (2) food-borne illnesses, (3) regaining lost skills like canning and preserving, and (4) environmental concerns.

Dependence on Foreign Oil: Modern society is heavily dependent on oil as a source of fuel. Cars run on oil. Homes are heated by oil. Oil is used to make a variety of products that are used on a daily basis. Many countries rely significantly on foreign sources of oil. There is also considerable uncertainty concerning how much oil is under the surface of the earth and how long that supply will last. If the supply suddenly runs out, the impact on the food system is undeniable. "After cars, the food system uses more fossil fuel than any other sector of the economy – 19 %. And while the experts disagree about the exact amount, the way [people feed themselves] contributes more greenhouse gases to the atmosphere than anything else [they] do – as much as 37 %, according to one study" (Pollan 2008). Additionally, Michael Pollan claims that dependence on foreign oil sources has made citizens in the United States more vulnerable, "For nations that lose the ability to substantially feed themselves will find themselves as gravely compromised in their international dealings as nations that depend on foreign sources of oil

presently do. But while there are alternatives to oil, there are no alternatives to food" (Pollan 2008).

Food-Borne Illnesses: Food-borne illnesses have been a growing problem with the centralizing of American food production. The Center for Disease Control's most recent statistics about food-borne illnesses are from 2011 and they "estimate that each year roughly 1 in 6 Americans (or 48 million people) gets sick, 128,000 are hospitalized, and 3,000 die of foodborne diseases" (CDC website 2012). The CDC currently divides food-borne illnesses into two categories: known food-borne pathogens (which includes 31 different pathogens that are known to cause illnesses) and unspecified agents (which includes chemicals, known agents that have not been proven to cause illness, agents that have not been identified, and other substances "whose ability to cause illness is unproven"). The top 5 pathogens that cause the most illnesses in the United States are norovirus, salmonella, *Clostridium perfringens*, *Campylobacter* spp., and *Staphylococcus aureus* (CDC website 2012).

Regaining Lost Skills: Many writers and food activists have commented about lost domestic skills. Since the time of the Industrial Revolution, households have relied upon men working away from the home, and as this increased, the household's demand for products made outside of the home increased (Hayes 2010). As the household shifted from being a unit of production to a unit of consumption, many of the traditional skills had by housewives have been lost. Skills like gardening, canning and preserving, cheese making, sewing, and even carpentry and repair work around the home have been outsourced to industrialization. As Shannon Hayes notes, "The industrial revolution brought changes to the family hearth as well" (Hayes 2010). Industrialization provided commodities like stoves and shoes, but in order to afford these things, men needed to work outside the home. And the more time outside the home led to men being freed of household tasks but also led to the need for a consumer economy in which the man of the family "needed to know. . .how to make salable product[s] or keep a job to pay cash for his family's necessities" (Hayes 2010). Factory work provided cash to buy commodities rather than make them. Some commodities (like electricity) eliminated the need for others (like candles), and others, like home-canned food, were exchanged for store-bought similar products. According to homesteading philosophy, the path to a simpler life, one freer from consumerism and dependency, includes regaining these lost skills.

Environmental Concerns: Many of these concerns are linked to a dependence on foreign oil, but there are also growing concerns about other environmental impacts of an industrialized and centralized food culture. Factory farms, or CAFOs (Concentrated Animal Feeding Operations), bear the brunt of much scrutiny over their environmental impact. As Michael Pollan claims, "if taking the animals off farms made a certain kind of economic sense, it made no ecological sense whatever: their waste, formerly regarded as a precious source of fertility on the farm, became a pollutant – factory farms are now one of America's biggest sources of pollution" (Pollan 2008). CAFOs create a lot of waste; animals kept in confinement create a lot of waste that creates a lot of pollution. Additionally, the inefficiency of raising animals fed on grain creates more waste.

The Ethics of Self-Sufficiency

Proponents of homesteading argue that they are able to save energy, minimize transportation costs (and therefore minimize oil use and reduce carbon emissions), provide healthy home-cooked foods for themselves and their families, and create a home atmosphere that is not based on consumerism (Seymour 2003). Dependence on foreign sources of energy is eliminated if one creates it oneself through the use of solar panels, wind turbines, etc. Activists like Seymour claim that these actions benefit the commons and thwart the effects of the tragedy of the commons. For instance, if people are able to reduce their own pollution through energy conservation and alternative methods, then they will promote the reduction of pollutants overall and promote clean air, water, and soil (Seymour 2003). Similarly, if they are able to reduce their transportation costs by

walking and cycling more, then the same purposes of promoting less pollution are served. Additionally, if citizens are not reliant on getting their food from other distant places, then they will reduce the amount of oil used to feed themselves and also the amount of pollution in the water, soil, and air. Having more control over what one eats by growing, raising, and producing it oneself, one is better able to have healthier foods but also, in many cases, tastier ones (Seymour 2003).

Critiques of Homesteading

Most concerns about homesteading stem from problems had by suburban and urban dwellers. There are certainly concerns about how feasible it is for a person or family to homestead in the suburbs or urban areas. Growing one's own food on a small patio space or in containers is quite limiting and will not produce enough for one, or one's family, to become self-sufficient. Additionally, many cities have ordinances forbidding homeowners from activities like beekeeping or raising chickens, which limits the amount of food one can produce for oneself.

Homeowners in the suburbs or urban areas may also face concerns from neighbors over the unsightliness of, for instance, having a wind turbine in one's backyard; utilizing a material like bubble wrap on one's windows during the winter, as some homesteaders do (Coyne and Knutzen 2010); or growing a vegetable garden in one's front lawn instead of having a usual, grass-covered front lawn. Neighbors may fear that their own homes will lose property value by being next door to or in the same vicinity as homesteaders. Coyne and Knutzen offer some troubleshooting on this matter, suggesting that if one wants to do away with one's front lawn, then the subsequent garden must be a "show piece" to avoid consternation from neighbors (Coyne and Knutzen 2010).

Although the feasibility of homesteading in the suburbs or urban areas is a concern, there are still many measures an individual or family can take. One can grow some herbs or produce in containers. Fruit trees also can be grown up against fences or walls (Coyne and Knutzen 2010; Seymour 2003). If all else fails, many suburbs and cities offer community gardens where participants can secure a plot of land to plant fruits and vegetables.

Summary

Homesteading is not for everyone. It is difficult and requires a lot of planning, time, and commitment, as well as land (in many cases). However, with concerns about the use of oil, food-borne illnesses, and dependency on others to create most of what is consumed, it is an alternative to consumerism and reliance upon others for one's food.

Cross-References

- ▶ Biodynamic Agriculture
- ▶ Climate Change, Ethics, and Food Production
- ▶ Farms: Small Versus Large
- ▶ Local and Regional Food Systems
- ▶ Sustainability of Food Production and Consumption
- ▶ Urban Agriculture

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Horticultural Therapy

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Synonyms

Garden therapy; Social horticulture; Therapeutic horticulture; Vocational horticulture

Introduction

Horticultural therapy is the practice of using horticultural activities for human healing and rehabilitation. Reference to the healing power of gardens and nature can be found as far back as ancient Greek times and through to recent times. In the United States, earliest articles published regarding the value of horticulture and gardening to human health are from the 1800s.

This entry will present the historical background of the profession of horticultural therapy in the United States, mention the key people in establishing the profession, define horticultural therapy, review the theoretical framework, and consider the future of the profession.

History

Treatment, rehabilitation, and/or residential care of individuals with disabilities during the 1800s up to around the 1950s often relied on agriculture as a major part of the facility. However, the farm was important for providing food to the facility and work on the farm was not intended as treatment but rather as a way for those individuals who could not pay to be at the facility to earn their room and board. It was the observation that those individuals who were required to work actually progressed toward return to the community faster that led to the recognition that staying occupied with responsibilities actually expedited rehabilitation. This in turn led to the development of occupational therapy and all subsequent allied activity therapies.

Dr. Benjamin Rush, a professor of the Institute of Medicine and Clinical Practice at the University of Pennsylvania and considered to be the father of American psychiatry, wrote in his book *Medical Inquiries and Observations Upon Diseases of the Mind* published in 1812 that "Man was made to be active. Even in paradise he was employed in the healthy and pleasant exercises of cultivating a garden" and that "agriculture by agitating the passions by alternate hope, fear, and enjoyment, and by rendering bodily exercise and labour necessary, is calculated to produce the greatest benefit" (Rush 1812). From its opening in 1813, patients at the Friends Asylum for the Insane in Philadelphia, Pennsylvania, worked in the vegetable gardens and fruit tree plantings. When Pontiac State Hospital in Michigan opened on 300 acres, it made extensive use of farming and dairy projects. However, production was the chief goal, and any therapy these patients received was a fortunate by-product. Dr. Thomas Kirkbride, superintendent of the Pennsylvania Hospital for the Insane and founder of the American Psychiatric Association, encouraged patients to work in the gardens or shops to aid recovery in his book *On the Construction, Organization, and General Arrangements of Hospitals for the Insane with Some Remarks on Insanity and Its Treatment* (Kirkbride 1854).

The earliest articles published in the United States indicate a broad view of benefits to be gained from gardening from helping mental patients to easing the stressful lives of the urban poor and as an aid in teaching mentally handicapped individuals. In *Darkness and Daylight or Lights and Shadows of New York Life* (Campbell et al. 1895), the impact of flowers on the poor, the infirm, and prisoners is described. In the *Journal of Psycho-Aesthenics*, E.R. Johnston (1899) writes: "In the garden every sense is alert. How the eye brightens at the masses of gorgeous color and the beautiful outlines – how many things, hot and cool, rough and smooth, hard and soft, and of different forms are to be grasped and held by trembling uncertain hands whose sense of touch is hardly yet awakened."

In the United States, the significant growth of occupational therapy (OT) programs in Veteran

Hospitals at the conclusion of World War II was really the impetus for the beginnings of the profession of horticultural therapy. Between 1920 and 1940, most books on OT mentioned gardening (Sullivan 1979). In 1936, the Association of Occupational Therapists in England formally acknowledged the use of horticulture as a specific treatment for physical and psychiatric disorders (McDonald 1995). Milwaukee Downer College, the first college to award a degree in occupational therapy, was also the first institution of higher learning to offer a course in horticulture within the occupational therapy curriculum, in 1942. After 1940, garden therapy was considered a separate treatment, and the first use of the term horticultural therapy was used by Ruth Mosher Place in 1948 (Olszowy 1978).

In 1952, the first weeklong workshop in horticultural therapy was offered at Michigan State University by Dr. Donald Watson and Alice Burlingame, a psychiatric social worker. This followed with the first master's degree program in horticultural therapy for occupational therapists. The first Master of Science degree in horticultural therapy was awarded by Michigan State University to Genevieve Jones, an occupational therapist, in 1955. The first book in horticultural therapy, *Therapy through Horticulture* by Burlingame and Watson, was published in 1960 (Burlingame and Watson 1960). Working under Dr. Karl Menninger from 1946 to 1953 at the Menninger Clinic, Topeka, Kansas, Rhea McCandliss became one of the first professional horticultural therapists.

The next significant steps occurred in the early 1970s with the establishment of university programs and creation of a professional association. In 1972, Kansas State University, with the cooperation of the Menninger Foundation in Topeka, Kansas, began an undergraduate curriculum in horticultural therapy (Odom 1973). Several other universities followed suit. The University of Maryland awarded a Master of Science in Horticulture for work by P.D. Relf in Horticultural Therapy in 1972 and PhD in 1976. In 1973, Clemson University offered a graduate degree in horticultural therapy (HT) and Michigan State University started its undergraduate horticultural therapy option in horticulture, which included 12 weeks of practical training at the Clinton Valley Center, formerly Pontiac State Hospital.

In 1973, the National Council for Therapy and Rehabilitation through Horticulture was formed to promote and enhance the profession as a therapeutic intervention and rehabilitative medium. It became the American Horticultural Therapy Association (AHTA) in 1987. Annual conferences began in 1973. Professional registration was established by the AHTA in 1975 based on a peer group review of qualifications. In 1985, the AHTA approved a core curriculum largely modeled after the Kansas State University curriculum. The Journal of Therapeutic Horticulture, the professional publication of AHTA, has been produced since 1986.

Volunteers have also had an important role in the development of horticultural therapy. Volunteers and members of the National Council of State Garden Clubs assisted occupational therapists in using plants and gardening activities in their therapy and rehabilitation programming, particularly following World War II. In 1951, the National Council of State Garden Clubs named horticultural therapy as one of the major objectives of member clubs, which it remains today (Simson and Straus 1998). Master Gardeners, another group of volunteers, are university-trained and serve as educators in their communities with primary emphasis on home gardeners. When the Master Gardener program began in the mid-1970s, its focus was primarily directed at diagnosing plant problems and offering solutions. While still a major focus, Master Gardeners now assist in a variety of educational programs including programs regarding the welfare of the youth, senior citizens, and persons with disabilities. Research on the role and impact Master Gardeners have in horticultural therapy began to be reported in the 1990s (e.g., see Flagler 1992; Kafami 1997; Marshall 1997).

Defining Horticultural Therapy

The definition of horticultural therapy lends itself to either brief discussion or endless debate,

depending on who is having the conversation. Definitions range from the simple (plants make people feel better) to the complicated (the use of plants by a trained professional as a medium through which certain clinically defined goals may be met). Given this broad spectrum, several other terms have been proposed in an effort to make distinctions along the spectrum, with limited success. For example, some agencies and associations use therapeutic horticulture to distinguish between programs with a predefined clinical goal (horticultural therapy) and those directed toward improving well-being in a more generalized way (therapeutic horticulture). Other examples are social horticulture and horticulture well-being. Unfortunately, these terms (and many more) are often used interchangeably so rather than aiding in defining the profession it has fostered confusion.

The following definitions are from primary sources for the profession of horticultural therapy today.

While there are a growing number of print publications on horticultural therapy, there are a limited number of university-level textbooks on the subject. The definition from *Horticulture as Therapy: Principles and Practice* (Simson and Straus 1998) is:

> Horticultural therapy is a process through which plants, gardening activities, and the innate closeness we all feel toward nature are used as vehicles in professionally conducted programs of therapy and rehabilitation.

The American Horticultural Therapy Association (AHTA) is the only national organization for the promotion and development of HT programming in the United States. The definition from AHTA is (www.ahta.org):

> Horticultural therapy is the engagement of a person in gardening-related activities, facilitated by a trained therapist, to achieve specific treatment goals.

Dr. Diane Relf, professor emeritus at Virginia Tech University, was one of the founding members of AHTA and spent her career defining and promoting the practice of HT through her research and work. Her definition is (Relf and Dorn 1995):

> There are four elements that are essential for an activity to qualify as horticultural therapy if it is to be considered a profession eligible for the same status as other caring professions.
>
> - A defined treatment procedure that focuses on horticultural or gardening activities
> - A client with a diagnosed problem who is in treatment for that problem
> - A treatment goal that can be measured and evaluated
> - A qualified professional to deliver the treatment

The Horticultural Therapy Institute is a private, nonprofit organization that provides educational programs in HT. Rebecca Haller is the director and along with Christine Kramer are editors of a book titled *Horticultural Therapy Methods – Making Connections in Health Care, Human Service, and Community Programs* (2006). Their definition of HT is:

> Horticultural therapy is a professionally conducted client-centered treatment modality that utilizes horticulture activities to meet specific therapeutic or rehabilitative goals of its participants. The focus is to maximize social, cognitive, physical and/or psychological function and/or to enhance general health and wellness.

Kansas State University is considered a leader in higher education in horticultural therapy. The following definition is from the K-State Study Guide *Horticultural Therapy* which is a promotional piece provided to perspective students:

> Horticultural therapy is a process directed by a horticultural therapist using flowers, fruits, vegetables, and ornamental plants to provide people with social, psychological, physical, and intellectual benefits.

The Chicago Botanic Garden is considered a leader in horticultural therapy program development and delivery as well as education. The definition from CBG is (www.chicagobotanicgarden.org):

> Horticultural therapy is the professionally directed use of plant, gardening, and nature activities for the purpose of restoring the physical and mental health of its participants.

A close study of these definitions demonstrates some agreement as well as differences among the leading individuals, associations, and institutions in horticultural therapy.

People-Plant Interaction

The philosophical basis of HT is that all humans have a basic need for contact with nature and that this contact will have a positive influence on them. The biophilia hypothesis, the functional-evolutionary theory, and the psycho-evolutionary theory are often cited to support this philosophy. E.O. Wilson's biophilia hypothesis (Kellert and Wilson 1993) states that humans have an innate relationship with the environment and our responses too and relationship with the environment are biological. Kaplan's functional-evolutionary theory (Kaplan and Kaplan 1989) and Roger Ulrich's psycho-evolutionary theory (1983) further explain the healing influence of environments on human beings. Both hypothesize that restorative environments are settings where recovery is associated with reduction of stress and that the benefits of contact with landscapes include a wide range of positive responses, such as preference, and/or reactions related to functioning and well-being. Both theories are based on Wilson's evolutionary perspective.

Considerable anecdotal reports and practical experience show the possible benefits of working with plants in many different settings. Research findings and case studies highlight the positive cognitive, social, psychological, and physical outcomes of nature and gardening. Reported benefits include social integration; increased self-confidence, self-esteem, and concentration; improved health; reduced stress and mental fatigue; and learning of practical skills, structure, and routine (for recent reviews, see Sempik et al. 2003; Gezondheidsraad 2004; Elings 2006). While the number of research publications continues to grow, most of the research to date is purely descriptive and contains little, if any, actual quantitative or qualitative data. Little is known about the mechanisms behind HT and evidence is weak due to the methodological limitations of many of the studies. Additionally, many of the studies report on benefits from exposure to nature with non-patient groups rather than active involvement in horticultural activities led by a professional therapist with patient groups. However, there is now sufficient evidence to the efficacy of people-plant interaction for prevention and treatment to justify a serious research effort.

Considerations for the Future

Many allied health therapies, such as recreational therapy, music therapy, and art therapy, emerged following WWII similar to the horticultural therapy profession. While these related allied therapies have been successful in becoming established health professions, horticultural therapy is still referred to as an emerging profession. A comparison of these professions suggests many possible reasons why horticultural therapy lags behind the other professions (Shoemaker 2002). Continued validation and growth of the horticultural therapy profession is critically needed through universal standards for clinical practice; defining and communicating entry level skills and educational attainment; research evidence that can inform the practice of horticultural therapy; and established collaborations between practitioners, academicians, and research scientists.

Summary

Awareness of the healing power of nature is closely linked to the development of human civilization and agriculture. The profession of horticultural therapy emerged following World War II and is supported by this historical awareness. This entry has provided a brief history of the profession, the theoretical framework and definitions for the practice, and the current limitations to the profession.

Cross-References

► Urban Agriculture

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Hospitality and Food

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Synonyms

Generosity; Entertainment; Liberality; Welcome

Introduction: The Archetypes

Humans need food and shelter. Humans also often find themselves in situations when they must depend on others for that shelter and food. They may be traveling or displaced by emergency, war, and natural disaster. As a result, hospitality, the provision of food and shelter to strangers, is a universal human theme. In the Western tradition, it features as central in two foundational narratives: the *Bible* and Homer's *Odyssey*. Practices and mores from Africa, Asia, pre-Columbian America, and Arab cultures all make of hospitality an honored and prescribed activity. When present, it signals a well-ordered, civilized, properly upright community. When absent, it signals offensive, vulgar behavior. As a focus of attention and prioritization, it tended to

be more central in the pre-Modern world. Cultural and intellectual changes altered its meaning and role during the Modern era (1500–1900). Still, it remained a constant point of reference and has occasioned renewed attention in the early twenty-first century.

The code of hospitality's lingering significance was made evident in an early film, Buster Keaton's 1923 comedy *Our Hospitality*. This movie was based on the Hatfield-McCoy feud. A young man, having lived in the city, travels back to reclaim his deceased father's country property. Along the way he falls in love. The young woman brings him home. At that point, her relatives realize that he belongs to the other clan. The family members are honor-bound to kill the enemy. However, as a guest in their home, they are also forbidden from harming him. Since all restraints disappear once he steps out the door, the entire setting presents a set of quandaries that enhance the comic possibilities. These possibilities make sense only because of a background understanding that goes back deep in time: the obligations associated with hospitality are absolute.

A contemporary Internet search of "hospitality" reveals something quite different. Far from being considered a virtue central to living a good life, the primary context has become an economic one. "Hospitality" now means, first and foremost, the "hospitality industry." Within this industry, the guest-host relationship is understood as a market exchange. In this way, the early twenty-first century is an exception. Although an economic dimension was always present, even if it involved simply the cost of feeding a guest, that facet tended, in the past, to be more peripheral than central. Archetypal stories from literature offer the major resource for this alternative, more traditional, take on hospitality.

Some stories from the *Bible* and Homer's *Odyssey* provide paradigmatic cases. Whereas the tale of Sodom and Gomorrah has, since the Middle Ages, been understood as an account of sexual license, the main evil is really failing the obligation of hospitality. Lot is the upstanding citizen who offers food and shelter to visitors (actually angels in disguise). The other townspeople deserve punishment because of their failure to properly welcome the strangers. For the *Odyssey*, an important background context involves the chief god Zeus. One of his most important titles is *Zeus Xenios*, Zeus, protector of strangers. Throughout the *Odyssey*, civilized, god-fearing people are easily identified by a key trait: they are hospitable. One model scene involves Menelaus and Helen entertaining Telemachus, the son of Odysseus. Before even asking his name, they welcome him to their home and provide food and shelter. At the other, uncivilized, extreme is Polyphemus, the Cyclops. Rather than greeting his guests by offering food, he first asks their names. Eventually, instead of providing food for them, he makes of them food for himself.

The great archetypal story of hospitality is the tale of Baucis and Philemon. It is found in the *Metamorphoses* by the Roman poet Ovid (43bce–18ce). Baucis and Philemon are wife and husband, poor and old. Into their community come two gods, Jupiter and Mercury. Following a common theme, they are disguised as poor beggars. The official word for this is "theoxeny," a god (theos) pretending to be a stranger (xenos). The villagers mostly slam their doors in the faces of the supplicants, another common theme. Not Baucis and Philemon. They open their door to the guests and hasten to make them feel comfortable, going so far as offering to slaughter their only goose for a meal. The gods, pleased, reward the elderly couple.

Lest anyone think that all hospitality literature is filtered through rose-colored glasses, there are plenty of alternative stories. In addition to the good host/hostess, another paradigm shows up regularly: the bad guest. Outsiders arriving on a doorstep are not always well intentioned. The seventeenth century French playwright Molière seemed especially sensitive to this. Like Keaton, he favored comedies, and like *Our Hospitality*, he built stories around guests. His guests, though, were no innocents. In *Amphitryon* he revives the two guests from Ovid's story. Only in this case Jupiter comes off as a fully human, randy abuser of his powers. Lusting after a lovely young bride, he develops a sure-fire plan of seduction.

Knowing her husband (the *Amphitryon* of the title) is off on military service, he disguises himself as the husband. The unwitting bride welcomes him with open arms.

With his more famous play, *Tartuffe*, Molière does something similar. In this case there are no disguised gods, just a hypocrite who is a good actor. Tartuffe is the kind of guest who does not at all appreciate the kindnesses visited on him. Instead he is scheming to dispossess his host in various ways: plotting to seduce both the host's wife and daughter and plotting also to take over the owner's home and belongings.

Hospitality and Ethics

Such stories suggest that when simple questions are asked about hospitality, the answers cannot be so simple. This is what makes hospitality both attractive and challenging when it comes to ethics. Traditionally, the ethical code associated with hospitality is both strong and rigid. The stranger must be welcomed. Food and shelter must be provided. In practice, there is always both flexibility and wariness. Bedouins, for example, extend the guest's welcome only through the time (three or so days) that the initial shared food would work its way through the body. The absolute claim of hospitality is tempered by practical considerations.

The Latin term *hostis* indicates another issue, the "Tartuffe" problem. The word *hostis* can mean both enemy and stranger. Will the stranger prove to be friend or foe? The answer is not always evident. Humans often seek an ethics that avoids personal responsibility and an ethics that will provide fixed rules or fixed procedures to follow. Responsibility, by contrast, involves assuming the liability for some individual, context-sensitive response. Hospitality can play an important role in dealing with ethics because, as the ambiguous term *hostis* indicates, an easy, fixed sizing up of a situation is often not the case. Hospitality as a paradigmatic ethical case involves *both* a mandate – welcome the stranger – *and* a caveat: be wary. In the hospitality context, it is hard to avoid some dimension of personal input and judgment when attempting a proper response to surrounding conditions. The case of hospitality is one within which there will always be risks associated with the combination of obligations and uncertainties.

Such complications are reinforced when examining the etymology associated with another Latin word. *Hospes*, like *hostis*, has a double meaning. It could be either "guest" or "host" depending on the context. To be a *hospes* signals first and foremost to be someone participating in a particular relationship. The use of a single, specifically ambiguous term, rather than two clearly separable ones, indicates how it is the relationship that takes priority. "Host" and "guest" are flexible because the roles within the general relationship can, in various circumstances, be inverted.

Hospitality epitomizes the ethical situation because it regularly involves unavoidable tensions. There is, first of all, the question of whether individuals will accept the traditional mandate of providing hospitality. If the answer is yes, the next issue is how to ensure that this is best put into practice. Then, even if the obligation is assumed, there is the "Bedouin question" regarding the degree and duration of hospitality. There is also the "Tartuffe" question of whether this particular stranger should serve as an exception to the general rule. As a result, hospitality exemplifies three important concerns relating to ethics. First, whatever action is undertaken can be followed by the question "is it good?" This is so even if the action in question obeyed to the letter some ethical dictate. Second, in the lives of complicated creatures like humans, a particular obligation never stands alone. The situation in which humans find themselves may be one in which various goods and virtues conflict. Virtues and duties are always plural. Finally, proper ethical comportment is a thread woven together by combining good sense, prior experience, guiding principles, duties, communal practices, well-developed habits, and practical judgments.

What emerges from such tensions is an important lesson at the intersection of hospitality and ethics. "Casuistry," now a discredited term, was once honorific. It identified the complicated

process appropriate for dealing with complicated situations. At least since the time of René Descartes (1596–1650), philosophers, resisting casuistry with its fuzziness, knotty distinctions, nitpicking details, and multifaceted sensitivity to situation, have sought instead clarity and distinctness. Clarity and distinctness, in turn, require a kind of policing, the kind that often prizes purity and the construction of rigid boundaries. In such a context, strangers should fit the neat category of either friend or foe. Such neat categorizations, though readily available in abstract thought, are less prevalent in concrete life situations. Wherever opposites can perhaps intersect, as with the dual meaning of *hospes*, and wherever evidence for removing uncertainty is imperfect, as with *hostis*, there will be responsibility, risk, and anxiety. Several strands in philosophy, especially strong during the Modern epoch, sought to allay responsibility and anxiety. The hospitality/ethics connection is important because it provides a paradigmatic case that can never be free of the responsibility/risk/anxiety axis.

In this way the hospitality/ethics intersection, when taken seriously, brings with it certain implications. Some revised version of "casuistry," difficult thinking about individual cases, has to be undertaken. In addition, two non-algorithmic themes made prominent by the ancient philosopher Aristotle (d. 322) also come to the fore: (a) living a good life involves finding the right middle ground and (b) in seeking such ground it is important to use as models, not fixed formulas, but rather experienced individuals, people with practical wisdom.

The stranger represents a question mark, an initial fuzziness. It is this kind of initial enigma which makes the ethics/responsibility/risk/anxiety chain impossible to avoid. There are always strangers, wanderers, the homeless, and the hungry. One possible response: follow the example of Baucis and Philemon's neighbors and turn the strangers away. If the visitors turn out to be Tartuffe, then such would be the better decision. Another possible response: follow the example of Baucis and Philemon by opening our doors and sharing our tables? If the stranger is, to draw on another paradigmatic story, Babette, from Isak Dinesen's *Babette's Feast*, then electing this option is the more commendable one. It is because hospitality represents a constant and open call for one risky response or another that it intersects necessarily with ethics.

Hospitality: Past and Present

In the pre-Modern world, hospitality was often understood in a wide sense that implicated various areas of human life. For the ancient Greek lawmaker Solon (638–558 bce), the notion of eating together was actually considered an important component of a healthy body politic. Solon prescribed common eating on a rotating basis for citizens. Those who sought constant access to the free meals were derided as moochers and gave rise to the pejorative sense associated with "the one who eats next to us," the "parasite." The opposite behavior, rejecting the state's hospitality, also deserved a reprimand. Those who refused to share in communal meals were accused of failing in public-spiritedness. Not only was accepting the hospitality of the community by eating in the central refectory a regular obligation, Solon's laws themselves were on display there.

The Athenian leader Pericles (495–429 bce) highlighted the importance of hospitality in his famous *funeral oration*. He proclaimed that a sign of Athens' greatness was its openness to strangers, even as he admitted the tension associated with such hospitality: "We throw open our city to the world, and never by alien acts exclude foreigners from any opportunity of learning or observing, although the eyes of an enemy may occasionally profit by our liberality. . . ."

During the Enlightenment, when intellectuals dreamed of a new era marked by continuing progress guided by the light of reason, the approaches to hospitality took a different turn. One of the most fascinating texts of the Enlightenment was the famous eighteenth-century *Encyclopédie*, which, as its name indicates, was an attempt to gather in a multivolume work all the most important knowledge that was available. The *Encyclopédie* continued the ancient tradition

of praising hospitality. As a product of its day, it did so with several important twists. The first was to move "hospitality" from a virtue to a duty. The second was to emphasize hospitality, not for itself, but as a vehicle for providing lessons of importance regarding other matters.

Both "virtue" and "duty" are important terms in the discourse of ethics. Both indicate an acknowledgement that comporting oneself in a particular manner is important. They differ in that a virtue has to be woven into one's character. It is a habitual mode of acting, one that plays itself out as a kind of second nature resulting from character development. In other words, the virtuous activity is not felt as an external imposition. A "duty," by contrast, need not be that which emerges comfortably from character. There is recognition of some activity which must be undertaken, but it need not come naturally or habitually. Indeed, there may be recognition of how important it is to do the right thing even if it goes against habituated inclinations. The *Encyclopédie*, true to its time, tended to identify hospitality with duty. Its entry on "duty" gave as examples "the duties of compassion, of liberality, of beneficence, of recognition, of hospitality. . . ."

When it came to object lessons making use of hospitality, the most important one had to do with a "golden age" attitude toward what was thought to be a more innocent past. For example, the entry "Canadians, Philosophy of" was really about the Hurons. The first impression of the "savages," the article noted, was "unfavorable." However, what eventually becomes evident is how "they are kind and affable, and toward foreigners and unfortunates, *they practice a charitable hospitality that puts all the nations of Europe to shame*" [emphasis added].

The last line indicates the second important change for the understanding of hospitality during the Enlightenment. Not only had it come to be considered a duty, but was to be used as a tool for propagating newer modes of thinking. In the specific case cited, hospitality was employed to mark a distinction between native peoples and Europeans. The former were envisioned as purer, less damaged, and closer to what was thought of as the "state of nature." The latter were represented as more corrupted, artificial, and inauthentic representatives of humanity.

One of the *Encyclopédie*'s main authors, Denis Diderot, also used hospitality in this way. His approach was fictional. It envisioned the contact between a European priest and natives of lands newly discovered by the Europeans. The French priest is made welcome by his Tahitian hosts. It is the content of the welcome that changes the usual pattern of hospitality. Whereas sharing shelter and food is typical, Diderot's Tahitian host has another sharing in mind. As part of the welcome, he offers to the priest, while parading them naked, his daughters. It is not right, the host claims, to spend a night alone. It is also not right that his youngest daughter has yet to become a mother. Such an imagined encounter was meant, as was often the eighteenth-century case, to expose how "unnatural" was priestly celibacy and by contrast how "natural" was the expression of sexuality, freed of artificial social constraints.

While seeming to provide testimony about hospitality, such a story indicates rather how it had now moved to a kind of backdrop for other, more pressing issues. The story can actually be read as working in ways that conflict with hospitality. There is, first of all, the desire to impose a particular way of living on the visitor. In Diderot's haste to criticize Europeans who have chosen artificiality in place of their authentic natural selves, he depicts a hospitality in which concern for the stranger falls by the wayside. The host might as well force forbidden food onto the guest. Second, the guest is being used as a way of achieving that to which the local family aspires: an infant for the youngest daughter. The guest, in other words, is being used as an instrument, a "means" as the Enlightenment philosopher Immanuel Kant would say, rather than an end.

Such a fanciful story-to-score-an-ideological-point helps focus on a fundamental issue – the need for discussions of hospitality to preserve a balance between two important dimensions: (i) actual empirical studies, as exemplified in ethological/sociological/historical research, and (ii) the general philosophical context within which the discussions take place. The latter

emerges most prominently in questions relating to the branch of philosophy called "philosophical anthropology," the attempt to arrive at a successful generic description of the human condition. The Spanish-born American philosopher, George Santayana (1863–1952), identified an important shift in human self-understanding, one which is central to determinations about what hospitality involves and how central it is. The mind of Modern, i.e., post-Renaissance, humans, as he put it, was "a sedentary city mind," not a "pilgrim mind."

Hospitality was central for Homer's characters because Odysseus was a wanderer. Bedouin hospitality is renowned because the Bedouin also are wanderers. Dante, definitely a pre-Modern, and living in a culture dominated by the humans-as-pilgrims theme, reserved the deepest circle of hell for those who were "traitors to their guests or host." Pre-Renaissance Europe in general worked within a framework which thought of humans as wanderers. Within such a context, it makes sense that hospitality would be considered of central importance. People on the move need food and shelter. By contrast, in cultures for which the central understanding of humans is as homedwellers, such an emphasis fades to the periphery. The framework of philosophical anthropology takes on special importance here. Hospitality will be given a central role when humans think of themselves as inherently wanderers, strangers, and pilgrims. It will move more to the periphery when humans understand themselves as fundamentally homedwellers.

Hospitality: Optional Virtue or Ethics Itself?

With regard to the ethics/hospitality relation, two extremes are represented by the philosophers Elisabeth Telfer (1936–) and Jacques Derrida (1930–2004). Telfer, reading the contemporary world realistically, reports that hospitality now falls under the heading of entertainment. It is a term most used in the context of entertaining friends. What comes to be central in such cases is reciprocity. Friends are involved in a series of mutual exchanges, exchanges which weave and strengthen preexisting links. As such, it continues to be considered a virtue, but an "optional" one. If two circles were drawn, one representing hospitality and the other ethics, there might or might not be an overlap. Life is made more pleasant by entertaining friends. This should not be confused, however, with living a good life in the highest sense. Other virtues are more central and not optional. Words have meanings which emerge at particular places and times. Attempting some artificial extension of what is today called "hospitality" would involve simply stipulating artificial meanings. Friendship and the entertainment that accompanies friendship do make life more pleasant and happy. What should be avoided is confusing this kind of entertainment with the more important considerations involved in what it really means to live a good life.

At the other end of the spectrum, Jacques Derrida is categorical: "Ethics is hospitality." Ethics, for him, is nothing less than an optimal mode of inhabiting the world. Such a habitation may, on the one hand, be characterized by the kind of border policing associated with wall-building and closing in on isolated communities. Or, it may involve a kind of openness and willingness to welcome the stranger who is genuinely other. This is the practice that most fully deserves the name "hospitality." Here, Derrida goes beyond ordinary usage and does indeed stipulate a wider sense which he wishes "hospitality" to accommodate. For him, "hospitality" marks a certain mode of being in the world. Food is central, as it is when hospitality is understood primarily as entertaining friends. In this case, however, the prototype case becomes feeding the hungry stranger.

Hospitality: Contemporary Issues

The Telfer-Derrida polarity helps identify questions for researchers today. This is because the traditional privileging of hospitality was imbedded in a web of assumptions and values that have come to be questioned. John Winthrop, the Puritan leader sailing across the Atlantic in 1630,

continued to be rooted in a pre-Modern, biblical context. Prior to landing, Winthrop delivered a sermon which referred specifically to the hospitality of Abraham and Lot as described in the Bible. Winthrop began his sermon by identifying the human condition as one of differences. Some people will be wealthy, others poor, some powerful, and others in positions of submission. There are reasons for these differences and among them are "that every man might have need of other, and from hence they might be all knit more nearly together in the Bond of brotherly affection. . . ." Winthrop's continuing embrace of pre-Modern themes, including hospitality, when contrasted with the actual Puritan practices of failing hospitality with regard to nonconformists, well illustrates one contemporary challenge. If the pre-Modern context was so congenial to hospitality, so also was it congenial to rigid class distinctions, divisive religious affiliations, anti-democratic sentiments, and a general "us versus them" attitude. One important area for intellectual reconstruction then becomes asking whether hospitality can be re-prioritized apart from the kinds of social, political, ethical commitments with which it was often associated. Derrida seems to think so. Telfer would rather preserve the modern values while allowing hospitality a more modest role. Modernity tended to marginalize hospitality while it emphasized rights, democratic aspirations, economic freedom, and social mobility. Secularization and tolerance began to replace rigid religious affiliations. Hierarchies were challenged and egalitarianism came to predominate. This has now become the new context – a context in which, as emphasized by Telfer, hospitality, redefined, has moved from central to optional.

In such a setting hospitality cannot but be dislocated. It certainly cannot take on the central role to which Derrida's claim of hospitality-as-ethics assigns it: identifying hospitality as the deepest and most important way in which humans relate to their surroundings. Those who might want to follow Derrida's focus on hospitality must ask how much of the return to pre-Modern ways is a necessary accompaniment of this focus. At minimum, certain questions need to be addressed. Some of the most prominent are the following:

Does ethics need an overarching good? Derrida's strong thesis seems to think so. Pre-Modern philosophy, in its Medieval version, at least, also answered "yes." The virtue in that case was love, *caritas*. Aristotle had made *eudaimonia*, human flourishing, play a similar role. Recently Charles Taylor has argued that any consistent mode of living requires what he calls "hypergoods," some general umbrella ideals which draw humans forward and justify the kinds of choices they make. Post-Modern thinkers tend, by contrast, to worry about those who would promote a single, ultimate good. They prefer to embrace an irreducible pluralism of goods, always somewhat in tension with each other. For them a claim like "hospitality is ethics," or parallel constructions like "justice is ethics," or "compassion is ethics" entails an oversimplification of a complicated situation.

Aligned with the first question is one about whether "hospitality" as an accepted good, whether "hypergood" or not, can be extended beyond human-to-human relationships. If hospitality is understood in the ordinary usage sense, as Telfer does, then the issue of dealing with nonhumans falls under a separate heading. If, on the other hand, Derrida's stronger thesis is taken seriously, the next step is to ask what hospitality can possibly mean when applied to the realm of animals, to that of plants, and to the inanimate components of the earth? In *The Odyssey*, hospitality is associated with the sharing of food. That means animals and plants have been either butchered or uprooted and transformed into edibles. Where is the place of hospitality here? Lest this issue of how hospitality is related to the nonhuman life seems artificial, Samuel Taylor Coleridge's *Rime of the Ancient Mariner* can serve as a corrective. The entire narrative is set forth because the mariner, violating the protocol of hospitality, killed the albatross.

There are also issues relating to the move away from Modernity and its central cluster of concepts: binary classifications, reductionism, social atomism, foundationalism, privileging of purity, and autonomy. Until a new cluster of

concepts can come to shape an alternative climate of opinion, it is not clear whether hospitality can/should take any prominent role. The major friend of hospitality, Derrida, tends to derive his inspiration from the philosopher Emmanuel Levinas (1906–1995) who, in turn, drew on decidedly pre-Modern biblical sources. If post-Modern ideas somehow allow for the reincorporation of older, pre-Modern notions, then perhaps the Derrida/Levinas initiative can take hold. Otherwise, the appropriate place of hospitality within a good life remains to be determined.

In general, once again, the question is whether hospitality can be revivified within a context which is so alien to the ones in which it has traditionally been celebrated. Can hospitality be prioritized within democratic republics and their emphasis on majority rule? What is its place in societies that have become more and more secular? Can hospitality have any meaning in today's world dominated by digital relationships rather than face-to-face ones? Should immigration law be influenced by hospitality? Does hospitality as a virtue impose obligations on guests as well as on hosts? Can hospitality provide fresh perspectives for biomedical issues like euthanasia and abortion?

Such a cluster of questions takes on special urgency in a world where globalization encourages the movement of not only capital but people, one in which refugees (from disease, famine, weather disasters, war, economic devastation, oppression) continue to be a permanent part of the landscape and one whose economic system rewards those willing to engage in multiple relocations.

Summary

Hospitality, food, and ethics are closely intertwined. Wherever there are wanderers, strangers, and refugees, there are people in need of food and people who can feed them. Whether the latter take it upon themselves to do so provides the basic ethical issue. Hospitality is a universal human theme. In the Western tradition, literature and religious texts have been the main mode of expressing its importance and nature. The meaning of hospitality has changed through time. Pre-Modern meanings differ from Modern (1500–1900) ones. Post-Modern attitudes remain as yet undefined. Two main ethical strands are present today: hospitality as an optional virtue (Elizabeth Telfer) and ethics as hospitality (Jacques Derrida).

Cross-References

- ▶ Authenticity in Food
- ▶ Christianity and Food
- ▶ *Derrida and Eating*
- ▶ Extraterritorial Obligations of States and the Right to Food
- ▶ Food Ethics and Policies
- ▶ Hinduism and Food
- ▶ Islam and Food
- ▶ Jainism and Food

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Human Ecology and Food

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Synonyms

Cancer on nature; Deep and shallow ecology; Ecology and ecologies; Ecology market; Food and cooperation; Human ecology; Human/environment relationships; Overpopulation

Introduction

The connection between human ecology and the great theme of food (and human nutrition) is immediately apparent: there is no other living being that changes the environment so radically for its own nutritional needs as the human being. It will perhaps be objected: every living creature tends to alter the ecosystem for their livelihood needs, and this is certainly true. The difference between the human beings and other species, however, is not so much a *quantitatively broader change* in nature (on a larger scale), but in a *qualitatively more profound transformation*: humans have the power to control and dominate the natural world with technology, as Francis Bacon argued (Merchant 2006, p. 518). It is precisely because of this human power that the need to rethink the relationship between humans and their environment arises, starting from the conceptual tool of human ecology – a very recent discipline that has as its theme the impact of the human species on the ecosystem.

The issue of food is such a special interest in human ecology because it intercepts major ecological issues (pollution, changing the landscape, the use of harmful substances, population overcrowding, the waste of natural resources, etc.) and can be a source of resolutions for the same being that causes such problems: the human being.

In this sense, the approach of human ecology is radically different from that of the more famous deep ecology, which "explains the ecological crisis as the outcome of the anthropocentric humanism that is central to the leading ideologies of modernity" (Zimmerman 1994, pp. 1–2) and states that "man could be described as a highly destructive parasite who threatens to destroy his host – the natural world – and eventually himself" (Bookchin 2004, p. 23); in this regard, human beings can easily be seen as a "cancer on the planet," because of their destructive power, as effectively expressed by Dave Foreman: "Our environmental problems originate in the hubris of imagining ourselves as the central nervous system or the brain of nature. We're not the brain, we are a cancer on nature" (Foreman 1990, p. 48).

At the same time, however, human ecology also distances itself from shallow ecology, which, by supporting the unconditional superiority of man over other living beings, interprets nature as a supply of more or less finite resources. In this regard, Warnick Fox writes:

> Shallow ecology views humans as separate from their environment. Figure/ground boundaries are sharply drawn such that humans are perceived as the significant figures against a ground that only assumes significance in so far as it enhances humans' images of themselves *qua* important figures. Shallow ecology thus views humans as the source of all value and ascribes only instrumental (or use) value to nonhuman world. (Fox 2003, p. 252)

Food is an appropriate issue by which to assess several ecological theories, including human ecology, because food highlights the tremendous environmental impact of human activities (agriculture, grazing, deforestation, etc.). However, before going any further in this direction, it is first necessary to solve preliminary definitional difficulties regarding the discipline of human ecology and situate human ecology in the broader context of the so-called change of perspective of ecology.

Human Ecology: Definitional Difficulties

The difficulties of defining the discipline of human ecology probably arise because of the imprecise epistemological status of ecology itself.

Ernst Haeckel devised the concept of ecology in 1866 to indicate the study of the relationships between organisms to each other and to their environment. After this concept was slowly affirmed by academics and disclosed to the public, ecology began to give rise to different "ecologies" in the beginning of the twentieth century, each of which investigated a smaller and more specific portion of reality (as opposed to being a global science). In this regard, nowadays it should be more correct to speak of "ecologies" in the plural and not just "ecology" in the singular: numerous specializations within ecological science have emerged with their own specific theoretical foundations. This phenomenon probably finds its own justification in the epistemological status of ecology in general: that discipline is defined as "interdisciplinary," as it has as its object of investigation the totality of the natural world, an object so rich and varied that it generates questions that can be answered only through the contribution of several disciplines. It is also possible to attribute the birth of such "ecologies" to several causes: the need to respond to different problems with specific methods in a particular area of reality, the influence of different schools of thought on solutions to the same problem, the diversity of the questions posed about this reality, etc. Therefore, there should be no surprise if ecology encompasses questions of biological, philosophical, sociological, physical, economic, or other natures.

"Ecology is the science of relationship between living organisms and their environment," and, more specifically, "Human ecology is the study of human interactions with the environment" (Terry Rambo 1983, p. 1). Because of the uniquely profound ways in which humans modify their environment, human ecology is central among the different ecologies. human ecology has attained considerable practical relevance in our time; for example, it has contributed extensively to defining the criteria for urban projects and economic planning. human ecology has availed itself of the historical, geographical, medical, economic, and social changes that have helped to achieve a complete and articulated frame for the various human needs that once we considered only at a partial level from a variety of disciplines such as economic geography, hygiene, and epidemiology. Gerald Marten says:

> In human ecology, the environment is perceived as an ecosystem. An ecosystem is everything in a specified area – the air, soil, water, living organisms and physical structures, including everything built by humans. [. . .] Although humans are part of the ecosystem, it is useful to think of human-environment interaction as interaction between the human social system and the rest of the ecosystem. [. . .] The social system is a central concept in human ecology because human activities that impact on ecosystems are strongly influenced by the society in which people live. Values and knowledge – which together form our worldview as individuals and as society – shape the way that we process and interpret information and translate it into action. Technology defines our repertoire of possible actions. (Marten 2003, pp. 1–2)

From one side, Marten – and with him most of the supporters of human ecology – tends to move away from a reductionist, scientist vision of the human/environment relationship. On the other side, however, he seems to retain a sociobiologistic perspective, which interprets mankind as a source of values and social experiences and, in this regard, which cannot exceed *the universal quantitative dimension* toward the affirmation of *the qualitative singularity* of every human individual – his uniqueness; the question

about the need to affirm the qualitative human singularity – which descends from human freedom – remains, so, open and unresolved (Bruckmeier 2013, pp. 229–234).

The possibility of avoiding Darwinian and sociobiologistic reductionism of human ecology is guaranteed only by a rethinking of human complexity through anthropological and philosophical instruments (Beltrão 1985) and, therefore, by a deeper reflection on the relationship between human beings and their environment and, furthermore, on the human being with himself.

The Change of Perspective of Ecology

The ecological revolution – or at least ecology understood as *Weltanschauung* or worldview – consisted of a radical change in thinking in which nature is interpreted as a dense texture or web of relationships:

> Where modernity brought us the mechanistic or clockwork view of the world, the current transformation is bringing us the web view of the world, that is, the world as a dynamic, comprehensively entwined, co-evolving world. [. . .] In society, for example, the change is witnessed by the ecology movement. (Goerner 2000, pp. 91–92)

This revolution was carried out primarily by supporters of the movement of deep ecology (Devall and Sessions 1984), who believe that humans should be given the same dignity as other living beings since humans share their ontological status with them. In this way, as Luc Ferry argued, the ecosystem, or *cosmos*, deserves a higher rank of dignity than human beings, because, in the great chain of being, it is the "necessary condition" of everything: nature can get along without human beings, but not the contrary (Ferry 1995). This change of ontology results in a change of vision of reality: it is necessary to adapt one's perspective to that of the whole ecosystem, since humans do not enjoy any privileged position within the ecosystem (i.e., anti-anthropocentrism). The transition from anthropocentrism to biocentrism thus marks a shift in values (and therefore a change of ethics): the salvation of the ecosystem and the wealth of relationships (the web) that constitute it have a priority over the needs of the human being. The conclusion that one reaches in this context is extremely simple and summarized as follows: (1) the first principle of every living thing that moves is self-preservation; (2) the ecosystem has an ontological dignity superior to each single part of which it is constituted; (3) each part (including the species *Homo sapiens*) may be sacrificed for the salvation (or the well-being) of the ecosystem.

A Further Change of Perspective

human ecology was born in the second half of the twentieth century in opposition to this holistic and anti-anthropocentric trend. It is constituted primarily as a knowledge aiming to return the human species to the center of the moral universe and hoping to reconstruct the correct relationship of humans with themselves and with other species. Humans are not only a cancer on the planet, therefore, but also the possible cure for this disease; human ecology gambles on human beings and their ability to build and develop new solutions and not just to destroy what comes into their hands.

Building on a realist conception of humanity, which sees humans as combining egoistic concerns while simultaneously being deeply social, responsible, and caring, human ecology believes that we must start from the reconstruction of the human personality. The human impact on the environment, in fact, is nothing but a reflection of the way of being of humans: a great cultural impoverishment has, indeed, led to the desertification of nature. In this sense, the direction of analysis proposed by human ecology is opposite to that suggested by traditional deep ecology: the individual (man) to the system (the ecosystem) and never vice versa.

The solutions proposed in human ecology put emphasis on the freedom of the individual as a basis to create a more sustainable world and eschew the idea of restricting individuals' freedom in the name of reducing their environmental impact:

> In our concern to preserve freedom we ignore the long and painful struggle by which it was achieved and flaunt the safeguards our society has thrown about the dignity of the individual. In our desire to

> give every individual an equal opportunity we have neglected to take advantage of the differences between individuals which should enrich our society. [. . .] We secure the best trainers we can for promising horses and dogs but allow our ablest students to idle through our school system. [. . .] We deplore the increase of juvenile delinquency while doing little to combat the idleness, lack of recreation, and the flood of evil printed material which probably contribute to it. (Sears 1954, p. 960)

If the human species is, in fact, the species which, more than any other, changes the environment that surrounds it, we should start precisely from this and attempt to heal humanity so that its relationship with other living species can become virtuous and non-harmful: human ecology therefore seeks firstly to work on individuals and on relationships among humans and then seeks to affect the relationship of humanity with the environment.

In light of this, the knowledge put forward by human ecology will be interdisciplinary and will aim to integrate their knowledge of "hard" scientific disciplines with those in the humanities to have a better overall understanding of the dynamics that affect human beings and that motivate them to act in certain ways. For this reason, "human ecology is concerned not only with the present but with the past. [. . .] And since the present and future of any community are expressions of its past, we may expect the study of archaeology and history to have a practical bearing on the critical question of man's future" (Sears 1954, p. 960). The combination of two different types of knowledge (that of the more scientific ecology and that of the humanities) will enable the discovery of the human dimension that is essential for more sustainably preserving our planet: "Who can better analyze and explain such conditions than the ecologist, trained as he should be to read the landscape? But he must be equipped to analyze the human community and understand the forces at work within it as well" (Sears 1954, p. 963).

Why (Human) Ecology Must Deal with Eating and Food

Eating is a highly cultural activity. At the same time, eating has a huge impact on the environment, both in terms of changes to the territory and in terms of atmospheric pollution. Furthermore, eating – including the production of food and the development of technical strategies to meet an increasingly sophisticated understanding of our nutritional needs – is an eminently human activity. In this sense, the theme of food is closely related to human ecology.

Of those outlined above, ecologists are most concerned with the impact on the environment arising from new human nutritional needs. Improvements in technology and science have made possible a better quality of life – think only of the phenomena of aging and overcrowding in populations, originating in the evolution in the biomedical field – but are also having a greater impact on the ecosystem of the human species; Sears, in the aftermath of the Second World War, wrote:

> We are an explosion. For the first time in earth history, a single species has become dominant, and we are it. The power and intensity of our pressure upon environment is without precedent. [. . .] This also means increasing demand for space in which to live and move and increasing demand for food and other necessities from the space that is left. Man thus becomes his own rival, or rather the victim of his own rival needs. (Sears 1954, p. 959)

The issue of overpopulation (and the consequences arising from this issue, such as climate change and an increase in resources consumption) is among the most discussed topics in the field of human ecology:

> Anthropogenic climate change, or climate change for short, is arguably one of the biggest problems that confront us today. There is wide agreement that climate change will affect the lives of all people around the world in areas such as food production, access to water, health, and the environment. Indeed, it has been estimated that millions could suffer hunger, water shortages, diseases, and coastal flooding as a result of global warming. (Liao et al. 2012, p. 206)

In terms of environmental impact, the issue of food production and associated territorial changes is of primary importance: the United Nations Food and Agriculture Organization found that almost 18 % of the world's greenhouse emissions come from livestock farming, and more recent estimates indicate that livestock

farming accounts for at least 51 % of the world's greenhouse emissions. And the world's greenhouse emissions are expected to increase very dramatically. It has also been estimated that almost 9 % of human CO_2 emissions are a result of deforestation for the development of pastures, 37 % of anthropogenic methane comes from livestock, and 65 % of anthropogenic nitrous oxide is caused by fertilizer. There are, besides, considerable negative impacts on water availability and biodiversity. In order to have remarkable environmental benefits, we probably need to reduce the consumption of red meat, since a large amount of these grazing animals are meant for consumption (Liao et al. 2012, p. 207).

Although the problem is clearly identified, solutions are still very controversial. They can be condensed into four main types: (1) behavioral solutions (educational and training activities in the field of alimentation with low environmental impact), (2) market solutions (legislative and policy interventions that encourage the purchase, transport, and production of certain types of goods), (3) geo-engineering solutions (large-scale manipulations of the environment), and (4) human engineering solutions (manipulations of people to make them less harmful to the ecosystem). About the latter, which might be described as "post-human," Liao argues: "While reducing the consumption of red meat can be achieved through social, cultural means, people often lack the motivation or willpower to give up eating red meat even if they wish they could. Human engineering could help here. Eating something that makes us feel nauseous can trigger long-lasting food aversion" (Liao et al. 2012, p. 208).

Regarding the market solutions, an "anthropocentric-utilitarian" option is given within the scope of the liberal economy: the so-called ecology market (Anderson and Leal 2001). The philosophical assumption that motivates these solutions is that humans have a natural tendency to be moved by self-interest. The resolutions proposed by "ecology market" are configured as pragmatic, which are not based on the enunciation of universal principles but on actual practices, starting with the rules of the market itself, that will make the market more sustainable. While the "ecology market" emphasizes positive stimuli related to prices, profits, entrepreneurship, and political environmentalism, it also proposes negative stimuli related to legislation and taxes. Far from seeking "zero impact," the "ecology market" aims to make "an impact with a positive sign"; to seek "win-win" solutions, advantageous to all economic, environmental, and social groups; and to do so starting from an authentically human dimension such as the need for private property.

A Model of Nutrition: Food Sharing and Cooperation

The speculations of human ecology on human nutrition (and on the environmental impact of human activities) often arrive at pragmatic solutions but often run aground when confronting ethical dilemmas that do not seem to allow optimal compromises: consider the well-known – but difficult to resolve – dilemma of "Feeding People Versus Saving Nature" (Rolston 2003).

One of the most reliable and efficient solutions to Rolston's dilemma offered by human ecology focuses on "Food sharing and cooperation" (Borgerhoff Mulder 2003). This approach focuses on the more general question: "Why do individuals give valuable resources away to others? To give or not to give is a special case of a more general dilemma: why do individuals engage in acts that incur personal costs and benefit others?" (Gurven 2004, p. 543).

The more general question is answered by appealing merely to cost/benefit calculations regarding the individual's own interests, without having to introduce metaphysical items:

> Individuals give for two reasons. One is to get a benefit back. The other is to avoid a cost. "Cooperation" theories stress mutual benefits. "Conflict" theories stress costs. Hunters may give up part of their hunt because they get favours back, or because the recipients are stronger than they are and the hunting isn't as good anywhere else. (Betzig 2004, p. 561)

There are four main types of "food sharing" (Gurven 2004): (1) kin selection-based nepotism (KS), (2) reciprocal altruism (RA), (3) tolerated scrounging or theft (TS), and (4) costly signaling (CS). All of these models, albeit for different reasons, highlight as the common denominator the need for human beings to share their experiences or to share their own needs, and first among these is the one of self-preservation. In effect, if the Darwinian struggle for survival and the pursuit of utility at any cost will almost certainly lead to a loss of nature (without solving the problem of feeding *all* the people), perhaps cooperation and altruism can offer an effective solution to Rolston's dilemma.

Human Ecology and Food: The Three Directions

The issue of food – even apart from belonging to the domain of sociology and behaviorist ecologies – is highly relevant for human ecology, the discipline that deals with the rediscovery of human nature.

The issue of food is central to human ecology because it intercepts in an exemplary manner the three directions of the human relationship: (1) the relationship that humans build with the environments in which they live (and thus, the impact of agriculture on the ecosystem, the consequences of their technological choices, the interventions that they decide to undertake, be they on a small or large scale, etc.); (2) the relationship that the individual human being interweaves with other human beings (i.e., the possibility of sharing needs, of devising shared solutions and appropriate policies, etc.); and (3) the relationship that every human individual builds in dialogue with himself or herself (the virtues that one can develop, the values that one discovers to be essential, the priority assigned to different goods, etc.).

It should be noted that denying the last dimension – i.e., the one that describes the relationship of each individual human being with himself or herself – means denying human ecology and, ultimately, supporting deep ecology or shallow ecology, according to which humans are not seen as the solution to the current ecological crisis, but the cancer or the master of the ecosystem.

Summary

The issue of food is a special interest in human ecology – a very recent discipline, with an imprecise epistemological status – because it intercepts humanity's relationship with the environment. Moreover, it brings to light many major ecological issues and finds a source of resolution for them in the same individuals that cause the problems: human beings. This approach is different from deep ecology, which sees human beings as a cancer on the planet: the solutions of human ecology depend on human beings and their ability to develop new answers, putting emphasis on the freedom of the individual as a basis for creating a more sustainable world. Eating is a cultural activity (and, in this regard, an eminently human activity) but with a huge impact on the environment: among other issues, overpopulation is widely discussed in human ecology. However, solutions are still very far away, although proposals can be grouped into four main types: behavioral solutions, market solutions, geo-engineering solutions, and solutions of human engineering. Among the most reliable and efficient solutions offered by human ecology is that of "food sharing and cooperation," which is a compromise between the two main aspects of human nature: the utilitarian and the social. The issue of food is so central to human ecology because it intercepts in an exemplary way the three directions of the human relationship: with the environment, with other human beings, and, finally, with oneself.

Cross-References

- ▶ Climate Change, Ethics, and Food Production
- ▶ Eating, Feeding and the Human Life Cycle
- ▶ Economy of Agriculture and Food
- ▶ Environmental Ethics
- ▶ Population Growth

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Human Rights and Food

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Synonyms

Basic rights and food; Food and economic and social rights; Right to food; Subsistence

Introduction

Access to food and water is a matter of intense individual concern. Healthy people who go without food and water for 48 h will find that intense feelings of hunger and thirst are motivating them to find and consume some food and water. Ensuring food access for everyone is also a long-standing matter of moral, social, and political concern. Inadequate access to food and safe water is still a human problem; roughly 800 million people currently do not get enough food to cover their energy requirements (FAO 2013). Today we talk about food access not just as a development goal (the first Millennium Development Goal is "Eradicate extreme poverty and hunger" (United Nations 2000)) but also as a human right – "the fundamental right of everyone to be free from hunger" (International Covenant on Economic, Social and Cultural Rights, United Nations 1966).

Human rights are an important resource for ethical reflection about food and agriculture. This entry first discusses the right to food as it is developed in the international human rights movement. It then turns to philosophical discussions of access to food in work by authors such as Peter Singer, Henry Shue, Amartya Sen, Martha Nussbaum, John Rawls, and Thomas Pogge. The third section relates the human right to food to issues about agriculture, population, and the environment.

Human Rights and the Right to Food

Human rights are legal and/or ethical norms that aspire to protect all people everywhere from severe political, legal, and social abuses. The main sources of the contemporary idea of human rights are found in the natural law and natural rights tradition of philosophical thought, the bill of rights tradition that begins with the Magna Carta, and the declarations and treaties created by international organizations such as the United Nations, the Council of Europe, the Organization of American States, and the African Union.

The contemporary human rights movement began in 1948 with the approval of the Universal Declaration of Human Rights (United Nations 1948). Subsequent human rights treaties include the European Convention on Human Rights (1950), the International Covenant on Civil and Political Rights (1966), and the International Covenant on Economic, Social and Cultural Rights (1966).

The Universal Declaration included "economic and social rights." Among these was Article 25.1, "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food. . .."

Human rights norms use the concept of an individual *right* to something. Rights are normative guarantees of access to some freedom, power, protection, or good. Examples of human rights include the right to freedom of religion, the right to a fair trial when charged with a crime, the right not to be tortured, the right to equality before the law, and the right to an education. A description of a right with associated duties should cover at least:

1. The *rightholder* (the party or parties who have the right)
2. The *object* of the right (what the right is *to*)
3. The *dutybearer* (the party or parties with duties or responsibilities under the right)
4. The *normative content* of the right (what the dutybearers are required to do to make available the object of the right and what the rightholder may do to activate and gain compliance with the right)

When we apply this framework to the right to food, we can say that, first, the rightholders are all people. Second, the object of the right to food is nutrition and hydration adequate for health and normal functioning. Third, the primary dutybearers are the governments of the 200+ countries into which our planet is divided. Individuals and international organizations may also have responsibilities under this right. Finally, the normative content of the right specifies when the right applies (when the rightholder cannot obtain adequate food and water through his or her own reasonable efforts), how the rightholder can activate and use the right, and the forms in which access to food and water must be provided by the dutybearer (cash payments, food cards, highly subsidized products, etc.).

Of the various economic and social rights, the right to food and the right to education are the most widely accepted. Famine and malnutrition are now widely recognized sources of moral, political, and legal obligation. Further, the right to food has canonical formulations (described below) in international treaties and national bills of rights and is seriously promoted by international agencies, international diplomacy and relief efforts, and NGOs.

When the rights in the Universal Declaration were made into treaty law in 1966 by two UN treaties, one of these, the International Covenant on Economic, Social and Cultural Rights, elaborated the right to food in Article 11:

> The States Parties to the present Covenant recognize the right of everyone to an adequate standard of living for himself [sic] and his family, including adequate food, clothing and housing. . ..

Under this right, countries have duties to (1) ensure that food is available to all their residents; (2) improve agriculture, food processing, and food supply chains; (3) teach people about nutrition; and (4) help create an international system that assists countries with food production and provides emergency assistance. Contemporary human rights documents put great emphasis on nondiscrimination in relation to all rights so

we could add the following: (5) ensure that access to food is not based on discriminatory grounds such as gender, race, religion, or caste.

The UN committee that supervises compliance with this treaty, the Committee on Economic, Social and Cultural Rights, also works to develop and clarify the content of each right by publishing interpretive comments. In 1999 the Committee issued "General Comment 12" on the right to food, which includes the following:

The content of the right: "The right to adequate food is realized when every man, woman and child, alone or in community with others, have physical and economic access at all times to adequate food or means for its procurement."

Food safety and cultural acceptability: Food should be available in "quantity and quality sufficient to satisfy the dietary needs of individuals, free from adverse substances, and acceptable within a given culture."

Duties under this right: "Every State is obliged to ensure for everyone under its jurisdiction access to the minimum essential food which is sufficient, nutritionally adequate and safe, to ensure their freedom from hunger."

Duties to regulate non-State actors: Violations of the right to food can occur through the direct action of States and also other entities such as individuals and corporations insufficiently regulated by States.

Comprehensiveness and sustainability: Efforts to satisfy this right should address "all aspects of the food system, including the production, processing, distribution, marketing and consumption of safe food…. Care should be taken to ensure the most sustainable management and use of natural and other resources for food at the national, regional, local and household levels.

Priority to the most vulnerable: "Even when a State faces severe resource constraints… measures should be undertaken to ensure that the right to adequate food is especially fulfilled for vulnerable population groups and individuals."

Ethical and Philosophical Work on the Right to Food

Work on the right to food by international lawyers and diplomats has been accompanied – and sometimes influenced – by the work of philosophical theorists.

Because access to adequate food and water is a condition of survival and well-being, and a subject of human rights, it has received considerable attention from contemporary moral philosophers. Peter Singer's 1972 essay, "Famine, Affluence, and Morality," provides a good starting point. It responded to a famine in Bengal and defended a duty of people in developed countries to provide effective assistance – even when the hungry people are in distant lands. Singer's approach was not based on human rights; it was rather based on a consequentialist principle that "if it is in our power to prevent something bad from happening, without thereby sacrificing anything of comparable importance, we ought morally to do it" (Singer 1972).

Henry Shue's 1979 book, *Basic Rights*, argued that subsistence (which included adequate food and water) was a basic right in the sense that no other rights could be enjoyed in its absence. Shue argued that "Deficiencies in the means of subsistence can be just as fatal, incapacitating, or painful as violations of physical security. The resulting damage or death can at least as decisively prevent the enjoyment of any right as can the effects of security violations" (Shue 1980, second edition 1996).

Amartya Sen has played a major role in influencing how people think about food and development. He urged shifting the focus away from "commodities" (the availability of goods and services) and toward people's "capabilities," what people are actually able to do and be (Sen 1985). Sen argued that adequate food cannot be understood in terms of a particular number of calories or a fixed quantity of some commodity such as rice; it should rather be understood in a way that is appropriate to one's capabilities, situation, and choices. Sen pioneered a capabilities-oriented approach to development

that he calls "development as freedom." In this view, freedom is conceived as having both negative and positive dimensions (Sen 1999). Sen's work on famines has also been important. He noted that famines often occur in locations without severe overall food shortages and argued that famines are generally best understood as problems of inadequate purchasing power – as matters, that is, of low capabilities (Sen 1981). Sen also argued that democratic institutions, and particularly freedom of the press, play a large role in preventing famines (Sen 1982). Both Sen and Martha Nussbaum have argued that unequal access to food is a major source of the problem of "missing women" (a significantly lower percentage of women than men in the population) in India and elsewhere (Nussbaum 2000).

In his much-discussed work, *The Law of Peoples*, John Rawls developed a view of international human rights that takes the right to life to include access to the means of subsistence (Rawls 1999, p. 65). Rawls also addressed the inability of "burdened societies" to provide for the basic needs of their citizens by endorsing a limited duty of international assistance (Rawls 1999, pp. 5, 115–126).

The most extensive recent philosophical treatment of food and human rights is found in Thomas Pogge's *World Hunger and Human Rights* (Pogge 2002). Pogge reminds us that nearly a billion people today live in severe poverty and that such poverty causes tens of thousands of deaths every day. He views these deaths as a major human rights violation that could be avoided if the contemporary international system were reformed.

Pogge emphasizes UDHR article 28 which says that "Everyone is entitled to a social and international order in which the rights and freedoms set forth in this Declaration can be fully realized." Pogge argues that the current international system plays a substantial role in creating and maintaining world hunger and that consequently wealthy countries – and their citizens – have not just a relatively weak duty of aid, but a stringent duty of justice to take decisive steps toward the eradication of global poverty. He holds that both countries and individuals have a duty not to be complicit in an international order that unfairly disadvantages poor countries and the people in them. Countries have such a duty, Pogge suggests, because they have violated the *negative duty* not to contribute to the imposition of a global institutional order that foreseeably and avoidably renders unfulfilled the most basic socioeconomic rights. Pogge goes to great lengths to refute the view that most of the causes of severe national poverty come from inside the countries that suffer it and argues for the urgent need for three feasible "reforms of the global institutional order that would each dramatically reduce existing poverty-related human misery." Pogge named the three main international causes of poverty "the three Ps": Protectionism, Privileges, and Pharmaceuticals (Pogge 2002: 263).

Agriculture and the Human Right to Food

For the right to food to be realized worldwide, agriculture has to do its part by producing food of sufficient quantity and quality for the large human populations that exist today. As we saw above, the ICESCR addresses issues of food production, storage, and affordability. Numerous ethical and policy issues come into play as we think about what people should eat, how land should be used, high-tech innovations in agriculture, the conditions of agricultural work, the environmental dimensions of food production, and international food assistance. Most of these issues have not been and probably never will be addressed by human rights documents. Interaction between people who work on human rights and people working on agricultural policy is uncommon but does occur within the World Bank and in the United Nation's Food and Agriculture Organization (FAO).

The human right to food cannot be sustainably realized without agricultural success. Current trends that threaten such success include:

1. World population is now around seven billion and is expected to increase by another billion or two in the coming decades (United Nations 2012). Much of this growth will occur in the least developed countries.
2. Climate change will be a challenge to agriculture in many ways, particularly since agriculture relies heavily on fossil fuels and contributes significantly to deforestation as savannas and forests are converted to fields and pastures.
3. Subsistence farming on small plots has become difficult or impossible in most countries. Successful agriculture is increasingly high tech and large scale.
4. Agricultural land, water, and workers are increasingly used for the production of nonfood products such as lumber and biofuels.

Summary

International human rights, and particularly the right "to be free from hunger," provide an important resource for ethical reflections about food and agriculture. Another important resource is writings about freedom from hunger by philosophers such as Singer, Shue, Sen, Nussbaum, Rawls, and Pogge.

Cross-References

- ▶ Access to Land and the Right to Food
- ▶ Biofuels: Ethical Aspects
- ▶ Climate Change, Ethics, and Food Production
- ▶ Environmental Ethics
- ▶ Environmental Justice and Food
- ▶ Farms: Small Versus Large
- ▶ Food Security
- ▶ Peter Singer and Food
- ▶ Poverty and Basic Needs

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Humane Slaughter Association

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The HSA is the only registered charity (registered in England, No. 209563) that works in the UK and internationally through educational, scientific, and technical advances exclusively to improve welfare standards for food animals during transport, marketing, slaughter, and killing for disease control and welfare reasons.

History of the HSA

The Council of Justice to Animals (CJA) was formed in London, UK, in 1911 to promote more humane methods both for the slaughter of food animals and for the destruction of cats and dogs and to improve the welfare of food animals in livestock markets and transport facilities.

The Council also maintained a number of dispensaries to provide veterinary services for the animals of the poor. In 1928 the CJA merged with the Humane Slaughter of Animals Association, and today the organization is generally known as the Humane Slaughter Association (HSA).

Major Areas of Work

Over a period of more than a century, the HSA has played a major role in the introduction of many of the improvements in food animal welfare during transport, in markets, and at slaughter that are now taken for granted.

Welfare at Slaughter

The HSA's first major project was aimed at replacing the poleax with a mechanically operated humane stunner. In the early 1920s, it carried out an 8-month demonstration of the effectiveness of the captive-bolt stunner at a slaughterhouse in Islington, London. During the demonstration, almost 64 % of the blows administered with the poleax failed to stun the animals successfully the first time. In contrast, when the captive-bolt stunner was used, only four out of 1,255 animals were not stunned effectively the first time, and this was due to faulty cartridges which failed to cause the bolt to leave the barrel of the stunner. Initially there were objections from the meat trade to the use of the captive-bolt stunner but these were successfully met. As a result of the HSA's efforts, a byelaw requiring the use of humane stunners was adopted by 28 London boroughs and later by 494 other UK local authorities Hughes (2011).

In the early 1930s, there was still no national legislation in the UK protecting the welfare of animals at slaughter. The HSA campaigned strongly for change and in 1933 the *Slaughter of Animals Act* was introduced. This required all cattle and calves in slaughterhouses to be stunned with a captive-bolt stunner before slaughter and pigs in slaughterhouses to be stunned with either a captive-bolt or an "electrolethaler" (electric stunner). However, in slaughterhouses without electricity, pigs could still be bled while fully conscious, and the method of killing sheep was left to the discretion of local authorities. Appeals by the HSA eventually brought these animals within the scope of the Act.

During the Second World War, thousands of pigs were reared for home consumption and many were being bled while fully conscious. To help relieve the situation, the HSA distributed almost 500 captive-bolt stunners to licensed slaughtermen all over the country. The *Slaughter of Animals (Pigs) Act 1954* finally made it compulsory to mechanically stun pigs slaughtered outside of a slaughterhouse for home consumption.

The HSA continued to work for improvements in the poor conditions in red meat slaughterhouses, many of which lacked basic sanitation and had inadequate accommodation and facilities for livestock. This finally resulted in *The Slaughterhouses Act 1958* and *The Slaughter of Animals* (*Prevention of Cruelty*) *Regulations* and *The Slaughterhouses* (*Hygiene*) *Regulations 1958*.

The HSA helped to develop the first handheld, low-voltage electrical stunner for poultry and later arranged for a Danish automatic stunner, dealing with 4,500 birds per hour, to be trialed in the UK. *The Slaughter of Poultry Act* was introduced in 1967, and during the debate in the House of Lords, special mention was made of the work of the HSA.

Religious Slaughter Without Prior Stunning

The HSA campaigned in support of a Private Member's Bill in 1956 to remove from the *Slaughter of Animals Act 1933* the exemptions from stunning for Jewish and Muslim methods of slaughter. However, the Bill was defeated by 178 votes to 132. A second Private Member's Bill was introduced in 1968, but despite a campaign by the HSA which cost over £25,000, this was defeated by 219 votes to 69. *The Slaughterhouses Act 1974* and later the *Welfare of Animals* (*Slaughter or Killing*) *Regulations 1995* and the *EC Regulation on the Protection of Animals at the Time of Killing 2009* have continued to allow religious slaughter without stunning. The Farm Animal Welfare Council (FAWC), the Government's independent

advisory body on animal welfare, investigated the welfare of animals slaughtered by religious methods on two occasions. It published reports in 1985 and 2003 in which it recommended that religious slaughter without prior stunning should be phased out. The HSA supported this recommendation, but the Government rejected it on both occasions.

While respecting religious beliefs, the HSA's position on the pre-slaughter stunning of animals has always been unequivocal – all animals should be effectively stunned prior to being bled to minimize the possibility of suffering.

Market Reforms

In the early years, the HSA visited many markets in the UK and found that animals suffered from exposure, lack of water, and rough handling in antiquated temporary street facilities. It was clear that purpose-built markets were needed and the Association worked with local authorities to ensure that provisions for adequate cover, lighting, ventilation, drainage, and nonslip floors were included in plans for new and renovated markets. Where necessary, the HSA gave financial support to provide calf shelters, loading bays, poultry pens, and water troughs. In 1992 a video "To Market to Market," together with a practical guide, was produced to aid those handling livestock, particularly in markets.

The Association continues to provide advice and assistance to livestock markets and in 1989 introduced a "Market Award" to support and encourage high standards of welfare. The HSA has also provided "Market Development Grants" to help fund welfare improvements to market facilities.

Animal Transport

The HSA worked for many years to have cattle arriving in Glasgow by ship from Ireland transported to the abattoir by rail rather than walked through the city, and, in 1941, this resulted in the necessary rail lines being laid. The HSA released its first transport training video in 1989; "The Road Ahead" video was updated in 2000 and translated into ten European languages. In January 2007, a new EU Regulation on the protection of animals during transport and related operations was introduced. The HSA subsequently produced Technical Notes on the new Regulation to assist those involved in the commercial transport of farm animals and horses, poultry, and farmed fish.

Overseas

As early as 1924, the Association exerted pressure in Greece and Italy for improvements in animal welfare. In 1950 a member of the HSA left £6,000 to help promote humane slaughter in Canada. A joint project for this purpose was set up between Miss Sidley (HSA) and Mr. Shelvoke of Accles and Shelvoke, the major UK firearms manufacturer. Slaughter demonstrations were arranged, and, as a result, the Canadian Parliament passed regulations enforcing the use of humane slaughter methods.

The HSA frequently provides educational materials, advice, and practical training to countries overseas (its educational materials and other publications are listed at www.hsa.org.uk/Publications). In many parts of the world, there remains an urgent need to improve the welfare of food animals, and the Association provides assistance, promoting humane slaughter methods, worldwide.

In 2005 the HSA was awarded a contract by the EU Commission to organize and run an international training workshop on welfare standards for the stunning and killing of animals in slaughterhouses or for disease control. A 3-day workshop was held in Bristol, UK, in 2006 and was attended by 85 delegates from 53 countries worldwide.

The HSA organized an international symposium on "Recent Advances in the Welfare of Livestock at Slaughter" in 2011, coinciding with the Association's centenary. The symposium, which was held in Portsmouth, UK, attracted delegates from 26 European, Asian, American, and Australasian countries Kirkwood et al. (2012).

Major Activities

The 1980s saw the HSA shift its emphasis increasingly toward education and training, and

this continues to be one of the main priorities of the Association. Educational materials for all those responsible for the welfare of animals in markets, during transport, and at slaughter or killing continue to be developed. Training videos on both the transport and slaughter of animals have been produced and distributed widely and translated into several languages, receiving awards from the International Visual Communications Association (IVCA) in 1995 and 2001. In 2005 the HSA was honored by the British Society of Animal Science and the Royal Society for the Prevention of Cruelty to Animals with an award for "Innovative Developments in Animal Welfare." In 2006 it was awarded the "Meat Industry Training Initiative of the Year" award for its training DVD "Poultry Welfare – Taking Responsibility."

In January 2013 a new EU Regulation on the protection of animals at the time of killing came into effect. The HSA was involved in the development of the new legislation, both at EU and UK levels. It has also provided advice and produced Technical Notes on the new Regulation to assist operators included within its scope.

Recent years have seen the need for advice on "exotic" farmed species, including water buffalo, bison, wild boar, camelids, and ostrich. The HSA has taken a leading role in both research and training in the handling and slaughter of these species in the UK. The Association has also been instrumental in the promotion of humane methods for the stunning and slaughter of farmed fish. It provided funding for research into the successful development of an electric stunner for farmed trout and continues to work with equipment manufacturers and farm managers to assess and improve equipment designed for the humane harvesting of both fresh- and seawater fish.

The Association publicizes its work and disseminates information at relevant events and through scientific and industry journals around the world. It provides funds for research and development into new or improved methods where these are needed, recent examples being the development of a captive-bolt gun for killing casualty poultry on-farm and improved handling systems for pigs at slaughter. In addition, the HSA organizes workshops and symposia to facilitate knowledge transfer between academia and industry.

The HSA provides information and advice to governments, the livestock and meat industries, and the general public. It is consulted for its knowledge, experience, and practical expertise and is pleased to help identify problems and to develop practical solutions which offer lasting improvements to food animal welfare.

The HSA is very grateful to the generosity of all its members and supporters over the years who have provided the funds to enable its vitally important work. Further information about the HSA is provided at www.hsa.org.uk.

Cross-References

► Animal Welfare: A Critical Examination of the Concept

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Hunting

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Synonyms

Animal and human predation; Animal liberation; Animal rights; Animal suffering; Ecosystemic values; Hunting; Identification with nature; Utilitarianism

Introduction

Hunting, or the pursuit with the intention to kill wild, nonhuman animals, is one of the oldest means of human subsistence – in fact many have theorized that the adoption of hunting by early hominids may have been an important catalyst in human evolution. It is also, particularly in the case of its more modern manifestations, one of the most controversial.

For its critics, hunting inflicts unnecessary suffering upon other nonhuman sentient animals and violates their rights for ends (i.e., human subsistence and nutrition) that could be achieved by far less violent and more benign means (i.e., plant agriculture). In fact many critics charge that hunting has no ethically redeeming qualities and is motivated solely by the thrill of the kill and a sadistic delight in inflicting pain and suffering upon living creatures, with one critic, Joseph Wood Krutch, going so far as to declare hunting is "the perfect type of that pure evil for which metaphysicians have sometimes sought" (Quoted in Cartmill 1993, p. 228).

Defenders of hunting, on the other hand, contest the assertion that hunting necessarily involves greater animal suffering than other forms of subsistence and suggest that, in fact, it may involve considerably less. Moreover, they argue that the application of rights-based ethics to the biological realm ends up distorting humans' relationship to wild nature and may constitute a condemnation of nature. Finally advocates of hunting suggest that hunting, far from being motivated by a hatred of wild nature and need to dominate it, can actually be motivated by a desire to reconnect with and affirm wild beings and natural processes.

Acknowledging that hunting is a multifaceted phenomenon involving a number of different practices, problematics, and controversies – far beyond the limited scope of an encyclopedia entry to tackle with in-depth – this essay will focus on, perhaps, the most obvious and apparent issues and questions involved in the hunting debate which center around the issues of animal welfare, animal rights, and finally the moral character of the hunter.

Hunting and the Question of Animal Suffering

Many arguments against hunting derive their theoretical inspiration from Peter Singer's utilitarian argument for the ethical obligation for humans to be vegetarians. According to utilitarianism, the ethical rightness or wrongness of a particular course of action or policy adopted is to be judged in terms of whether the consequences of such action or policy result in the production of the greatest amount of happiness or pleasure and the least amount of pain and suffering possible for all interested parties concerned, and, in animal rights/liberation circles, Singer's claim to fame rests upon extending this utilitarian logic to include the ethical status of nonhuman animals. For Singer argues that given the profound amount of animal pain and suffering involved in contemporary industrial meat practices, morally conscious human individuals have a duty to seek out food choices that involve less sentient animal suffering, such as a more plant-based diet. For while Singer does not deny that there are means of raising and slaughtering animals for meat that avoid the infliction of pain, such practices, he argues, are uncommon and thus the ethically prudent action is to avoid meat eating altogether and adopt a vegetarian diet whereby one is assured that the degree of animal suffering is minimized.

Though Singer himself rarely specifically mentions hunting, in the odd passage where he does, he appears to think a condemnation of hunting is implied by his wider utilitarian critique of the ethics of meat eating. In *Practical Ethics*, for instance, after discussing meat eating, he quickly dispenses with hunting in a mere sentence asking his reader to merely "apply the appropriate ethical principles" (Singer 1993, p. 68). In other words, he appears to see his utilitarian argument against the meat eating as being an unproblematic argument against hunting as well.

Nevertheless, several thinkers have argued for the ethical legitimacy of hunting precisely upon the basis of Singer's utilitarian logic. Gary Varner (1995), for instance, has defended therapeutic hunting (or hunting employed to maintain the aggregate welfare of an ecosystem and

targeted species populations) upon utilitarian grounds. Noting that in the absence of natural predators, prey populations will quickly expand past the carrying capacity of their environment, Varner argues that therapeutic hunting may be necessary to keep such species within the carrying capacity of their environment and thereby avoid the tremendous amount of animal suffering that would be incurred by starvation. Anti-hunting theorists, such as Kretz (2010) and Mallory (2001), however, have legitimately pointed out that the absence of natural predatory populations is in no small part due to the power of the hunter lobby. Nevertheless, Varner has argued that given the present circumstances, limited therapeutic hunting is necessary in order to maintain ecosystemic balance.

Similarly and perhaps more problematically to Singer, given his vegetarian commitments, Archer (Archer 2011) and Cahoone (2009) have cogently argued that industrial plant agriculture and consequently a vegetarian diet may involve significantly more animal suffering than either the industrial meat industry or hunting. For while Singer seems to assume that plant agriculture involves less animal or sentient suffering due to the fact that plants are non-sentient and therefore feel no pain, this ignores the considerable indirect suffering to animals caused by industrial plant agriculture. As Cahoone notes, plant agriculture indirectly affects the well-being of nonhuman wild animals in several ways: (1) it involves the portioning of an area of wild ecosystems for the exclusive use by humans, thereby directly affecting the sustainability of wild populations; (2) it frequently involves killing wild populations who opportunistically feed on agricultural land; (3) it harms wild populations through pesticides, fertilizers, and other support technologies; and (4) the groundbreaking and harvesting machinery involved in industrial plant agriculture kill and maim numerous ground-dwelling amphibians, birds, and small and immature mammals (Cahoone 2009, p. 79). Archer, for instance, has conservatively estimated that a vegetarian diet results in 25 times more animals killed per kilo of useable protein than other forms of subsistence such as free-range cattle and wild-harvested or hunted game (Archer 2011, p. 979).

Indeed, particularly in the case of the hunting of wild game, there appears to be no contest. For most contemporary hunting, Cahoone argues, involves sneaking up beyond the formidable sensory array of the game and delivering a kill-shot in which death is almost instant with little risk of suffering involved (Cahoone 2009, p. 73). Critics such as Evelyn Pluhar however point out that there is considerable risk with all hunting that the animal's death will not be instantaneous and can result in crippling and injury to the prey. She also notes hunting has resulted in considerable transformation of wild habitats through brush clearance and damning (Pluhar 1991, p. 121). Nonetheless, as Cahoone notes, crippling and maiming of sentient beings also occur during the process of plowing and harvesting involved in plant agriculture (though as yet no meaningful statistical correlation has been made between the two), and in terms of the transformations of wild environments, it would appear that there is no contest.

Of course, it is possible that other scholars could weight and calculate the pain and suffering caused by plant agriculture and hunting differently and come up with perhaps significantly different numbers than Cahoone or Archer. Nevertheless, Cahoone and Archer's objections not only challenge the assumption that a plant-based diet necessarily involves less suffering than other forms of food procurement but also points to a significant weakness of utilitarian types of ethical reasoning, in that how one calculates the balance of pleasure and pain is inherently tied to which empirical factors one sees as relevant and the quantifiable values one assigns them. Thus, utilitarian calculation can frequently be used to justify two completely contradictory positions depending upon the scope and multiplicity of empirical elements or factors one considers germane to one's case and how one assesses the particular degree of pain and pleasure derived from these factors. This shortcoming of Singer's utilitarian approach has led many critics of hunting to embrace Tom Regan's rights-based approach.

Hunting and the Question of Animal Rights

In *The Case for Animal Rights*, Regan has argued that certain nonhuman animals have intrinsic rights derived from the Kantian theory of inherent rights. Though he notes the Kantian theory of rights necessarily involves the issue of rational agency, Regan extends Kant's criteria to include all those who might be interested in the maintenance of their life (i.e., animals capable of conscious awareness). In Regan's view this means that animals possessing consciousness have the basic right never to be treated as merely a means for the ends of others. Regan sees this as entailing the right to life and the right to be treated with respect which includes the right not to be harmed. Regan, however, does not believe that this right is absolute and acknowledges that there are times when in respecting someone's right not to be harmed, another's right to be harmed must be overridden. Nevertheless, he is concerned to minimize such exceptions, arguing that in these situations one must employ the miniride principle (minimize overriding) and the worse off principle. In general he sees the ascription to animals of the right to be treated with respect as entailing the abolition of raising and using animals for meat, the end of animal experimentation, and the outlawing of trapping and hunting. Indeed, Regan sees his rights-based approach as closing certain loopholes which might be permitted under Singer's utilitarian approach. For in granting nonhuman animals' certain unalienable rights, Regan argues, he is able to provide uncompromising grounds by which to condemn all forms of animal abuse such as hunting.

Certainly, it is not entirely clear how his rights-based position is not as vulnerable to Archer and Cahoone's objection as Singer's is: after all given the enormous amount of animal death and suffering involved in plant agriculture, surely plant agriculture involves the same if not a greater degree of infringement upon the rights of animals as other forms of food procurement. Yet perhaps more philosophically significant, as many environmental philosophers have pointed out, Regan's rights-based approach seems to run completely counter to all biological and ecological reality and processes. As Ann Causey straightforwardly observes "There is no evidence that nature has assigned rights to any creatures and plenty of logical, biological and evolutionary evidence that she has not" (Causey 1989, p. 335): quite simply in the natural world not only is there no right to life but more importantly nature itself is structured according to the trophic cycle by which energy is recycled throughout the ecosystem via the consumption of organism by other organisms. To put it bluntly, life feeds on life.

This was the argument underlying the schism between animal rights theorists and environmental philosophers: with environmental theorists such as Callicott (1980) and Rolston (1984, 1988), who argued that animal rights theories were incompatible with the aims of ecological protection. The continued survival of wild ecosystems, they argue, is dependent not on the survival of the individual organism but the ecological systems of relations which sustain them. Thus, in the place of individualistic right-based theory, they proposed an ecological ethic in which the overall ecosystem and the ecological roles a species occupies in the ecosystem are more valuable than the individual members. Consequently according to this ethic, an act which may be harmful to an individual animal can be seen as valuable according to this ecological ethic if it benefits the ecosystem as a whole. This led certain environmental philosophers such as Rolston to argue for the moral legitimacy of hunting. For while acknowledging that in terms of human social morality, hunting would be considered immoral, this social morality, he argued, is inappropriate or the wrong ethics to apply in terms of our relationship with wild nonhuman animals. Rather because hunting is continuous with the ecological process of nonhuman predation and humans' original ecological niche, the appropriate ethical code to employ, he argues, is an ecological one that aims at the preservation of ecosystemic integrity. Similarly, Ned Hettinger has expanded on Rolston's argument in his seminal paper, "Bambi Lovers versus Tree Huggers," and asked whether animal rights theorists can condemn all forms of hunting and not by the

same token condemn the natural world in general and predators in particular (Hettinger 1994).

Generally, animal rights/liberation theorists have responded to this challenge by noting that it is dependent upon the naturalistic fallacy which attempts to derive ethical norms from natural ones and they point out that there are numerous examples of behavior among nonhuman animal species, such copophagia, brood parasitism, post-cotial mate cannibalism, etc., which are in stark contradiction to human morality (Mallory 2001; Luke 1997; Regan 2004; Evertt 2004). Similarly Singer, for instance, has famously written:

> It is odd how humans, who consider themselves so far above animals, will...use an argument that implies we ought to look to other animals for moral inspiration and guidance! The point is that other animals are not capable of considering other alternatives, or of reflecting morally on the rights or wrongs of killing for food; they just do it. We may regret the way the world is, but it makes no sense to hold nonhuman animals morally responsible or culpable for what they do. (Singer 2002, pp. 224–225)

Yet, leaving aside the question whether predators cannot be considered morally culpable these responses, quite frankly, seems to miss Hettinger and other environmentalists' point, which is not that environmental entities and processes conform to human ethics but rather that if one is to articulate an ethical value for natural entities and processes, one needs to understand and appreciate wild nature as it is in and of itself, not impose human norms upon a realm whose processes appear to be antithetical to these norms in general. Quite simply, as Hettinger and Rolston point out, much of the animal liberationist/welfare discourse appears to establish the foundation of our ethical responsibility to nonhuman nature on grounds clearly antithetical to it. Furthermore, with Luke and Pluhar's condemnation of hunting as an atavistic return to nature that "would enact bashing other human beings over the skull" (Pluhar 1991, p. 124), it appears that their difficulty with hunting is not that it removes us from nature but rather that it brings us far too closely in contact with it – for the hunter is a human who kills other animals like an animal and therefore is little better than an animal. This touches upon deep ethical issues at play not only in vegetarian condemnations of hunting but also its wider condemnation in the general population as well. For opinion poll surveys suggest that while most have little problem with hunting per se – particularly if it is done for the purposes of subsistence or ecological control – they do have a problem with the hunter, particularly the sport hunter, and specifically his or her motives, in that it is felt that the sport hunter must be informed by the most bestial (animal-like) of motives.

Hunting and the Question of Human Brutality

Eric Zencey recounts a telling anecdote whereby the vice-president of a local college informed him that it was immoral for a person to go hunting if they could buy meat (Zencey 1987, p. 60). For as Matt Cartmill has written, "Even the most enthusiastic lover of fried chicken may suspect that there is something wrong with a man who finds recreation in wringing the necks of chickens" (Cartmill 1993, p. 241). Indeed as Cartmill further goes on to write "For most of us, ceremonial going into the woods once a year with a rifle sounds about as attractive as marching into a dairy barn once a year to bash cows with a sledgehammer" (Cartmill 1993, p. 228) and just about as easy. Given then that sport hunting appears to be such an easy and straightforward affair in which success is almost guaranteed, there seems little reason to undertake it, aside from the desire to dominate, inflict pain, and kill another living creature. Little wonder then that the practice of sport hunting is popularly equated with everything from serial killing to violent rape or that anti-hunting theorists have attempted to tie hunting with every historically pernicious social practice from hierarchy to patriarchy, for it seems an easy and straightforward case of the need of the strong to assert control and dominance over the weak.

Many ecofeminists such as Marti Kheel, for instance, have argued that hunting manifests an objectivizing gaze which sees nonhuman animals

as simply objects for human use and compared this to other forms of human domination (Kheel 1995). Similarly Roger J. H. King has argued that hunting is motivated by little more than necrophilia or the love of death for death's sake and has suggested that this love of death underscores both hierarchy and patriarchy (King 1991). Mary Zeiss Stange in her book *Woman the Hunter*, however, has contested this cultural and historical link between hunting, misogyny, and hierarchy, pointing out that many hunter-gatherer societies depend on hunting as a primary means of subsistence and are some of the least hierarchical and patriarchal societies on record. Moreover, as Rod Preece has observed in his history of vegetarianism, *Sins of the Flesh*, many societies founded upon the principle of vegetarianism such as Vedic India were as extremely hierarchical and misogynistic (Preece 2008).

Furthermore, Garry Marvin has contested that hunting implicitly manifests human domination and control over the natural world by arguing that hunting differs from other forms of animal killing, precisely in terms of the absence of human control. Marvin notes that most hunting involves the killing of wild animals (which have not been genetically tamed or otherwise put under our control) and which also must be able to escape or defeat the intentions of the hunter (Marvin 2006). In fact, far from reenforcing a sense of human superiority, he points out hunting can impart in the mind of hunter a much-needed sense of human inferiority. For in many respects wild animals have physical and sensory endowments which put humans to shame; for not only are they faster and stronger but they also have a sensory acuity, particularly in terms of their sense of hearing and smell far beyond those of humans. Add to this a formidable behavioral repertoire of stealth and evasion and it is little wonder that, as Zencey points out, fewer than 10 % of all hunts are successful (Zencey 1987, p. 60). Indeed, despite the common tendency, particularly among critics of hunting, to focus on the act of killing to the exclusion of all else, the actual moment of the kill represents the tiniest fraction of the time spent hunting – if it occurs at all. The vast majority of the hunt, as Cahoone notes, is spent in continual searching for signs of the prey, and, "Often this searching is hunting, is the entire experience, because most hunts are unsuccessful" (Cahoone 2009, p. 74).

This searching itself requires considerable knowledge of bush craft, the surrounding environment, and the habits, behaviors, and spoor of the prey (Cahoone 2009; Kerasote 1993; Shepard 1973; Zencey 1987). This could explain why, in demographic surveys, hunters routinely rank above other sections of the population in terms of their general knowledge of wilderness and wild species (Kellert 1978). In fact, it is the opportunity to spend time and get close to nature, rather than the need to give vent to some frenzied bloodlust, which hunters routinely invoke when asked why they hunt (Kellert 1978). Moreover, as José Ortega y Gasset notes in his phenomenological account of hunting, hunting requires an unrivaled focused attention and alertness toward one's environment and he argues that this is a fundamental aspect of its appeal (Ortega 1972).

Yet hunting stimulates in the hunter not only a hyperawareness of their surroundings but also an intense sense of intimacy between the hunter and the prey. For, as Ortega and others point out, the very activity of tracking and stalking the prey demands not that the hunter objectify the prey but requires precisely the opposite: the hunter must assume that the prey has thoughts, intentions, and is in some sense conscious (Ortega 1972; Kerasote 1993; Parker 2010; Shepard 1973; Stange 1997). Throughout the hunt, the hunter needs to continually get inside the mind of the animal, to see the world and the current situation from its perspective. Did the prey hear the rustle of grass as the hunter crept forward? Does the change in direction and speed of its tracks or the tilt of its head indicate that it has caught the hunter's scent? Thus, the hunter must constantly imagine the *subjective* state of his or her quarry, attempting to quite literally perceive the situation through its senses.

This, then, to many anti-hunting theorists is the aspect of hunting that is perhaps the most incomprehensible: how can one identify so intimately and viscerally with the mind of another animal and then take its life? Kheel, for instance, has suggested that "In order to understand how an

act of identification can coexist with the desire to kill a being with whom one identifies, it is important to understand the ambivalent nature of the hunt. . .The hunter is both driven by conflicting desires to both identify with an animal and to deny that he is an animal himself" (Kheel 1990, p. 133). Yet, many commentators have argued that one of the virtues of hunting is precisely that it confronts us with the facticity of our animality and the fact that we like all other animals are mortal and will die. Indeed they argue that vegetarianism itself is motivated by an aversion toward this acknowledgment that we are carnal, finite beings and hence mortal (Cerulli 2010; Nelson 1997; Kover 2010; Shepard 1973).

Summary

The hunting debate is in large part structured around questions of animal suffering, animal rights, the nature of nature, and ultimately the nature of our humanity. For one side, hunting is a brutal activity which imposes unnecessary suffering and contravenes the innate rights of nonhuman animals to life solely out of the human desire to inflict pain and domination upon the nonhuman world. For the other side, hunting arises out of the need to viscerally connect wild nature and wild processes. Yet whatever side of the debate one falls into, what cannot be debated is that the hunting debate ultimately involves competing visions of nature and what this implies in terms of our nature.

Cross-References

- Animal Welfare: A Critical Examination of the Concept
- Carnism
- Environmental Ethics
- Food and Place
- Industrial Food Animal Production Ethics
- Industrialized Slaughter and Animal welfare
- Meat: Ethical Considerations
- Peter Singer and Food
- Vegetarianism

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Hybridity in Agriculture

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Synonyms

Agrarian; Agribusiness; Agrichemical; Agroindustry; Agronomics; Agronomy; Biotech farming; Breed; Breeding; Cross; Cross-pollination; Engineered crops; Farming; GM; Horticulture; Hybrid; Industrial farming; Nonorganic; Plant; Seed crops

Introduction

In a very general sense, *hybrid* can be understood to be any organism that is the product of two (or more) organisms where each parent belongs to a different kind. For example, the offspring from two or more parent organisms, each belonging to a separate species (or genera), is called a "hybrid." "Hybridity" refers to the phenomenal character of being a hybrid. And "hybridization" refers to both natural and artificial processes of generating hybrids. These processes include mechanisms of selective crossbreeding and cross-fertilization of parents of different species for the purpose of producing hybrid offspring. In addition to these processes, "hybridization" also refers to natural and artificial processes of whole genome duplication that result in the doubling or trebling of the sets of chromosomes of the organism.

This entry provides an overview of the impact of hybridity on agriculture. It begins with an historical sketch that traces the early horticulturalists' and naturalists' investigations of hybrids. This starts with the observations of Thomas Fairchild and Georges-Louis Leclerc, Comte de Buffon, and leads to the explanation of its mechanism by Gregor Mendel, James Watson and Francis Crick, and Ernst Mayr and the eventual manipulation of hybrids and hybridization by Barbara McClintock.

Following this, the reader is introduced to a number of key terms and concepts in use within current research as well as highlighting diverse ethical concerns that center on hybridization. Recent research that attempts to ascertain the role of hybridization in adaptive change will be introduced. This will include research on the evolution of crop species, increased biodiversity, and the use of hybrids to manipulate phenotypically desirable traits in agricultural crops. The focus of the discussion is on a particularly significant type of naturally occurring hybridization, polyploidy hybridization. Polyploids are organisms which have more than two complete genomes in each cell. This kind of hybridization is ubiquitous among crop plants. The role of polyploidy in plant evolution and the affects of polyploidy on

plants and animals will be reviewed. A critical discussion of its agricultural value in the production of fertile polyploid hybrids highlights key epistemological, ontological, and ethical issues. These are illuminated with reference to the distinct processes of artificial and natural hybridization.

A survey of these different kinds of hybridization includes the ethical and economic impacts of hybridity on global nutrition, the environment, and considerations of some practical implications for the agricultural industry. Tracking the role of hybrids, the process of hybridization, and the current impacts of it for agriculture requires knowledge of the history of its early conceptualization, understanding, and use. This is the topic of the following section.

Historical Background

With the domestication of plants and animals, early farmers became familiar with the practice of crossbreeding as a way to produce food crops and livestock with desirable traits. They were also aware of naturally occurring hybrids in both animals and plants. But although the phenomenon of hybridity was known, the intentional crossing of organisms was not recorded until 1717. The English horticulturalist, Thomas Fairchild, was the first to intentionally produce a hybrid by crossing a carnation (*Dianthus caryophyllus*) with a sweet william (*Dianthus barbatus*) in a small city garden in the London district of Hoxton.

In 1753, the French naturalist, Georges-Louis Leclerc, Comte de Buffon, discusses the infertility of hybrid offspring which is the result of the reproductive relationships (either through natural copulation or through artificial insemination) between two animals of different species. In *The Donkey*, he discusses the case of the mule, an infertile cross between a donkey and a horse (Buffon 1753). In 1890, Wilhelm Rimpau was one of the first to develop an intergeneric hybrid crop with agricultural potential. This was triticale. Triticale was the result of the hybridization of wheat and rye. Together with other German breeders, Rimpau built upon this new technology and made improvements in winter and spring wheat crops.

It was not until 1900 that the underlying mechanisms responsible for hybridity (and more generally, the principles of inheritance originally discovered and published by Gregor Mendel in 1866) were widely known and understood. This came when Erich Tschermak, Hugo de Vries, and Carl Correns independently corroborated Mendel's research on the inheritance of factors in crossed hybrid generations in the common pea *(Pisum sativum*) within their own agricultural studies.

In the late 1920s, high-yield hybrid corn was developed and marketed in the United States. The discovery of the structure of DNA by Francis Crick, James Watson, Rosalind Franklin, and Maurice Wilkins in 1953, and the later development of genetics and genomics that followed, provided knowledge of the biochemical mechanisms of hybridity that would complement the practical knowledge already established in agricultural technology. In the early 1980s, the use of this practical knowledge came to fruition in its implementation within biotechnology. It was at this time that biotechnological research and agricultural practice combined in the production of a hybrid tobacco plant with antibiotic resistance in 1982. With this union of research and practice, discussion of the economic, legal, and ethical impacts with this new technology also followed apace. For instance, within the next 4 years, the subsequent Environmental Protection Agency gave approval for the antibiotic resistant tobacco in 1986. This laid a precedent for further biotechnologically produced hybrids. As a result of the research on tobacco and the approval for its sale, other biotechnologically produced hybrids such as soybeans, corn, and cotton followed. These were approved for sale shortly after (in 1995 and 1996) in the United States (Wieczorek and Wright 2012).

While early horticultural and agricultural practices took as given the importance of hybridization for the cultivation of more desirable plant characteristics and higher-yield crops that were better adapted to diverse environmental

conditions, the role of the hybrid was still being discussed as an evolutionary anomaly among many zoologists. For example, Ernst Mayr formulated his highly influential BIOLOGICAL SPECIES CONCEPT (BSC) with specific reference to the exclusion of hybrids by defining species as those populations which are reproductively isolated from other population groups (Mayr 1963). That reproduction can occur between members of different species through hybridizing was a problem for his conception of species that required a solution. Mayr's solution was to deny that hybridization between organisms of different species was evolutionarily significant. He maintained that the majority of hybrids are "totally sterile" and "successful hybridization is indeed a rare phenomenon" (Mayr 1963). Mayr concluded, on the basis of this reasoning, that since hybrids are rare, they only ever amount to "evolutionarily unimportant mistakes" (Mayr 1963). There was a striking disconnection between the theoretical discussions of hybrids as "evolutionarily unimportant mistakes" among zoologists and the practical use of hybrids by farmers and agronomists. While the former denied the evolutionary impact of hybrids, the latter not only recognized it but routinely used hybrids to improve crop performance and increase yield in cultivation.

Polyploid Hybridization

The term "polyploidy" was originally introduced in 1916 by the German botanist, Hans Winkler. Barbara McClintock's early research on *Zea mays L.* (maize) suggested that epigenetic silencing may have a particular evolutionarily important role in polyploids. The process of polyploidization contributes large-scale genomic reconfigurations and changes in gene expression and functioning. Her later research suggested that this process might be an instance of what she referred to as "genomic shock," an event that causes increased transposable element activity and epigenetic silencing (McClintock 1984).

Rather than dismissing hybrids as insignificant sterile evolutionary dead ends as Mayr did in setting out his BSC, McClintock's research focused instead on the role of hybrids and hybridization as producing novel mechanisms of evolution: "Species crosses are another potent source of genomic modification" (McClintock 1984). The shift from hybridization being understood as an occasional taxonomic nuisance, with no evolutionary impact, to a mechanism capable of large-scale genomic reconfiguration amounted to a revolution in how hybrids and the process of hybridization were viewed.

The Role of Polyploid Hybridization in Plant Evolution

Polyploidy occurs widely in angiosperms (flowering plants) and is believed to play a significant role in plant evolution (Soltis and Soltis 2009). Polyploidization is a naturally occurring mechanism that leads to instantaneous speciation. Instant speciation refers to the formation of a new species in one generation. Speciation is usually a gradual process that takes place over thousands of generations. This kind of hybridity is the result of a doubling or trebling of the sets of chromosomes of the plant and is ubiquitous in agricultural crops (Udall and Wendel 2006). The result of polyploidization is not only genome duplication but also variation in the regulation and expression of genes from the parental diploid to the polyploid progeny.

These changes may (in some cases) lead to higher fecundity, phenotypic variation, and environmental adaptedness of the polyploid. Duplication of the genome is thought to provide organisms with more resources and a potential for increased ecological flexibility. This may allow them to populate a new or extended environmental niche; have greater adaptability to stressful environments, the ability to mask recessive mutations that could have a negative impact on the organism; and possess increased vigor over diploid species. In these cases, hybridization may not be best described as a detrimental breach of species boundaries threatening species separateness (as Mayr suggests), but may instead be better understood as an evolutionary advantageous mechanism by which an organism can increase its genetic and epigenetic resources (Kendig 2008, 2013).

Polyploidy in Agriculture

High-yield crop varieties of maize, cotton, wheat, oilseed rape (canola), peanut, and sugarcane are all the result of whole genome duplication and hybridization (Udall and Wendel 2006). These crops are allopolyploids. Allopolyploids are a type of polyploid that are defined as organisms whose cells include two or more distinct genomes that can come about through hybridization of two different species. Allopolyploids are distinguished from autopolyploids which are organisms that have genomes that are identical or very similar and arise from the same species.

Studies focusing on a variety of wild and domesticated species have shown that allopolyploids have an increased ability to respond to biotic and abiotic stress in comparison to their diploid parents (Kim and Chen 2011). While by no means conclusive for all polyploids, these kinds of evolutionary adaptability have been extensively studied in recent research on domestic cotton polyploids. Polyploid cotton has been found to produce stronger fibers than diploids. As a consequence, the polyploid cotton is often preferred to the diploid cotton and has a greater market value globally.

Understanding gene expression of these and other allopolyploids has contributed to a better understanding of the different transcriptome changes of diploids and allopolyploids that can be significant for crop production. Such research may reveal how polyploid wheat and rye resist abiotic stress or insect attack. But in order for polyploidy to be used effectively as a marker for improving crops, an understanding of its effects on the whole organism needs to be known and understood (Udall and Wendel 2006). If this were possible, patterns of gene expression that are evolutionarily changeable within allopolyploids and other polyploids could be selected for and used to produce crops with desired phenotypes such as increased stalk strength, root health, and resistance to disease or predation or increase the nutritive value of crops for humans or feed grain for livestock.

Polyploids, Homoploids, and Hybridization in Animals

Although many plant hybrids are fertile, animal hybrids are often sterile. However, the classic example of the mule as the evolutionary dead end of a hybrid cross cannot be generalized across all species. Animal hybrids usually occur by means of homoploid hybridization. Homoploid hybrids occur as a result of two organisms with the same chromosome number interbreeding. Differences in chromosome number complicate mitosis and frequently result in inviability of the hybrid animal.

Polyploid hybridization in animals is rarer but does occur and has been extensively studied in a variety of fish species, including the red crucian carp and blunt snout bream hybrids, as well as the widely studied cichlid fish species complex that exists as the result of multiple hybridization events.

A Taxonomy of Hybrids: Natural, Artificial, Induced, and Biotechnologically Produced

Polyploid hybridization can occur naturally and can also occur as the result of intentional crossing of organisms in the case of artificial selection and breeding among homoploids or polyploids. In addition to natural and artificially produced hybrids, hybridization can also occur by chemically inducing them. For instance, polyploidization can be induced in kiwifruit by means of colchicines (see Wu et al. 2012). And perhaps the most widely discussed within the bioethics literature, hybrids, can also be produced by means of biotechnological interventions to produce transgenic hybrids between diverse taxa. The focus of the remainder of this entry will be on these naturally and biotechnologically produced hybrids and their ethical impacts.

Ontological, Ethical, and Legal Impacts of Hybridity in Agriculture

Ontological and Ethical Distinctions: Natural and Artificial Hybridizing

Natural hybridization is often contrasted with *artificial* hybridization. However, natural hybridization is the occurrence of hybrids without intervention of any kind. Artificial hybridization is used in all conventional, traditional, and organic farming that relies on artificial or selective

breeding. Artificial hybridization is also used in biotechnologically produced hybridizing. "Natural" and "organic" may more particularly impute the nonuse of certain types of farming techniques, namely, biotechnologically assisted farming techniques, variously referred to as genetically modified organisms (GMOs). These crops are the result of altering an organism's genes by direct removal or insertion of DNA from another organism or DNA. It is a type of artificial hybridizing which occurs in the lab rather than in the field. This differs from traditional artificial breeding methods in that the organism is modified by directly making changes to the DNA to produce different phenotypes rather than breeding hybrid crosses of parents with desirable phenotypic characteristics.

Non-GMO Farming and Organic Farming

Non-GMO farming and organic farming may trade on the ideal of natural production as a contrast class to the artificiality or engineered variety, but all farming involves artificial selection, and some organic farming may allow biotech tweaks but not GMOs. This demarcational fuzziness means that what kind a thing is (GMO or non-GMO, naturally or artificially produced), and therefore to what ontological category it belongs, becomes difficult, if not impossible, to adjudicate. This ontological fuzziness also has impacts on ownership and distribution and has myriad ethical ramifications.

Biotechnologically produced hybrid crops bring with them a host of legal issues including liability and intellectual property issues. Liability for GMO contamination has been discussed with regard to cross-hybridization especially in the production of soybeans, cotton, oilseed rape, and maize. Conventional farmers, whose crops have been compromised due to pollen drift (cross-pollination with transgenic crops), can be sued for patent infringement if they keep their seeds and replant them even if they did not know that these seeds are the product of an unintentional transgenic cross. Conventional farmers without a license to use the transgenic seeds can be prosecuted for using their traditional methods of seed saving, sharing, and exchanging and planting them the next year (McEowen 2004).

Biotechnologically Produced Hybrid Crops (Conceived of as a Solution to Drought and Hunger)

Biotechnologically produced hybrids have been discussed as a solution to growing drought and the effects of climate change on agriculture in developing and industrialized countries as well as a solution for global hunger and malnutrition. Interest in these technologies as solutions to improve global health was expressed early on by the director general of the United Nations Food and Agriculture Organization, Jacques Diouf (2001). In a press release, Diouf stated that the use of biotechnologically produced hybrids and GMOs must be considered as a possible solution to "the supply, diversity, and quality of food products and [a way to] reduce costs of production and environmental degradation, as the world still grapples with the scourge of hunger and malnutrition" (Diouf 2001). Diouf maintained that the nutritional needs of the world have outstripped the capacity of conventional farming techniques. In order to feed the world's population, biotechnological means of increasing yield and nutritional value of crops must be seriously considered.

Many biotechnologically produced crops currently on the market are designed to withstand herbicides used to control weeds such as water hemp, ragweed, and Palmer amaranth pigweed (e.g., IMI corn, STS soybeans, Roundup Ready soybeans, canola/rapeseed, cotton). One of the most widely discussed are crops that have been created that are tolerant to HPPD inhibitor herbicides widely used in corn production (Successful Farming 2012). Farmers growing herbicide-tolerant crops can limit the amount of money spent on controlling weeds (Successful Farming 2012). Growing these herbicide-tolerant crops also allows the farmer multiple modes of action to control a variety of weeds while not harming the yield of his or her crop.

In addition to herbicide tolerance, agricultural companies are currently producing hybrids that solve problems of extremes of temperatures

(e.g., extreme heat), drought conditions/flooding, water shortages (due to the rapid reduction of aquifers or other controversial irrigation techniques), low pollinator populations (e.g., bees), and lower yields that affect crops in the many of the western seed-crop states in the United States (Kansas, Missouri, Colorado, Nebraska, Oklahoma, Texas, South Dakota) (Minford 2012). To do this, seed companies isolate genes identified with controlling how plants react to stress. Some rely on selecting genetic markers to cross with desirable phenotypes, while others rely on single-gene biotechnological approaches to add corn drought-tolerant genes from bacteria to produce drought resistance transgenically (Minford 2012).

Biotechnologically produced crops have also been engineered to be resistant to insect predation. For instance, the transgenic cotton *Bacillus thuringiensis*-cotton (Bt-cotton) and Bt-maize are both breed to diminish the effects of certain pests. *B. thuringiensis* is a gram-positive soil-dwelling bacterium. Bt-cotton and Bt-maize are produced with a toxin of *B. thuringiensis* which is toxic to many species of lepidopteran larvae (caterpillars) that feed on the stalks, ears, and leaves and the coleopteran larvae (beetle grubs) that feed on the roots of cotton and maize plants (Thalmann and Küng 2000).

One of the frequently discussed benefits of Bt-maize and Bt-cotton is that farmers can reduce their reliance on airborne insecticides. This impacts not only the air quality but also soil and the environmental impact of these chemicals on nontarget crops and wildlife. It also provides an advantage to the farmer in terms of limiting exposure to these chemicals. The farmer can reduce his or her direct contact with the chemicals which may positively affect the health of the farmer. Planting weed- and insect-resistant crops also reduces the farmer's time in the field and expenditures on chemical herbicides, insecticides, and fungicides.

Biotechnologically engineered ways of increasing the nutritive value not only for human consumption but also for use in animal feed have also been explored. In the United States and EU, more than 60 % of corn and soybeans are used to feed livestock with corn being the major feed source in a wide variety of animals including poultry, swine, and dairy cattle (Thalmann and Küng 2000). New transgenic hybrids increase desirable nutrients in crops fed to livestock. As a result this leads to healthier more productive livestock and potentially a lower feed bill if the farmer does not need to buy additional minerals to add to feed. For instance, crops of seed or grain can be altered to produce a more desirable composition in recombinant plants which can produce higher levels of oleochemicals, proteins, or carbohydrates (Thalmann and Küng 2000). Some hybrids are also designed to remove things in the crop that are harmful to animals. For instance, canola is a modification of rape that reduces the uric acid within the plant which is toxic to livestock. This means that the crop can be used as a feed crop instead of just as an oilseed crop. There is a hybrid of fescue for hay that also reduces its toxicity to cattle.

Biotechnologically Produced Hybrid Crops (Conceived of as a Threat)

In addition to discussions of the benefits of biotechnologically produced hybrids, there have also been considerable ethical concerns raised about the threats the production of biotechnological hybrids poses to public health and the environment. With regard to public health, these have focused on the potential of transgenic crops for carrying antibiotic resistance that would compromise drugs currently in use to treat illnesses.

With regard to the environment, ethical discussion has focused on the potential destabilization of ecosystem balances with the introduction of herbicide resistance and insect resistant crops. With reference to socioeconomic issues, these worries have focused on the labeling and marketability of organic products. One ethical and economic concern is that products may be accidentally contaminated by means of cross-pollination from neighboring transgenic species. This would affect farmers' ability to accurately maintain organic crops due to transgenic crop drift from other nonorganic farms.

In addition to these concerns for organic food production, other worries focus on the impact of transgenic crop drift on conventional farmers who practice seed saving, sharing, and exchanging. Some recent research suggests that saving seeds from plants that produce desirable traits to plant in the following year (to ensure that they had better crops) has been a traditional practice that has a history that goes back to that of the early Neolithic farmers (Shillito 2011) and continues to be a practice of traditional farmers in developing countries and socioeconomically vulnerable communities. The suggestion that the practice of seed saving, sharing, and exchanging should be curtailed to protect crops has been mooted. However, restrictions on these practices would disproportionately affect these cohorts and possibly frustrate the social and economic inequities already present. A move that itself would involve multiple ethical repercussions.

The prime ethical concern with regard to transgenic hybrid crops is the inadvertent dispersal of the transgenic crop pollen through wind or the movement of pollinating insects. The dispersal of herbicide-tolerant crops to other conventionally farmed fields is of special concern as their dispersal could produce *superweeds* that would not be controlled by herbicides currently in use. In addition to concerns about the possible creation of superweeds, analogous problems may arise with regard to insects which are the focus of insecticide-resistant crops. The incidence of potential *superpests*, produced as a consequence of adaptive resistance to targeted insecticide resistant crops, has also been observed and discussed (Liu et al. 1999). Concerns have also been raised about the possibility that crops bred for resistance to some pests may actually encourage the proliferation of other pest insects creating populations of secondary pests. If the primary insect predators are reduced, other secondary pests such as the boll weevil and stink bug may rebound (Liu et al. 1999). In addition to these worries, insect-resistant crops such as Bt-cotton and Bt-maize may also affect non-target species of insects such as green lacewings and other insects that are beneficial to crops. The introduction of herbicides and insecticides may have the potential to disrupt agricultural production as well as natural ecosystems in unpredictable and potentially catastrophic ways. These secondary effects would raise significant concerns for agro-industry, environmentalists, and conservationists alike.

Industry-Based Initiatives

Much of the recent ethical discussion has focused on the impacts of introducing new transgenes into the environment and their effect on production and yield. However, the performance of different crops is the consequence of multiple variables which include but are not limited to average rainfall, irrigation, drainage, nutrient content and composition of soil, drought, wind, insect control, weed management, choice of pesticides (herbicides, insecticides, fungicides, etc.), existence of hedgerows or borders, local biodiversity, crop rotation practices, and harvesting times.

Industry-based actions to curtail cross-hybridization between commercial crops using biotechnologically produced hybrids and to protect the interests of traditional and organic farmers have grown in recent years. The group, Save Our Crops Coalition, aims at curtailing the inadvertent application of synthetic chemicals or fertilizers to organic crops or the inadvertent spread of these to traditionally grown crops. Other initiatives based in industry and cited in trade journals are to not to overuse one pesticide chemical (strongly discouraging a one-size-fits-all approach to weed management) and instead suggest that farmers identify weeds and adjust their control to the specific needs of their particular crops (Successful Farming 2012). Targeting the herbicide to the weed rather than overusing the same herbicide has been an increasingly adopted practice since the discovery of the resistance to herbicides of the group triazine of more than 55 different weeds (Thalmann and Küng 2000).

Trade journals and the experience of individual farmers suggest that there are other impacts that farmers need to be aware of with regard to the management of hybrid crops. Increases in yield

and desirable plant phenotypes such as stronger stalks and resistance to drought, pests, and herbicides used to control weeds have other impacts that affect practical crop management. Some hybrid plants have stronger stalks and have more biomass and plant residues than do traditionally produced crops. Others are bred to have less biomass and send more energy to the grain head. Because of this, hybrid plants also impact farmers' choices in buying equipment essential to harvesting and tillage. Some hybrid crops require more horsepower and torque from farm machinery to manage plant residue after harvest and remove crops during harvesting and by tillage equipment.

Farmers are aware of the mutability of crops due to accidental cross-pollination which can lead to the spreading of a particular undesirable trait throughout multiple hybrids. Practical measures to guard against this include increasing the biodiversity of crops planted in fields and ensuring that different kinds of crops are planted in the same field at different times of the year. This latter practice is called *crop rotation*. Rotating crops in the same field reduces the potential degradation of the soil. By alternating crops, the nutrient composition of the soil can be maintained or improved. Crop rotation also limits the population of crop-specific diseases and insect pests and potentially reduces the number of superpests that may develop.

In addition to these considerations, trade journals have also expressed concern over the use of old herbicides with new transgenic crops. The continued use of old herbicides in an industry with new biotechnological solutions appears to some as incongruous. These herbicides are being used, in part, because of the limits on research, testing, and introducing new chemicals into crop production (Successful Farming 2012).

Current discussion reflects the confluence of three different modes of investigation: (1) How research and biotechnology can provide new ways of understanding the mechanisms of hybridization, (2) how these mechanisms can be used in practice to increase agricultural production, and (3) how we *should* use these new technologies. The latter ethical question requires that biotechnological research and agricultural practice link up in ways that are reciprocally informative. That is, finding an ethical route to maintain sustainable agriculture using hybrids in agriculture depends not just on research methodologies and biotechnological strategies of increased production but also on the business of being a farmer.

Summary

The interplay between the theoretical understanding and the practical knowledge in agriculture has been both complimentary and adversarial in the understanding and use of hybrids in agriculture. The benefits and potential risks to the environment, the agriculture industry, worldwide food crop production, and global socioeconomics are just some of the ethical issues that have arisen with the use of hybrids in agriculture. An understanding of the biotechnology currently in use as well as the history of research on hybrids beginning with Fairchild, Buffon, Mendel, Mayr, and McClintock has been provided in this entry. This, combined with a survey of industry management strategies, international discussion of the use of biotechnologically produced hybrids, as well as farmer-led concerns with unintended cross-pollination fills out a picture of the role of hybridity in agriculture. Key cases for ethical discussion include polyploidy hybrid use in agriculture, herbicide-resistant crops, and insect-resistant crops such as Bt-cotton and Bt-maize. Ethical discussions have also centered on the practice and restriction of seed procurement, distribution systems, biotechnology development, and the effects of the use of hybrid organisms on both traditional agricultural farmers. Concerns over the potential for unintended negative effects such as the development of superpests and superweeds have also been discussed. These have wide-ranging consequences that affect both the general public and the environment. Approaches intending to address the multiple aspects of the use of hybrids in agriculture in ways that are ethically responsive to concerns of all cohorts have been reviewed. These have arisen from the agricultural industry itself, trade

journals, coalitions of farmers and the public, biotech companies, and the United Nations FAO. These suggest that to be successful, any integrated ethical approach must be mindful of a range of agricultural practices, communities, and future impacts.

Cross-References

- Agricultural Ethics
- Biodiversity
- Cross-Contamination of Crops in Horticulture
- Farmer-Scientist Knowledge Exchange
- Farms: Small Versus Large
- Food Boycotts
- Food Security
- GMO Food Labeling
- Herbicide-Resistant Crops
- Intellectual Property and Food
- Intellectual Property Rights and Trade in the Food and Agricultural Sectors
- Pest Control

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