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THE FAT OF THE LAND: LINKING AMERICAN FOOD OVERCONSUMPTION, OBESITY, AND BIODIVERSITY LOSS

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ABSTRACT. Americans' excessive consumption of food harms their health and quality of life and also causes direct and indirect environmental degradation, through habitat loss and increased pollution from agricultural fertilizers and pesticides. We show here that reducing food consumption (and eating less meat) could improve Americans' health and well-being while facilitating environmental benefits ranging from establishing new national parks and protected areas to allowing more earth-friendly farming and ranching techniques. We conclude by considering various public policy initiatives to lower *per capita* caloric intake and excessive meat consumption, and to translate this temperate behavior into substantial environmental protection.

KEY WORDS: biodiversity, consumption, environmental protection, food ethics, obesity, overconsumption, sustainability, temperance

1. INTRODUCTION

It is common knowledge among both scientists and the general public that obesity has risen in the United States in recent decades (Mokdad et al., 2001; Flegal et al., 2002; Mokdad et al., 2003) and that this constitutes a major public health problem (US Department of Health and Human Services, 2001; Cuttler et al., 2003). It is also a matter of public record, if not public consciousness, that the United States consumes more food and energy resources *per capita* than any other large nation and is also responsible for a disproportionately large share of environmental pollutants that degrade global ecosystems (World Resources Institute, 2005). This paper considers the relationships between overconsumption and ill health of both people and ecosystems, by examining some links between food consumption, obesity, and environmental degradation in the United States.

While the topic of food overconsumption is important, we believe it has been neglected by agricultural ethicists to date. Standard readers and texts such as Blatz (1991), Ruttan (1994) and Thompson (1998) do not discuss food consumption or overconsumption in a sustained way. A review of the

Journal of Agricultural and Environmental Ethics for the past 6 years found only two articles that discussed in passing the deleterious health or environmental effects of food overconsumption: Zwart (2000) and Holm (2003). No articles focused on this issue as a primary concern. Brom (2000) discusses "consumer concerns" in the context of food ethics, focusing on the need for proper food labeling to enable consumers to make informed, ethical decisions. Yet while his conception of conscientious consumer choice includes eating safely and limiting the negative environmental consequences of consumption, he does not consider eating less (as opposed to eating differently) as an important means to these ends. Similarly, when Keller and Brummer (2002, pp. 268–70) list five keys to creating "sustainable agricultural practices," neither consumer temperance nor limiting overall demands on agricultural systems are among them. Yet, sustainability cannot occur in a context of limitless consumer demand. Nor will we achieve improved human health or land health without more intelligent and more *moderate* consumption. For these reasons, agricultural ethicists need to consider food overconsumption and its effects on people and nature.

2. FOOD OVERCONSUMPTION AS A HUMAN HEALTH ISSUE

Many individuals around the world suffer from *under* consumption of food. Worldwide, an estimated two billion people (about 30% of total world population) are malnourished and 170 million children are underweight (Pimentel and Edwards, 2000; World Health Organization, 2002). Yet the United States, most other developed countries and increasing numbers of middle-class citizens in developing countries have the opposite problem: an excessive consumption of food (Hill and Peters, 1998, p. 1371; US Department of Health and Human Services, 2001). Let us focus on the US. Calculating exact figures for food consumption is challenging, because some food is thrown away and people sometimes do not accurately report what they eat (Taubes, 1998). Taking these complications into account, a recent, comprehensive study by the USDA's Economic Research Service estimates that in 2000, US citizens consumed an average of 2800 calories per day (Putnam et al., 2002). This represents a 300-calorie/day increase (12%) since 1985 (this percentage increase is especially significant, since it holds regardless of any questions that might legitimately be raised about total calories consumed). Since only 2,200 calories are needed to supply the energy needs of the average American (Basiotis et al., 2002; Putnam et al., 2002), Americans typically consume approximately 25% more calories than necessary.

This excess consumption has made many Americans overweight. According to the most recent comprehensive National Health and Nutrition Examination Survey, in 1999–2000 nearly two-thirds (64.5%) of American adults were overweight and nearly one-third (30.5%) were obese, or severely overweight (Flegal et al., 2002).[1] More recent studies show similar results (Mokdad et al., 2003; Hedley et al., 2004; Ogden et al., 2006). While the factors involved are multiple and interact in complex ways, research has repeatedly confirmed that two factors are most important in leading to overweight and obesity: excess caloric intake, and lack of exercise (Bonow and Eckel, 2003; Katz, 2005; Poskitt, 2005).

The health dangers of being overweight or obese are well documented. Of the ten leading causes of death in America, four show a positive correlation to overweight, or are related to the diet and activity patterns that lead to overweight (McGinnis and Foege, 1993). These include the three leading causes of death – heart disease, cancer and cerebrovascular disease (stroke) – as well as the seventh leading cause – diabetes (Table 1).

Excess weight puts greater strain on the heart and circulatory system, increasing the risk of coronary heart disease and heart attacks (Galanis et al., 1998; but see also Kenchaiah et al., 2002, who argue lack of exercise is a more important cause of heart disease than obesity). Heart disease killed 720,000 Americans in 1990 – approximately one out of every three deceased (McGinnis and Foege, 1993). Men and women suffering from gross overweight also have a 40–80% increased risk of dying from cancer (Calle et al., 1999), although the causal mechanisms for this relationship are still being debated. Overweight and obesity often lead to high blood pressure, a major risk factor for stroke, the cause of nearly 300,000 American deaths in 1980 according to a major study (Amler and Eddins, 1987). Obesity is also a leading cause of diabetes; one study found that "for every kilogram of increase in weight, the risk for diabetes increases by 4.5%" (Ford et al., 1997, p. 220). The incidence of Type II diabetes – formerly called "adult onset" diabetes – has greatly increased in recent years (Mokdad et al., 2003) and researchers predict that if Americans cannot slim down, one out of

[1] The NHANES employs body mass index (BMI) to measure overweight and obesity. BMI is a simple measure of weight in relation to height, usually measured in pounds over inches or kilograms over centimeters. Thus a woman 5′2″ tall would be judged overweight if she weighed over 140 pounds and obese if she weighed over 170 pounds; a man 6′0″ tall would be judged overweight if he weighed over 190 pounds and obese if he weighed over 220 pounds. US Department of Health and Human Services (2001) notes that "BMI has some limitations, in that it can overestimate body fat in persons who are very muscular, and it can underestimate body fat in persons who have lost muscle mass, such as many elderly." Nevertheless, BMI remains a clear, widely accepted measurement of overweight and obesity, used by many scientific researchers and public health organizations.

Table 1. Ten leading causes of death for Americans: 1990.

Cause of death	Number of people deceased	Scientifically established connection to excessive weight (*)
Heart disease	720,000	*
Cancer	505,000	*
Cerebrovascular disease (stroke)	144,000	*
Accidents	92,000	
Chronic obstructive pulmonary disease	87,000	
Pneumonia and influenza	80,000	
Diabetes mellitus	48,000	*
Suicide	31,000	
Chronic liver disease/cirrhosis	26,000	
HIV infection	25,000	

Data taken from McGinnis and Foege, 1993, p. 2207.

every three children born in the United States in 2000 will become diabetic during his or her lifetime (Narayan et al., 2003).

For some cancers and other diseases, obesity appears to be a less important risk factor than the specifics of diet, particularly Americans' high meat consumption. For example, high consumption of animal fat correlates with increased incidence of colon cancer; one study estimated a 50% reduction in consumption of animal fats might lead to a proportionate reduction in the incidence of colon cancer (Henderson et al., 1991). Americans consume 995 calories daily from animal products, in contrast to half that amount for southern Europeans, Asians and South Americans, and one-sixth that amount for Africans (World Resources Institute, 2005). In an official position paper on vegetarianism, the American Dietetic Association (1993) noted that a number of studies show lower mortality rates for heart disease, hypertension, and colon cancer among vegetarians than among nonvegetarians.

In 2001, the US Surgeon General estimated that "unhealthy dietary habits and sedentary behavior together account for approximately 300,000 deaths every year" (US Department of Health and Human Services, 2001). Current estimates of the number of overweight and obesity related deaths in the US range from 112,000 (Flegal et al., 2005) to 365,000 (Mokdad et al., 2005). Whatever the actual number (and keeping in mind that obesity, poor diet and lack of exercise all harm our health in a variety of ways) there is

consensus that, in the words of one study, ''obesity appears to lessen life expectancy markedly, especially among young adults'' (Fontaine et al., 2003). In addition, Allison et al. (1999, p. 1530) make the important point that ''aside from mortality rate ... obesity substantially increases morbidity and impairs quality of life.'' Visscher et al. (2004) echo this, writing that ''obesity is [even] more strongly related to morbidity and disability than to mortality.''

The economic costs of overweight and obesity are also substantial. Direct health care costs include in-patient and out-patient care for obesity-related diseases, medicines, and nursing home care. Indirect costs include wages lost due to illness, lower productivity on the job, disability, and premature death (US Department of Health and Human Services, 2001). One study estimated the total economic costs of obesity in 1995 in the US at $99 billion (Wolf and Colditz, 1998). Overweight and obesity may also decrease happiness and well being in less obvious ways that are harder to measure. Overweight people tend to feel more lethargic and to participate less often in enjoyable physical activities, from sports to sex, often falling into a sedentary spiral. Obese people may have a negative self-image (US Department of Health and Human Services, 2001; Gard and Wright, 2005) and whether or not this is justified, it can lead to considerable unhappiness.

The causes of the recent rise in American obesity are undoubtedly complex, but the scientific consensus is that two factors are paramount: lack of exercise and excessive caloric intake (McGinnis and Foege, 1993; US Department of Health and Human Services, 2001; Katz, 2005). Over the past several decades, Americans have become more sedentary in both work and leisure activities (US Department of Health and Human Services, 1996; Poskitt, 2005). Children's playtime is more likely to involve watching television than playing ball or exploring the local woods, and many more adults work at desks than in jobs requiring physical exertion. At the same time, Americans are eating out more often and restaurants are putting larger portions of rich, fatty foods in front of them (Hill and Peters, 1998). Tens of billions of advertising dollars are spent each year to keep Americans' food consumption levels high.

It is quite clear that major benefits to Americans' health, happiness, and economic productivity could be achieved by eating less and eating more healthily. These potential benefits justify recent efforts by the US Surgeon General, the Centers for Disease Control and several of the National Institutes of Health to help Americans rein in their bulging waistlines (see their websites for details). Although changing national dietary habits is a huge challenge, recent successful campaigns to reduce smoking give grounds for optimism. Yet there is another, often overlooked area in which altering dietary habits could bring important social benefits: improved ecological health.

3. FOOD OVERCONSUMPTION AS AN ENVIRONMENTAL ISSUE

Like human health, ecological health is a complex, multi-dimensional, yet necessary concept. Participants in a major symposium on ecological health defined it as follows: ''An ecological system is healthy and free from 'distress syndrome' if it is stable and sustainable – that is, if it is active and maintains its organization and autonomy over time and is resilient to stress'' (Costanza et al., 1992, p. 9). Just as a healthy human being is free from disease and able to perform his or her characteristic functions well, a healthy forest, stream, or farm is free from air or water pollution, siltation or topsoil loss, or other harms that would sooner or later impede its natural productivity. Most definitions of land health emphasize preservation of basic ecological processes, preservation of native flora and fauna, and preservation of the land's economic productivity (Costanza et al., 1992; Jorgensen et al., 2005). While agriculture necessarily involves local displacement of native plants and animals, attempts to apply this concept to agriculture typically make their preservation across the broad agricultural landscape one important aspect of land health. Wendell Berry, for example, in setting out his agricultural ethics, takes such an expansive view. ''The concept of health is rooted in the concept of wholeness,'' he writes (Berry, 1977, p. 102). Land health for Berry encompasses both flourishing human communities, where people do good work and live good lives, and healthy natural communities, where the native flora and fauna thrive (Berry, 1981, 1996).

Of course, it is possible to define land health and sustainable agriculture in more narrow, anthropocentric terms, as just sustaining what humans need or want from the land: perhaps simply basic agricultural productivity. But this seems unacceptably selfish, a denial of the intrinsic value of other species (Rolston, 1994, pp. 83–88). Even from a human perspective such a definition seems shortsighted, since depauperate landscapes limit our aesthetic, scientific, recreational, and spiritual possibilities – even, in many cases, our economic possibilities (Kellert, 1996; Cafaro, 2001). In *A Sand County Almanac*, Aldo Leopold writes of two farmers who make time to restore tamarack trees, an extirpated species, to their Wisconsin farms. He calls their action a ''revolt against the tedium of the merely economic attitude toward land,'' and goes on to say,

> We assume that because we had to subjugate the land to live on it, the best farm is therefore the one most completely tamed. These two farmers have learned from experience the wholly tamed farm offers not only a slender livelihood but a constricted life ... They propose to devote a little spot of marsh to growing native wildflowers. Perhaps they wish for their land what we all wish for our children – not only a chance to make a living but also a chance to express and develop a rich and

varied assortment of inherent capabilities, both wild and tame (Leopold, 1970, p. 203).

This little story well expresses the view that ecological health includes land continuing to produce flourishing populations of native species, and that such healthy land provides a harvest of beauty and interest that greatly improves human lives. The agricultural landscape *can* provide such a harvest, when curious people meet good land. But too often, it does not.

In the United States, 1272 species are listed as threatened or endangered under the Endangered Species Act: 527 animals and 745 plants (US Fish and Wildlife Service, 2005), while many others qualify but have not been listed due to political factors. Globally, over 38,000 species of plants and animals are listed as imperiled by the Swiss-based International Union for the Conservation of Nature (2004), and the total threat is surely much greater because many species are unknown or too poorly known for the IUCN to assess their status.

The causes of extinction are complex; often a species faces multiple or uncertain threats. But scientists generally agree that habitat loss is the primary cause of species endangerment. Wilcove et al. (1998), in a comprehensive study of Endangered Species Act information published in the US Federal Register, found habitat degradation/loss implicated as a cause in 85% of threatened and endangered species in the US. Crucially, in analyzing the causes of habitat degradation/loss, they identified agriculture (principally row-cropping) as the leader, affecting fully 38% of all endangered species. Livestock grazing was also an important cause of habitat degradation/loss, affecting 22% of all species. In addition, agriculture was an important contributor to several other major causes of endangerment, including water developments such as reservoirs and dams (affecting 30% of species) and pollutants (20%).

Wilcove et al.'s (1998) findings regarding agriculture's role in biodiversity loss were confirmed by Czech et al. (2000), who compared Federal Register data with data from the multi-volume *Official World Wildlife Guide to Endangered Species of North America*. Row-cropping and ranching are the third and fifth most important causes of species endangerment, according to the information collected in the *World Wildlife Guide*, while reservoirs and other water diversions, pollution, and aquifer depletion and wetland draining – all with important links to agriculture – are also important causes of endangerment (Table 2). Czech et al. (2000) found that "agriculture is also the most ubiquitous of endangerment causes, endangering species in 35 states and Puerto Rico." It should come as no surprise that agriculture plays a key role in US biodiversity loss, since farming and ranching are by far the predominant land uses nationwide; farming and

Table 2. Leading causes of endangerment for American species classified as threatened or endangered by the US Fish and Wildlife Service.

Cause of endangerment	Number of species endangered	Strong connection to agriculture (*)
Interactions with nonnative species	305	
Urbanization	275	
Row-crop agriculture	224	*
Outdoor recreation and tourism development	186	
Domestic livestock and ranching activities	182	*
Reservoirs and other running water diversions	161	*
Modified fire regimes and silviculture	144	
Pollution of water, air, or soil	144	*
Mineral, gas, oil and geothermal extraction or exploration	140	
Industrial, institutional and military activities	131	
Harvest (hunting, collecting)	120	
Logging	109	
Road presence, construction and maintenance	94	
Loss of genetic variability, inbreeding depression, orhybridization	92	
Aquifer depletion, wetland draining or filling	77	*
Native species interactions, plant succession	77	

Table adapted from Czech et al., 2000, p. 594.

grazing together occupy more than half the land area of the continental US (Anderson and Heimlich, 2000). In contrast, national parks and national wildlife refuges together occupy only 6.7% of US lands, much of this in Alaska.

The most obvious source of harm to biodiversity by agriculture occurs when wild species lose habitat through conversion of natural areas to crop or ranch lands. In some rich farming areas, such as the Midwest corn belt and California's Central Valley, 98% of the landscape has been converted to

farmland. Compounding this loss, agricultural lands that may retain habitat value as woodlots, wetlands, and fallow fields lose that value as every agricultural acre is forced into higher economic productivity by modern industrial agriculture (Pimentel and Pimentel, 1996). Across the western United States, overgrazing has degraded grasslands and shrublands, eliminating native species, causing soil erosion, and damaging streams (Kauffman and Pyke, 2001). Agriculture also harms biodiversity through various kinds of pollution. For example, fertilizers, pesticides and siltation are the most important pollutants affecting endangered freshwater aquatic species in the US (Richter et al., 1997). Dams created for crop irrigation also reduce biodiversity, through direct habitat destruction and alterations to hydrological processes (Wilcove et al., 1998).

Laudable efforts to make agricultural practices less harmful to the environment are being put into practice in many places. These include contour plowing, creating stream buffer zones, reducing pesticide use through integrated pest management, and providing incentives to farmers to retire some fields from use (Jackson et al., 1984; Mason, 2003). However, we must remember that agricultural production is tied to demand. Decrease food consumption and the need for food production also falls – as do prices for agricultural products. This reduces the costs of environmental improvements in agriculture, since such improvements often involve tradeoffs in agricultural productivity. Leaving buffers along streams, in order to lessen siltation and water pollution, means less land in cultivation – easier for taxpayers to fund if crop prices and land prices are lower. Putting land into the federal Crop Reduction Program (CRP) means less agricultural production – less costly for a farmer or rancher if soybean or beef prices are lower.

In contrast, if we continue the current trend of unending increases in demand for agricultural products, this demand will eventually undermine all attempts to limit agriculture's environmental harms. The greater the monetary incentives to increase production, the harder it becomes to protect the environment by foregoing production.[2] Thus, lowering food consumption (demand) must be part of the strategy to limit agriculture's harms to biodiversity. Agricultural ethicists have generally ignored this issue.

Americans' excess food consumption translates directly into increased agricultural demand. All else being equal, US citizens' habit of consuming approximately 25% more calories than necessary to maintain health increases the amount of land needed to grow crops and graze animals by 25%. It increases the amount of pollutants dumped onto agricultural lands and

[2] And with endless human population growth, at some point this population will need to use all available land for agricultural production. So population stabilization or reduction must also be part of agricultural sustainability and of sustainable development more generally.

running-off into rivers and streams by 25%. Of course, all else is not equal. For one thing, approximately 20% of the food produced in the United States is exported (Reed, 2001). But let us assume no change in exports, assume further that 20% of agricultural lands remain devoted to export production, and focus on the 80% of farm and ranch lands left over for domestic food production. If Americans ate more healthily and reduced their caloric intake by one-fifth, then approximately one-fifth of that 80% could be retired from agriculture and converted to wildlife preserves, parklands, or greenbelts. 16% of current agricultural lands could be devoted primarily to maintaining biodiversity. Alternatively, some of this decreased consumption could be used to encourage a transition to more humane livestock production methods, more small family farms, or more organic, low-impact agriculture – all of which tend to be less productive than environmentally harmful industrial agriculture.[3]

These environmental and social benefits could be further increased if Americans cut their excessive consumption of meat and dairy products in half. Of all the food groups, animal products not only make the greatest contribution to obesity, but are the most inefficient to produce. Depending on the type of animals raised, farmers have to feed them 3–16 pounds of plant food to get one pound of meat or other animal product. Approximately 38% of the world's grain is used as animal feed (Pimentel and Edwards, 2000), and this percentage is even higher in the United States. If Americans changed to a diet 50% lower in animal products in addition to consuming one-fifth fewer calories, US farmers could theoretically reduce commodity production by 25% overall. If this were combined with a national conservation strategy to *permanently* retire agricultural lands from production, the environmental results would be impressive.

Consider two examples. North Dakota's Theodore Roosevelt National Park was created to preserve the flora and fauna of the short-grass prairie. At 70,000 acres, however, the park is too small to do the job. It harbors no wolves or grizzly bears, seen in abundance by early American explorers, and its bison – micro-managed to avoid conflicts with adjacent cattle ranches – are semi-domesticated. Much of the land surrounding the park is marginally productive grazing land, with a small and declining human population; this includes both large private ranches and the 525,000 acre Little Missouri National Grassland. With transfer of the grassland to the park and purchases from willing sellers, Roosevelt National Park could be expanded to several million acres at an affordable cost. Cows could be moved out and the great bison herds and top predators returned. With its wildlife restored, this

[3] Of course, the United States is not just a huge food exporter but also a huge food importer. So more temperate eating habits among Americans would lessen the demands we place on agricultural lands worldwide.

park would be as impressive as Yellowstone or Yosemite, attracting millions of visitors and providing a multitude of economic opportunities that would far outweigh the meager opportunities currently provided by a marginal ranching economy. Such a national park would be a fitting tribute to Roosevelt, one of America's greatest conservationists, and a real contribution to preserving the biodiversity of the short-grass prairie (for a similar proposal, to create a "Buffalo Commons" on parts of the western plains, see Popper and Popper, 1994).

At the other end of the Great Plains, virtually the entire tall-grass prairie ecosystem has been converted to farmland, mostly growing corn and soybeans for livestock feed. In Illinois, only one ten-thousandth of the original 37 million acres of tall-grass prairie remains: 3500 acres occurring in small, isolated conservation areas (Chadwick, 1993, p. 116). The lower Midwestern states have the most extensive damage to terrestrial and wetland habitats in the US, but they have no large national parks or conservation areas. Indeed, the total area of national park lands in Iowa, Indiana, Kansas, Illinois, and Ohio is 58817 acres, less than 0.0005% of the agricultural acreage in these states. If US citizens consumed one-fifth less food and halved their consumption of animal products, much of this farmland could be retired from production.

Imagine a series of national tall-grass prairie preserves, stretching from Texas to Minnesota, in which some of these corn and soybean fields are returned to prairie. Built in some cases around the current small preserves, retired farmlands would be laboratories for ecological restoration and centers for studying natural history. They would also constitute monuments to Americans' ability to recognize higher values than gross material consumption. Farmers who wanted to stay on the land could be paid to grow wildlife or native species, rather than corn. At present, farmers receive billions of dollars in subsidies to support high production in the face of low commodity prices; as we have shown, high agricultural production is both harmful to the environment and nutritionally unnecessary. The US government would do better to spend that money to encourage farmers to help restore native biodiversity and environmental health to the heartland.

We need to be clear: reducing *per capita* food consumption by itself will not lead to sustainable agriculture or the restoration of biodiversity across the agricultural landscape. We might, for example, use the land freed up from food production to build more second homes, or to produce biofuels, replacing one kind of consumption with another and still giving biodiversity short shrift. As with human health, to improve land health we will have to decrease overall consumption, not just replace one kind of consumption with another, and, *we will have to put in place*

policies that encourage it. We need to spend less money, time and *land* boosting agricultural consumption and production, and spend more of these resources for environmentally beneficial purposes.

We should also realize that lessening demand for agricultural commodities could hurt farmers, even threatening to drive some of the more vulnerable out of business. That is why we suggest coupling policies to decrease consumer demand with policies that buy or lease ag lands for conservation purposes, that reward farmers for sustainable practices, that improve opportunities for farmers to market locally, and so forth. We should start from a comprehensive conception of land health that includes economically viable farms and farm communities and flourishing natural communities, and then put all the pieces in place that facilitate these goals (including limiting overall human demands on the land).

All such proposals, whether modest or grand, engage complex social and political issues. In the face of this complexity, we return to some simple facts. First, people and native biological communities are in competition for a finite amount of land, fresh water, and other resources. More environmentally benign agricultural production may lessen this competition, but it never completely eliminates it. Each mouthful of food we eat carries *some* environmental cost. When we tuck into a hamburger, we are utilizing resources that some native plants and wild grazers, predators and scavengers now cannot utilize (Freilich et al., 2003, pp. 759–760). We are generating environmental costs related to raising and transporting that food, from the pesticides protecting the corn and washing into adjacent wetlands, to the gas used to transport the cattle to a feedlot, to the stink of that feedlot for its neighbors. Eating two hamburgers, all else being equal, doubles those environmental costs. For these reasons, we ought to limit consumption.

We realize that limiting consumption is only part of an intelligent, environmentally conscious food consumption. Green consumers should support organic farmers and ranchers by buying their products; they should support *local* producers, in order to limit the environmental effects of food transportation and help preserve local agricultural land from suburban development (Halweil, 2002). But we insist that the sheer volume of consumption is another important, although typically neglected, factor in intelligent consumption. Earth-friendly, health-conscious consumers should also buy and consume less food. Combining temperance with public policies to further land health opens up the possibility of a genuinely sustainable agriculture. Accept an endless increase in demand for agricultural products, and sustainable agriculture becomes impossible.

4. CONNECTING HUMAN AND ENVIRONMENTAL HEALTH

Nutritionists and public health officials have concluded that decreased food consumption is one key to Americans living longer, healthier lives (Hill and Peters, 1998; Putnam et al., 2002). Our argument is that it is also a key to the health of the American landscape. A healthier landscape, in turn, will benefit Americans in body and soul. In discussing air or water pollution, we have long been accustomed to making connections between human and environmental health. We ought to begin to make similar connections when considering the health and biological productivity of the land, and the role decreased consumption can play in protecting them.

In a recent report, the US Surgeon General wrote forcefully: "The Nation must take action to assist Americans in balancing healthful eating with regular physical activity" (US Department of Health and Human Services, 2001). Dr. Satcher called for a broad movement of individuals, families, industry, health care workers, and governments to address Americans' weight problems. Among the priorities for national action are the following:

- Ensure daily, quality physical education and activities for Americans of all ages.
- Reduce time spent watching television, playing computer games, and in other sedentary behaviors.
- Promote healthier food choices, including at least five servings of fruits and vegetables each day, and *reasonable portion sizes* in homes, schools, worksites, and communities.
- Ensure that schools and other places frequented by children provide healthful foods and beverages by ... reducing access to foods high in fat, calories and added sugars and to *excessive portion sizes*.

We wholeheartedly support this agenda. We find it significant that the Surgeon General did not focus solely on the content of diet (still important, of course) but also considered *quantities* of food consumed. Taking a cue from recent, successful anti-smoking campaigns, we suggest that progress will be most rapid if public policy includes both "carrots" (incentives for healthy behavior) and "sticks" (penalties for unhealthy behavior). For example, the federal tax code could be amended to give tax breaks or tax credits for health club memberships and for participation in fat-reduction programs, particularly those like Weight Watchers that stress limiting portion size and overall food intake (current tax law only allows such tax breaks in limited cases that do not cover the majority of Americans). Insurance companies could be legally required to pay for health club memberships and nutrition counseling. On the other hand, insurers could be allowed to raise premiums for the overweight and obese in group health

plans and to lower premiums for those at healthier weights. Because excessive weight clearly correlates with increased disease and health care costs, such differential premiums would be justified.

Public education must remain a central component in efforts to lower food consumption. However, we need to face the fact that past efforts have not succeeded. This suggests, first, that our understanding of the complex psychological and social causes of obesity is underdeveloped and that more research into these causes is needed (Gard and Wright, 2005). In this regard, the National Institutes of Health have stepped up interdisciplinary efforts to understand the "environmental, social, economic, and behavioral factors" behind the current obesity epidemic (US Department of Health and Human Services, 2004). Second, the failure of purely voluntary approaches suggests that more direct and coercive approaches should be considered. There is good evidence that increasing cigarette prices, through steep state and federal taxes, has led to decreased cigarette use. Increasing the cost of unhealthy foods might work similarly, especially among poorer Americans, who are disproportionately overweight. By the late 1990s, 19 US states and cities levied special taxes on snack and junk foods, raising about $1 billion per year (Jacobson and Brownell, 2000). A national junk food tax, with the proceeds earmarked for nutrition and exercise programs, could do a lot of good. Such taxes could be extended to fast foods high in calories and unhealthy fats and sugar, such as cheeseburgers, french fries and donuts. At the same time, subsidies could be offered for healthy foods, such as whole grain breads, legumes and soy products, and fresh fruits and vegetables.

Some readers may blanch at the paternalistic and even coercive nature of such suggestions (Gard and Wright, 2005). We believe the potential benefits to Americans' health and happiness justify such paternalism. Furthermore, we believe strong governmental measures are necessary in this instance to preserve public health. Such efforts are the necessary counterweight to the billions of dollars being spent by corporate America that help perpetuate this problem. The head of the Centers for Disease Control has described overweight and obesity as a health "catastrophe" in the United States (Reuters, 2003). It is time for strong measures.

Other readers may feel that we are "picking" on a particular group – overweight and obese people – rather than addressing the real issue: general American overconsumption. In this case, though, the group in question includes a majority of Americans, since nearly two-thirds of us are overweight or obese (Flegal et al., 2002; Ogden et al., 2006). *Most* of us are consuming more food than necessary, and those who are not deserve credit for their temperance. Still, thinner Americans should not be complacent about their own consumption practices. It is possible to eat a healthy diet with an exorbitant environmental cost; for example, by eating lots of

gourmet delicacies flown in from all around the world. Eating less and eating more healthily are necessary parts of ethical food consumption, but not the whole of it.

Better, smaller diets will help Americans live happier, healthier lives. But they will also reduce demand for agricultural products, thus making possible improvements in land health. To get the full environmental and social benefits from reduced agricultural demand, we should combine healthier diets with incentives for farmers and ranchers to practice proper stewardship on their lands, and with penalties if they do not. We suggest the following steps at state and national levels:

- Waive all sales taxes on organic produce and on humanely raised livestock, and grant property tax reductions to their producers. Such healthy and humane production costs money, and good land and livestock stewards deserve the support of society.
- Tax fertilizers and pesticides, to discourage their use and help pay for the tax breaks suggested above.
- Mandate 300-foot buffer zones along all rivers and streams, with no grazing or cropping, to reduce siltation and water pollution.
- Increase funding for the federal Crop Reduction Program, to take additional land out of agricultural production.
- Pay farmers and ranchers to produce wildlife. For example, ranchers in several Great Plains states currently receive subsidies to leave black-tailed prairie dogs on their lands, in an effort to protect this dwindling keystone species. Such programs should be greatly extended.
- The federal government should identify ecosystems currently underrepresented in the national park system due to agricultural conversion, and create national parks to restore and preserve these ecosystems. First among these might be a Tallgrass Prairie National Park.
- Federal and state governments should identify areas where a declining agricultural economy presents opportunities to restore land to wildlife, and create parks and wildlife preserves to do so.

In these ways, American society would move from an agricultural paradigm that is profit driven, pursuing ever greater productivity with little concern for human health, the environment, or rural communities, to an agriculture with *sufficient* productivity, that subsidizes important social goals such as a clean environment, biodiversity protection and healthy farming communities (Berry, 1981; Thompson, 1995). Rather than view the consumer's goals narrowly in terms of ever more and cheaper food, we should try to create consumers who are satisfied to have enough good, safe food to be healthy

and who care about the natural and human communities to which their food consumption attaches them (Berry, 1996).

5. CONCLUSION

We propose that ecosystem health and human health are connected. Excessive food consumption leads to poor human health and environmental damage. Unhealthy ecosystems lead to additional direct human harms, as when people sicken from the air or water pollution generated by huge livestock confinement facilities. But ecosystem sickness also leads to intellectual and spiritual losses, as a dull and lifeless agricultural landscape becomes a bore to live and work in. Even if this landscape remains productive of agricultural products, it may no longer be productive of happy and healthy people (Pyle, 1993), much less flourishing populations of native flora and fauna. The challenge is to remain productive of all three, in perpetuity. This is the full meaning of environmental sustainability and land health.

Agricultural ethicists almost all see sustainability as one key goal for an ethical agriculture (Schoon and te Grotenhuis, 2000; Raoult-Wack and Bricas, 2002). Yet this goal cannot be reached without addressing overconsumption of agricultural products. In an article on sustainable agriculture, Robertson and Harwood (2001, p. 99) make the important point that the term ''sustainable development'' is scale-dependant. ''The agricultural practice that is sustainable at the scale of the individual field,'' they write, ''may lack sustainability at the larger farm scale if the inputs required to maintain sustainable production eventually exceed the capacity of the farm to provide them.'' Similarly, genuinely sustainable practices must be sustainable at the broader levels of whole landscapes and societies. An agriculture that seeks to satisfy ever increasing demands for its products cannot meet this requirement.

By considering consumption as a key issue in agricultural ethics, we challenge the ''more is better'' mentality at the root of many of our agricultural and environmental problems. Wendell Berry, Matsuo Fuoka (1985) and other sustainable agriculturalists teach us that taking a stand against this mentality, saying ''I don't need a bigger farm'' (or car, or bank account), may leave more time and resources for cultivating ourselves and our relationships to people and to nature. As philosophers and religious teachers have emphasized, temperance makes us better people and helps create better societies.

Temperance, however, is not necessarily good for business. We can expect powerful corporate interests to fight the changes we have proposed in the preceding section. The Frito-Lay and Coca Cola companies have won

repeal of junk food taxes, by tempting state politicians with promises of new plants and threatening them with plant closures (Jacobson and Brownell, 2000). There are many businesses, large and small, that benefit from Americans' overconsumption of unhealthy food. Agribusinesses that do much of the initial processing of food; oil and chemical companies that market petroleum-based fertilizers and pesticides; implement makers and their franchisees; drug companies that market weight-loss drugs: the list of corporations with a direct interest in keeping Americans overweight is impressive. We should not expect any of these companies to support measures to improve Americans' temperance and fitness. Reformers' only hope is to appeal directly to the public interest, as was done in the fight to reduce tobacco consumption. We believe that reason and public spirit can overrule greed and inertia.

Americans are at a unique point in our history, faced with great opportunities and challenges. We have created a society wealthy in food and material goods beyond the wildest dreams of our founders. But creating a better society no longer depends on creating more wealth or increasing consumption (Thoreau, 1971 [1853]; Lane, 2000). The sooner we face this reality – in all areas of our lives and our economy, including agriculture – the better.

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