Is There a High Cost of "Cheap Food" Policies?

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Introduction

Nearly a half century ago the world was aroused by Rachel Carson's (1962) apocalyptic message of *Silent Spring.* Carson's successors in the alternative agriculture advocate (AAA) movement continue to be pessimistic regarding the nation's food supply and environment. Professor Robert Paarlberg's (2010) response is forthright:

> In Europe and the United States, a new line of thinking has emerged in elite circles that opposes bringing improved seeds and fertilizers to traditional farmers and opposes linking those farmers to international markets. Influential food writers, advocates, and celebrity restaurant owners are repeating the mantra that "sustainable food" in the future must be organic, local, and slow. But guess what: Rural Africa already has such a system, and it doesn't work.

By default, organic farming is the food system of Africa and other impoverished regions of the world because farms are insufficiently productive to purchase synthetic fertilizers and pesticides, to acquire schooling to build human capital, to finance roads and other infrastructure essential for commercial agriculture, and to fund research developing improved varieties.

This essay mainly addresses U.S. AAA's recent lament: *The high cost of cheap food*. Public policy, it is argued, in the form of farm commodity price and income support programs has made food artificially cheap, thereby contributing to chronic overeating and consequent cardiovascular and related maladies. On the other hand some analysts, by adding biofuel subsidies to the public policy mix, reject the "cheap food policy" finding. This essay further broadens the scope of extant public policies affecting food to encompass public investments in research, extension, education, and infrastructure to raise agricultural productivity. At issue is whether the U.S. has pursued a low cost food policy, and, if so, the impact on society's health and well being. And do AAAs offer an attractive alternative?

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This essay makes a case that sustainable agriculture requires modern science and technology to address very real problems of poverty, disease, violence, and hunger. Policy digressions into promoting organic, local, and slow foods produced on small farms risk loss of agricultural productivity essential for improving well being of people in rich and poor countries alike.

A U.S. Historical Cheap Food Policy?

Food policy has many components, here encompassing government commodity price and income support programs, bioenergy programs, and research, extension, and infrastructure programs.

Government commodity programs

A fashionable current target of alternative agriculture activists is public subsidies of agricultural commodities that contribute to cheap food which in turn causes excessive food consumption, obesity, and attendant diabetes, cardiovascular diseases, and cancer. Grunwald (2007, p.34) asks "…why the most fattening calories in our grocery shelves are the most subsidized". According to Walsh (2009, p.33):

> For all the grumbling you do about your weekly grocery bill, the fact is you've never had it so good, at least in terms of what you pay for every calorie you eat…But cheap food is not free food, and corn comes with hidden costs. The crop is heavily fertilized—both with chemicals like nitrogen and with subsidies from Washington.

Michael Pollan (2006) contends that the U.S. agricultural establishment has indeed pursued a cheap food policy, nowhere more evident than for corn. According to Pollan (2006, pp.50, 51): "So Wall Street and Washington sought changes in farm policies that would loose 'a plague of cheap corn' on the nation." Pollan (2006, p.51) blames former Secretary of Agriculture Earl Butz, whose farm policy allegedly "…revolutionized American agriculture, shifting the food chain onto a foundation of cheap corn." Cheap corn subsidized by government price support commodity programs in turn induced a plague of factory mega farms, fast and cheap food, and obese consumers. Walsh (2009, p.31) concluded that "Unless Americans radically rethink the way they grow and consume food, they face a future of eroded farmland, hollowed-out countryside, scarier germs, higher health costs—and bland taste."

Whatever their other faults, commodity programs account for only a small share of chronic overeating. Westoff (2010, p.1) noted that U.S. corn farmers earned receipts of $40 billion in 2009 and received government subsidies of $4 billion in direct payments and crop insurance. He also observed that U.S. farm commodity subsidies, crop insurance, and conservation subsidies total approximately $20 billion per year. The latter is only 2 percent of consumer expenditures on food, and hence not large enough to have much influence on consumers' purchases. Some of those government payments were for the 30 million acre Conservation Reserve Program and other output-suppressing programs which added to food prices.

Tweeten (2002, p.10) estimated that farm price and income policies (including crop insurance subsidies) increased farm output by approximately 3 percent on average in the 1998-2000 period.

That additional output decreased farm commodity prices by about 6 percent. However, because farmers receive only 25 percent of consumers' food dollars, commodity programs decreased food prices at the retail level by just over 1 percent one off—not enough to have much impact on consumption and hence on obesity.[1]

The obesity epidemic has been led by sugar and fat, ingredients prominent in fast foods such as hamburgers and soft drinks, the latter sweetened by corn fructose. Public policy has a mixed effect on these foods, however. Corn price and hence fructose price were slightly lowered by farm commodity policy. But U.S. sugar policy has constrained imports and supported domestic sugar prices, often at double the world price, raising fructose prices and restraining sugar consumption.

Bioenergy programs

Government commodity programs to increase food supply and thereby lower food prices are more than offset by government biofuel subsidies and mandates that increase farm output demand and thereby raise food prices. Blenders of transportation fuels receive a tax credit of 45 cents for each gallon of ethanol that is combined with gasoline. That credit mostly flows to ethanol producers and to corn farmers. The blend credit absorbed 30 percent of the nation's corn crop and reduced government revenue by $6 billion in 2009 (U.S. Department of Agriculture, 2010b, Table 1). High-protein feed byproducts of ethanol production dampened the food price impacts, but biofuels use was sufficient to entirely offset the 3 percent increase in output due to commodity programs.[2] Thus these government policies on the whole had minor impact on farm food output, prices, and incentives for overeating (see Box 1).

Box 1. The Congressional Budget Office (2010) concludes that costs to taxpayers of reducing greenhouse gas emissions through the biofuel tax credits vary from $750 per metric ton of carbon dioxide equivalent for ethanol, about $275 per metric ton for cellulosic ethanol, and about $300 per metric ton for biodiesel. Those estimates do not reflect any emissions of carbon dioxide that occur when biofuel feedstock production causes forests or grasslands to be converted to farmland. Accounting for all costs including changes in land use brings the cost to more than the benefits of reducing greenhouse gases (GHGs) through the use of biofuels. More cost effective means exist to reduce GHGs. Burney et al. (2010) at Stanford University estimate that agricultural research to raise yields in the 1961- 2005 period cost only $4 to $7.50 per ton of atmospheric carbon reduced. Higher yielding crop varieties, for example, produce more output per unit of fossil energy input. This conclusion does not mean that biofuels have no place in the economy. But allowing competition in the marketplace in the absence of subsidies either to oil or biofuel production would appear to be a useful way to let markets determine the role of biofuels in a sound economy.

[1] Critics may call for a focus on corn rather than aggregate farm output. This essay emphasizes the latter because except in the short run farm commodities are fungible. That is, a corn subsidy expands corn production at the expense of other crops, raising the latter's prices until economic returns are equivalent among crops.

[2] Ethanol utilized 30 percent of the nation's corn crop in 2008, but allowing for distillers grain byproducts for feed, the net removal was 21 percent. With corn comprising 18 percent of farm output, the net ethanol reduction in farm output was .21x18 percent=4 percent—enough diversion of farm output to offset the 3 percent added by government commodity programs.

In summary, public commodity programs and bioenergy programs have had only modest net impact on food prices in recent years. However, blaming "subsidies from Washington" referred to by Walsh 2009) and the "plague of cheap corn" referred to by Pollan (2006, pp. 47-56) for cheap food has too often sent consumers down blind alleys.[3] A survey conducted by the Milwaukee-based firm Morgan and Myres (Mercer, 2010, p. 1) found that people in Illinois question modern farming methods. AAA attacks on fructose have caused some food processers to substitute cane sweeteners for corn sweeteners although the two sweeteners are equivalent in metabolism and cost. And replacing fat with sugar in foods may contribute to chronic overeating.

Agricultural research, extension, and infrastructure programs

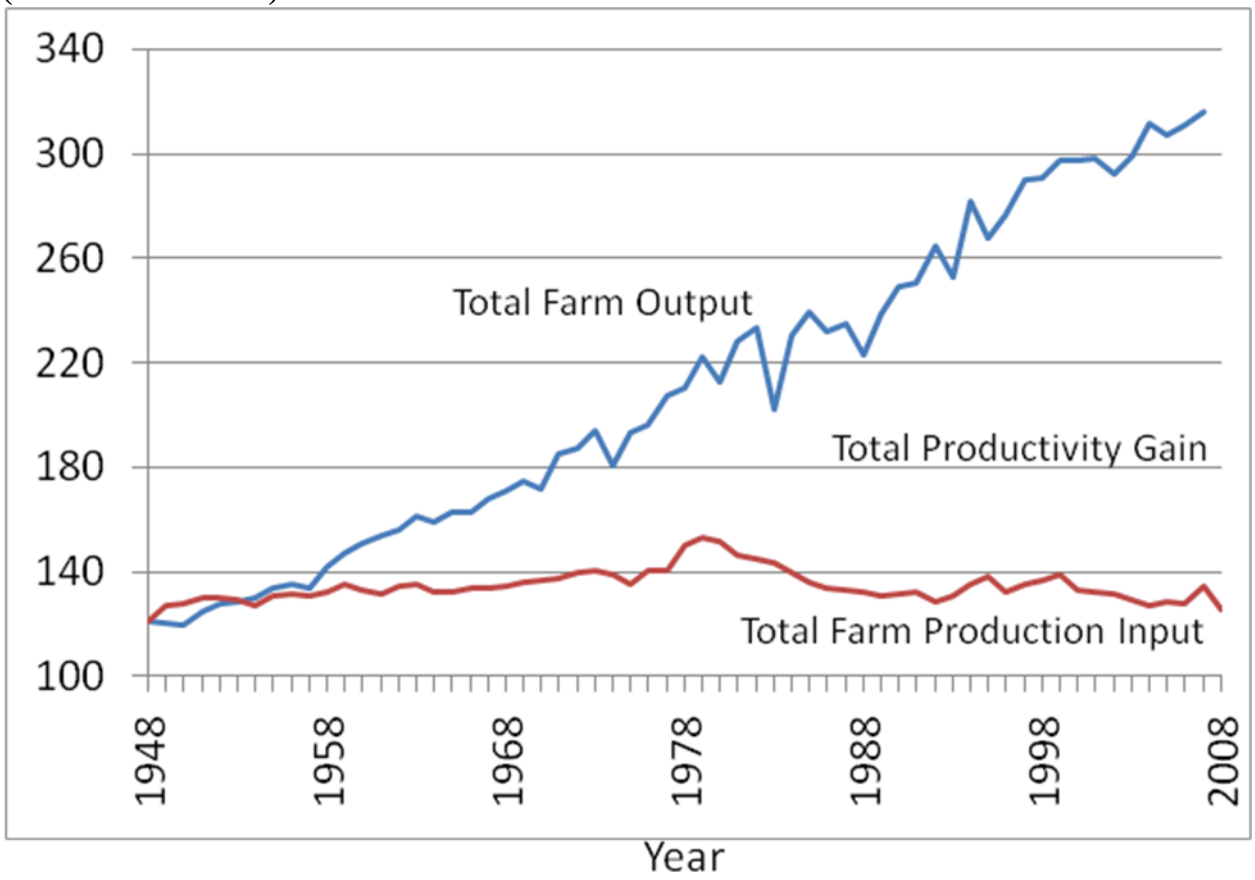
The remainder of this section is devoted to the "800 pound gorilla" —the public policy to raise agricultural productivity through research, extension, education, and infrastructure. Such policies overshadow all other policies contributing to a "cheap food policy". Unquestionably, the U.S. and many other nations have pursued a low price food policy. The heart of that policy is investment in agricultural research, with U.S. expenditures increasing from $5 billion in 1970 to $9 billion in 2008 (U.S. Department of Agriculture 2010a, p.1, *in 2001 dollars*). Public sector expenditures slightly exceeded private sector outlays in 1970 but accounted for just $4 billion of the $9 billion (44 percent) of total expenditures in 2008.

At issue is not whether the nation has followed a low cost food policy; it has! Rather, the issue is whether the low cost food policy is wise. The policy has had a very high positive payoff. Figure 1 shows the path of total U.S. farm conventional production inputs and total farm output annually from 1948 to 2008. Conventional farm production inputs such as labor, commercial fertilizers, pesticides, and land supplied largely by the private sector increased modestly from $121.3 billion in 1948 to $125.6 billion in 2008 (U.S. Department of Agriculture 2010a, and expressed in 2008 dollars). During the same period, farm output of crops and livestock increased from $121.3 billion to $313.2 billion, a nearly threefold gain. The excess of output over input since 1948 (the difference between the lines for output and input in figure 1) had grown to $187.6 billion by 2008. If that productivity value since 1948 that had accrued to $187.6 billion of conventional farm inputs saved in 2008 alone is not lost but is maintained in perpetuity and discounted at 5 percent, it is worth $3.74 trillion.

Whereas as noted earlier commodity programs and biofuels had little net impact on farm prices, productivity advances increased farm output on average by 1.5 percent annually and, other things equal, lowered farm-level food prices approximately 3 percent per year in the six decades from 1948 to 2008. Given that farm ingredients constitute 25 percent of food price, the 3 percent annual reduction in farm-level prices constitutes about a 1 percent annual reduction in consumer food price.

[3] Other dimensions of food policy include food safety. For example, the Food and Drug Administration reported 1,614 illnesses, 187 hospitalizations, and two deaths from consumption of raw milk between 1998 and 2008. Yet, some AAAs continue to push for more raw milk sales despite little scientific evidence of nutritional or other benefits (see "Real Raw Milk Facts" 2010).

Figure 1. U.S. Total Farm Production Input, Output, and Productivity Gain from 1948 to 2008 (Billion 2008 dollars)



Source: U.S. Department of Agriculture (2010a)

The low price elasticity of demand for food implies that consumers do not consume much more food as food price falls but receive most of the lower-price benefit as less cost—equivalent to an addition to income. The $187.6 billion in saving on agricultural inputs in 2008 alone from productivity gains since 1948 saved the 305 million U.S. residents on average $615 per person. That $615 was not free: The gain in farm productivity and hence most of the gain in farm output since 1948 came at a cost for nonconventional inputs including research, education, and infrastructure inputs. A typical rate of return on the cost of nonconventional public inputs underlying productivity gains is 45 percent (see Tweeten and McClelland 1996, pp. 83-87), hence the *net* gain from investment to raise agricultural productivity was $58.22 billion in total or $191 per person in 2008.[4] This gain may be viewed as equivalent to $191 added to income per person in 2008 and every year thereafter from agricultural productivity gains generated in the

[4] Let aggregate farm output from nonconventional input (productivity) be O and the rate of return on nonconventional input I be r, so that

O= (1+r) I, and

I=O/ (1+r). The net economic gain from nonconventional inputs is therefore

1948-2008 period. If the foregoing calculation had included productivity gains from investments to raise agricultural productivity prior to 1948, additions to personal income would have been greater. The "cheap food policy" has had a dramatic payoff, substantially raising living standards of American consumers. An alternative conclusion is that the nation could afford to spend up to $191 per person each year to alleviate any unfavorable outcomes from keeping food prices low and just break even on food policy.

Low cost food, a blessing to consumers, indeed has induced some excess food consumption. It is important to note, however, that chronic overeating, a worldwide epidemic, has causes that overshadow the impact of public programs to lower food costs. Food technicians and chefs have been ingenious in concocting tasty, irresistible, processed, fast foods containing high levels of salt, fat, and sugar. In developed countries the latter are low-cost food ingredients whatever the public policy regime. The value of time has risen sharply as women have taken jobs outside the home and they purchase food prepared outside the home to reduce time in the kitchen. Fresh fruits and vegetables recommended for a healthy diet are not prominent in the "take home and eat" prepared food diet. Consumers have become more sedentary as the nation has morphed from dependence on extractive and manufacturing industries requiring much manual labor to service industries and desk jobs. Modern transportation, television, and computers also have promoted sedentary lifestyles.

The conclusion thus far is that public programs, whatever their other virtues and shortcomings, have not had a decisive impact on America's chronic overeating problem. One can argue, nonetheless, that public policy for food could be made more health conscious. Examples would be to impose taxes on sugar soft drinks (perhaps with proceeds used to subsidize fruit and vegetable consumption) or increase health insurance rates of overweight persons. There seems little reason to make sugary soft drinks and empty nutrient snacks available in schools. An extended treatment of such measures is beyond the scope of this essay, however.

The Centers for Disease Control and Prevention (2010) appropriately made no mention of an overall increase in the price of food as a promising means to reduce chronic overeating. In 2010 some 72.5 million Americans were obese as evident from a body mass index over 30. In the same year 40 million persons, many of them obese, participated in the Supplemental Nutrition Assistance Program (SNAP), formerly the food stamp program. If, as averred by AAAs, cheap food is a source of chronic overeating, should SNAP be terminated? The answer is no, but greater effort is warranted to steer SNAP subsidies to encourage consumption of fruits and vegetables and away from sugary drinks and high-calorie snacks. SNAP could come closer to the federal WIC (Women, Infants, and Children) subsidy program which makes only approved foods available to recipients.

Alternative agriculture activists contend that the numbers in figure 1 omit important costs that are externalities, that is, costs that do not enter the accounts of firms and hence to not cause them

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N=O-I=O-O/(1+r)=rO/(1+r).

With the gross gain O of $187.6 billion in 2008 and rate of return 45%, the net gain is $58.22 billion and the per person gain with a population of 305 million is $191.

to act in the public interest. High yield agriculture utilizes synthetic nitrogen, but as little as 25 percent of it is taken up by beneficial plants, the remainder contaminating groundwater or volatilizing as a greenhouse gas into the atmosphere. A recent study by analysts (Burney et al. 2010) at Stanford University estimated the net effect on greenhouse gas (GHG) emissions from agricultural intensification from 1961 to 2005. Their conclusion was that

> We find that while emissions from factors such as fertilizer production and application have increased, the net effect of higher yields has avoided emissions of up to 161 gigatons of carbon since 1961...Our analysis indicates that investment in yield improvements compare favorably with other commonly proposed mitigation strategies. Further yield improvements should therefore be prominent among efforts to reduce future GHG emissions.

Do AAAs Offer a Low Cost Food Alternative?

The quintessential alternative agriculture vision protecting the environment and welfare of consumers and animals is a food system comprised of small, organic, local farms producing organic crops and livestock, grass fed cattle, and free-range hogs and chickens delivered to nearby farmers' markets serving local vegetarian and vegan consumers. Such a food system, if widespread, drastically diminishes living standards because food in such a setting is very expensive. One reason for increasing cost is that the one source of resource savings, vegetarian diets, doesn't work—people consume more animal products as income rises. The AAA vision is a poor example for developing countries seeking ways to raise agricultural productivity and living standards.

Organic farming constitutes only niche production and marketing in the United States and is widely practiced only in poor countries characterized by subsistence agriculture. In 2007, organic crop farmers accounted for only 0.7 percent of all farms and for 0.4 percent of farm receipts in the U. S. (Committee on Twenty-First Century Systems Agriculture, 2010, p. 223).

The organic market is growing rapidly but is likely to remain small. Organic foods are expensive because they require more resources to produce. A 1990 survey (Batte et al. 1993) found that organic crop yields in Ohio averaged 25-30 percent below conventional farming crop yields. Accounting for lower cropping intensity, for green manure crops needed to build fertility, and for organic fertilizers brought in from elsewhere, Tweeten (2003, p.71) concluded that it takes nearly twice as many acres to produce a given crop output organically as conventionally. This conclusion is consistent with a comprehensive national study at Texas A and M University by Knutson et al. (1989) which estimated that crop yields on average would be cut in half by ending use of synthetic fertilizers and chemicals. "Organic" production rules preclude genetic engineering technologies. Such genetic engineering currently is a major source of increasing yields and constitutes the most promising technology to raise future productivity of the world's food system.

In a recent review, the Committee on Twenty-First Century Systems Agriculture (2010, p. 224-226) concluded that on average over a wide range of conditions across the United States, organic

yields averaged approximately 90 percent those of conventional agriculture. The wide disparities among studies comparing organic and conventional yields are explained by differences in management, soils, and on what fertilizer and pesticide additives are allowed. Enough additives and cropping the best soils can bring "organic" yields closer to conventional yields, but blurs the distinction between the two means of production. For example, organic and synthetic fertilizers and pesticides can have similar impacts on the environment and health. There can be little doubt that organically producing today's farm output would require a massive expansion of cropped and pastured area. Problems of soil erosion and wildlife loss would be severe as cropping would be extended to marginal, to forested, and to environmentally fragile soils. Additional mechanical cultivation to control weeds in organic production would raise soil erosion and diminish opportunities for carbon sequestration possible with no-till farming. If government controls were instituted to restrict crop area to protect the environment, the result would be food shortages and high food prices.

Farms producing organics historically have been smaller and more labor intensive than conventional farms. Production costs on small farms tend to average more than double the unit costs on large farms (see Tweeten 1989, p.124). An affluent society characterized by high labor costs does not treat labor-intensive enterprises kindly. Consequently, over time a world of organic production is likely to become as concentrated on large farms as is current conventional agriculture. Moving organic production to larger farms would raise objections from organic food buyers who don't like the concentrated, confinement, factory systems characterizing such farms.

Diane Bourn of Otago University and colleagues in New Zealand reviewed approximately 100 studies comparing organic foods with those grown using agricultural chemicals (see Kovach 2002). Organic foods were found to be no healthier or tastier on average than other foods. (The researchers noted that the bulk of the studies—mainly from Europe but also from the United States and Australia—were poorly done, but the direction of any bias was not clear.) The authors claimed environmental benefits for organic foods, but did not consider the impact on the environment of soil erosion and wildlife losses from widespread low-yield organic cropping.

Dangour et al. (2010) published in the *American Journal of Human Nutrition* what they called "… the only systematic review to assess the strength of the totality of available evidence of nutrition related health effects of consumption of organic foodstuffs". Based on nearly 100,000 articles (most of which were rejected for lack of scientific rigor or methodological flaws) from the past 50 years, the authors concluded that "evidence is lacking of nutrition-related health effects that come from consumption of organically produced foodstuffs".

None of the above numbers directly measure resource productivity. Market price is one measure of relative productivity for products with similar final-demand characteristics. Batte et al. found that price premiums to farmers for organics in 1990 ranged from 67 percent for corn to 135 percent for wheat. The premium carries to the retail level—consumers paid more in 1990 and continue to pay more for organic than for conventionally grown foods. In an article generally supportive of organic farming, Walsh (2009, p. 33) published the annual cost of a representative organic ($1,732) and a conventional market basket ($825) of a typical food consumer. Assuming no glitches in markets, such numbers indicate that organic foods require more than twice as

much resources as conventional foods per unit, a massive loss of resource productivity compared to conventional foods.

Michael Pollan (see Worthen, 2010, p.1) explained why it makes sense to pay the seemingly exorbitant $8 charged consumers for one dozen locally produced organic eggs:

> Eight dollars for a dozen eggs sounds outrageous, but when you think that you can make a delicious meal from two eggs, that's $1.50. It's really not that much when we think of how we waste money in our lives.

Of course, consumers of organics do not live on eggs alone and some consumers are willing to pay a price premium for a comprehensive organic diet. Economists consider labeling of products an especially attractive policy because it allows consumers in the marketplace to vote with their dollars for their preferred foods, including the way food is produced. Labeling allows tailoring of production and marketing practices to individual consumer preferences. But labeling gives rise to some paradoxical results that help to explain why activists often prefer the referendum which forces all producers to adopt a practice if a majority of voters support it. For example, eggs from free-range and barn-raised laying hens were just a niche market in California under labeling, but received an overwhelming two-thirds majority of votes in referendum outlawing battery cages. The resulting new policy will not do much for animal welfare if eggs produced under conditions less favorable than those in California can continue to be shipped into the state after the referendum.

Rising energy costs, environmental concerns, and costs of production have given prominence to "food miles" by "locavores" to promote local food production and discourage food imports from distant production sites. To save energy and the environment, locavores favor food that travels the fewest miles from production to consumption. Desrochers and Shimizu (2008, p.1) ridicule the concept:

> The evidence presented suggests that food miles are, at best, a marketing fad, but one which so frequently and so severely distorts the environmental impacts of agricultural production that it could be liable to prosecution under false advertising statutes. More importantly, it constitutes a dangerous distraction from the very real and serious issues that affect the affordability, energy consumption, and environmental impact of modern food production.

The food miles concept does not consider the fact that the cost per pound of food transport in an 18-wheeler is a fraction of the cost in a family SUV. It does not consider the advantages of combining numerous food purchases in one trip to the supermarket versus a trip to the farmers market for a few items. It does not consider the lower costs (including energy) of food production in areas of comparative advantage or the advantages of year-round access to fruits and vegetables. In a larger sense, food miles ignore the malnutrition among low income consumers from unaffordably high food prices.

Locavores promote farmers markets in part because of freshness and taste of locally produced food. Farmers markets indeed are a useful component of the nation's food marketing system, but

do not address food problems such as food insecurity or obesity. According to Jane Black (2010), growth in farmers markets is not proof of strong local food systems. Black went on to note that "Researchers at Franklin and Marshall College's Local Economy recently released a study that suggested that it is largely wealthier urbanites who benefit from farmers markets. When small farmers head for the big cities, where they can charge higher prices, traffic drops off at smaller, rural markets and makes them untenable."

Before concluding, this essay briefly turns to one additional issue on the alternative agriculture agenda affecting food costs: better care of farm animals, an issue promoted by animal rights activists. As with many issues raised by AAAs, these issues are value-laden, are controversial, and affect food costs. The issues are contested in the political arena and not always with results favoring farmers.

The Humane Society of the United States (HSUS) seeks to phase out battery cages for laying hens, gestation crates for pregnant pigs, and crates for veal calves in favor of group housing. In 2008, California voters approved a measure (Proposition 2) mandating as of January 1, 2015 that it shall be a misdemeanor for any person to confine a pregnant pig, calf raised for veal, or egg-laying hen in a manner not allowing the animal to turn around freely, stand up, lie down, and fully extend its limbs. Several other states have laws similar to California's Proposition 2.

It is important to recognize that nearly everyone including persons associated with large confinement feeding operations supports humane treatment of animals. At issue is what constitutes humane treatment. On the one hand, large confinement cage or crate operations would seem to reduce animal welfare by inhibiting the freedom of animals for nesting, sex, and exercise. Proponents contend that Proposition 2-type legislation will enhance animal welfare, provide healthier food because animals will contract fewer air-borne diseases, and will reduce soil, water, and air pollution. AAAs seized upon the half billion egg recall for salmonella control in 2010 as proof that factory farms pose a unique danger to food safety.

On the other hand, the agricultural establishment contends that food safety and environmental protection depends on management, not size of operation. The previous major incidence of salmonella in eggs was from a cage-free organic production system (Smith 2010, p.1). Confinement protects laying hens from extreme temperatures, predators, and soil-borne diseases and parasites. Animals in confinement can be monitored closely at low unit cost for animal health and adherence to safety regulations. Feces are not walked on or eaten, but fall through screens. With eggs and feed moved by conveyor belts and untouched by human hands, confinement operations use less land, labor, and other resources per animal unit. Battery cages currently housing laying hens usually hold 6-7 hens, allowing a perhaps publicly unacceptable one-half square foot of space per bird. With a wing span of 3 feet per hen, Proposition 2 requires 9 square feet per hen—an expensive but unneeded size because chickens are herd animals that prefer to flock together. Proposition 2 requirements are expected to raise egg production cost by 25 percent or more (Sumner et al., 2009). California has enacted legislation to forbid egg imports from states with less stringent animal welfare laws. Such legislation could face challenges in federal court, however, for obstructing interstate commerce.

One of the best protectors of animal welfare is performance—poorly treated animals are unproductive and diminish farm profits. Animal psychologists and veterinarians have monitored the impact of confinement on animal hormone levels, the cardiovascular system, and behavior such as cannibalism. Such objective measures of animal well being give mixed results, leaving an unfortunate leeway for subjective and hence often arbitrary judgments (cf. Tweeten 2009).

Conclusions

A policy of employing science and technology to reduce food costs has served society and the environment well. Alternative agriculture advocates are not a homogeneous group and advice differs among their spokespersons, but on the whole the weight of evidence cited in this study indicates that the policies they advocate are not helpful to food consumers at home and abroad. Some persons prefer to eat organic, local, and slow food for their own reasons, but on the whole are not doing the environment or the economy a favor.

St. Augustine called for people to "Love God and do as you please". The economist advises to "Price right and do as you please" for efficient markets. It is sometimes appropriate to tax foods such as sugar soft drinks that have negative externalities—where social costs exceed private costs; and to subsidize foods with positive externalities such as vegetables for the very poor. Restraint is in order, however, because to improve well being the cost of intervention must be less than the cost of allowing the externality to continue.

To be sure, current markets do not price right—carbon is underpriced and hence so are fossil fuels. If prices are right, wider use of labeling will allow consumers to vote in the marketplace for the food production practices they prefer. Fresh, locally produced foods often have advantages of taste and local farmers markets rightly will remain part of the food system--even in the unlikely case that such markets are hurt by carbon taxes reflecting the full social cost of fossil energy. Many consumers will continue to enjoy the freedom to purchase slow, local, and organic foods produced by local small farms for farmers markets. *However, a case cannot be made to subsidize such a system of small farms (or of large conventional farms)*.[5] It is appropriate nonetheless for government to help fund basic research as a public good for alternative as well as for conventional agriculture.

The current world food system obviously has flaws. But on the whole, the world's richest economies have an enviable record of providing safe, abundant, low cost food, and higher real

[5] Not all current agricultural practices can be defended. Indiscriminate use of antibiotics for farm animals is one of them. Half of antibiotic use in the United States is on farm animals, and is for one or more of three purposes: promote growth, prevent illness, and treat illness. Sub therapeutic use of antibiotics to promote growth or prevent illness in farm animals is difficult to defend if it builds resistance to antibiotics used to treat illness in humans. In 2006 the European Union banned the use of antibiotics to promote growth in farm animals. The Food and Drug Administration says that overuse of antibiotics for livestock has increased the prevalence of antibiotic-resistant bacteria that threaten human health (Brasher 2010, p.1). U.S. livestock producers contend that there is insufficient scientific evidence that drug-resistant bacteria move from animals into food, that restrictions on antibiotic use would unduly drive up animal production cost, and that antibiotics such as ionophores, for example, which have no human application can be used safely for cattle. Public policy will evolve to deal with such issues as results from ongoing research inform the political debate.

income. The U.S. was one of the group of 30 rich nations in the Organization for Economic Cooperation and Development which between 1990 and 2004 increased food production and agricultural biodiversity while benefiting the environment by reducing farmland area, soil erosion, greenhouse gas emissions, and nitrogen overuse (see Paarlberg, 2010, p.10). In serving the best of these trends, only agriculture based on science, modern technology, and the market is sustainable.

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