

**Considering the Contribution of U.S. Food and Agricultural Policy to
the Obesity Epidemic: Overview and Opportunities**

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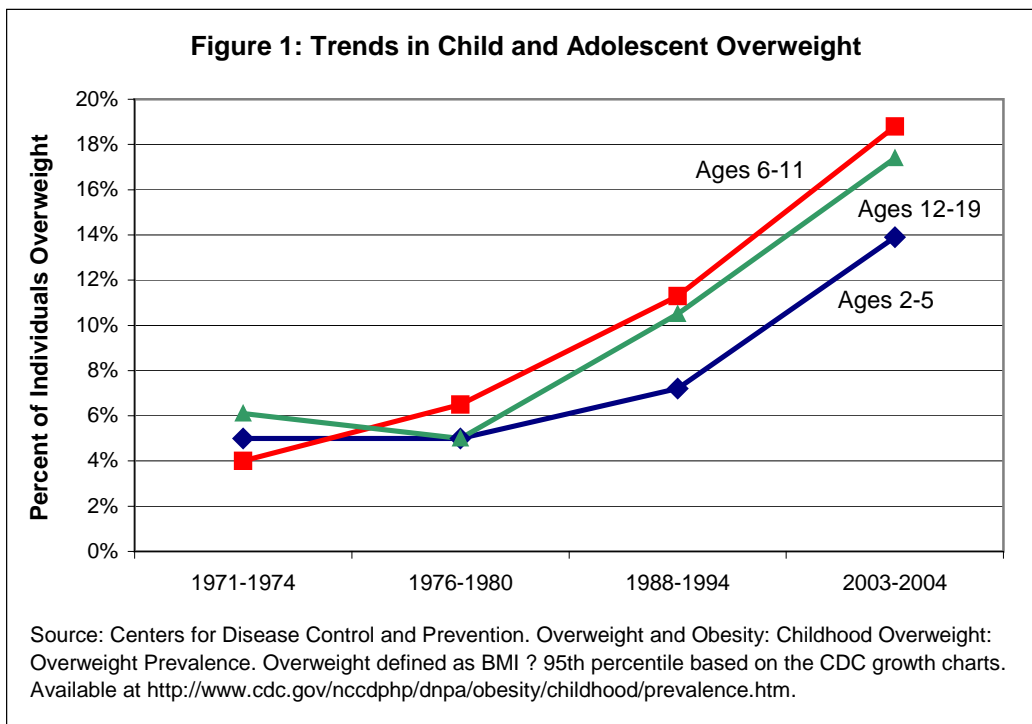
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INTRODUCTION

Nearly one in three American adults are now obese; two-thirds are overweight or obese.^{1, 2} These proportions have increased steadily over the past 30 years. Direct and indirect costs of obesity alone have been estimated at \$117 billion.³

Overweight and obesity are just one measure of Americans' underlying nutritional dysfunction. Poor diet also is a risk factor for four of the six leading causes of American deaths – heart disease, cancer, stroke, and diabetes.⁴ Combined with obesity, these diseases may cost a collective \$556 billion *per year* in direct and indirect costs, according to estimates.⁵ Being obese can also give rise to high blood pressure, high cholesterol, asthma, sleep disorders, liver disease, and arthritis, as well as mood and mental health disorders.

The problem of childhood obesity, as measured by today's direct costs, is much smaller. But an exclusive focus on current costs greatly distorts the true picture. Today's overweight children are harbingers of tomorrow's overweight and obese adults; since the 1970s, children considered overweight or obese have doubled, from 15 percent of all children to nearly 30 percent today⁶ (Figure 1). The share of children considered obese has tripled. With these trends, future costs of childhood obesity – in human or economic terms – are sure to explode. Some say today's children will be the first to live shorter lives than their parents.⁷



Once obese, people have trouble shedding the weight. Treatment of obesity therefore is difficult, often unsuccessful, and also hugely expensive.⁸ The 100,000 or so U.S. stomach bypasses performed each year – at 20 to 40 thousand dollars apiece – cost as much as Vietnam's entire health budget.⁹ Prevention of obesity in childhood, therefore, is not only a logical focus for

public policy, but a cost-effective focus as well. A 2004 report by the Institute of Medicine called the prevention of childhood obesity a national priority.¹⁰

Childhood obesity is a society-wide problem reflecting the interaction of environment, biology, and behavior.¹¹ At a population level, biological factors do not change over the short-term. Therefore, they offer little opportunity for prevention. On the other hand, today's children look so different, statistically and in appearance (Figure 1), compared to children thirty years ago that it is obvious that something significant must have changed in their environment. If we can better understand and help reverse the environmental contributors, the prevention of childhood obesity will be more achievable.

What are these environmental contributors? There are few definitive answers. Factors from television and video games, to lack of sidewalks and pervasive junk food marketing have been implicated, for example. The World Health Organization believes the urbanization of our population promotes poor eating and inactivity.¹² It is likely that several environmental factors contribute to obesity, and the *synergy* between them may well be more important than any individual factor.

Public policies help shape food environments for children, as well as environments for their physical activity. School lunch programs, children's access to energy-dense processed foods in vending machines and convenience stores, and marketing of these foods to children are all issues that have been the focus of policy advocacy. Oddly absent in public discussion thus far, however, has been discussion of the impacts of agricultural policy.

Food has to come from somewhere. Federal agricultural policy helps determine which crops and animals U.S. farmers produce, the price of those crops, and subsequently which products food processors, distributors and retailers ultimately will get into the mouths of children and their families. In the midst of an "epidemic" of child obesity, how can our society rethink its approach to children and food without talking about agriculture?

The lack of public attention to agriculture is not surprising. Never have so few Americans been involved directly with producing food. For children in particular, the disconnect between agriculture and their daily lives has never been greater. Suburbanization, combined with the industrialization of agriculture, makes it increasingly unlikely that children will ever see, let alone experience, a working farm. As houses expand and their lots shrink in size many children may never have the experience of growing food. There is little wonder that federal agricultural policies – even ones involving as much as \$180 billion per decade, like the Farm Bill – can be nearly ignored in discussions about nutrition and health.

Our paper lays out some of the ways agricultural policies help shape which, and in what relative quantities, foods are produced and consumed in the United States. In doing so, we are able to identify some important contributing factors to negative trends in overweight and obesity. Our interest is also in identifying possible strategies for redirecting policies so as to blunt those trends. Unlike expensive and often-unsuccessful treatments of obesity, public policies that can succeed at preventing childhood obesity may not only be "nine-tenths of the cure," but also a highly effective public investment.

The paper's organization is as follows:

- The first section summarizes trends in the supply and consumption of food produced in America, focusing on added fats and sugars.
- The second section examines agricultural policy. It explores the historical evolution of agricultural policy, along with technological changes that have greatly affected today's cropping systems. We focus on recent agricultural policies, including the nutritional programs and programs supporting producers of certain commodity crops that make up the bulk of the Farm Bill.
- Our third section correlates negative trends in individual health with the nutritional value of foods produced, the availability and price of those foods, and U.S. agricultural policies that encourage their production.
- Finally, we arrive at some recommendations for areas in which we believe changes to public policy, both in the short- and long-term, hold promise for influencing current trends in diet-related disease. We also highlight some priority areas for further research and analysis.

One caveat to our report is necessary. Because food and diet impact on human health at many different levels, our analysis will not focus solely on obesity prevention. Rather, we provide recommendations for areas of further analysis and research around policies affecting food production and distribution more generally. While we think reductions in obesity and in diet-related disease will be one important benefit of such policies, the scope of health benefits likely will be much broader – and the potential cost savings much greater – than can be appreciated by limiting the focus solely to obesity.

I. TRENDS IN FOOD PRODUCTION AND CONSUMPTION

Ample evidence exists that childhood obesity is “a result of the interplay between people’s genes and environments.”¹³ Obesity prevalence has escalated over so short a period of time that no underlying change in the genetics of the population can account for it. Children’s environments, on the other hand, have changed quite markedly in recent decades, and continue to do so.

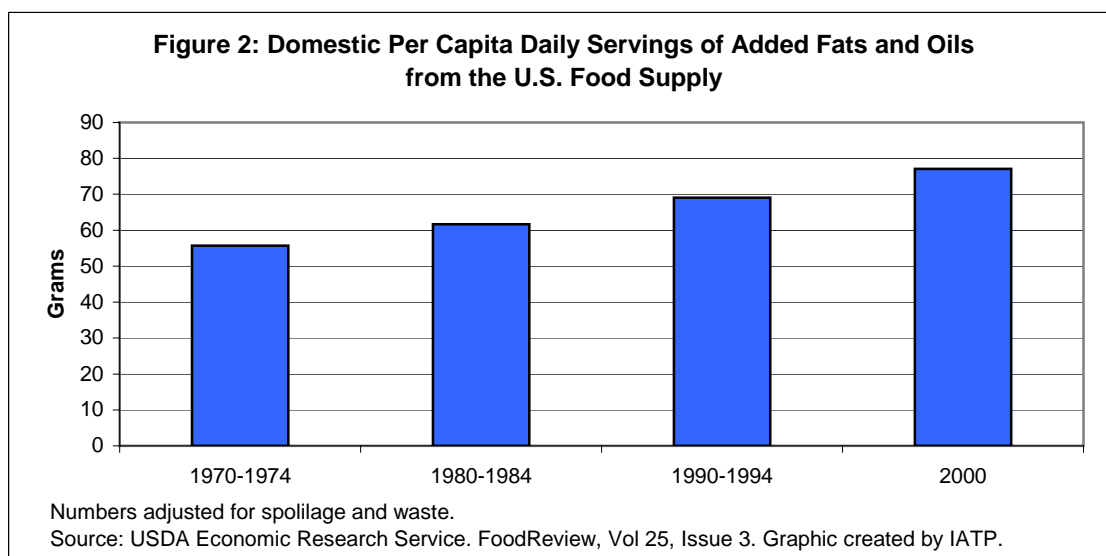
Though many “environmental” factors contribute to childhood obesity, the over-consumption of calories is a primary driver. Americans ingested roughly 300 calories more in the year 2000 than in 1985, according to USDA estimates.¹⁴ Of the 300-calorie excess in per capita consumption, it is estimated that added fats accounted for 24 percent and added sugars for 23 percent.¹⁵

Excess calorie consumption is at least partly related to processed food products supplied by the food industry, which are in turn associated with the domestic food crops grown by farmers. Compared to 2000 federal food pyramid recommendations, for example, the USDA estimates that the U.S. food supply delivered about a 59 percent excess of added fats and oils, an 18 percent excess of grains and a 158 percent excess of added sugars.¹⁶ By contrast, the typical American diet is too low in fruits and vegetables, in calcium and fiber, and in whole unrefined grains.¹⁷

Trends in Added Fats and Oils

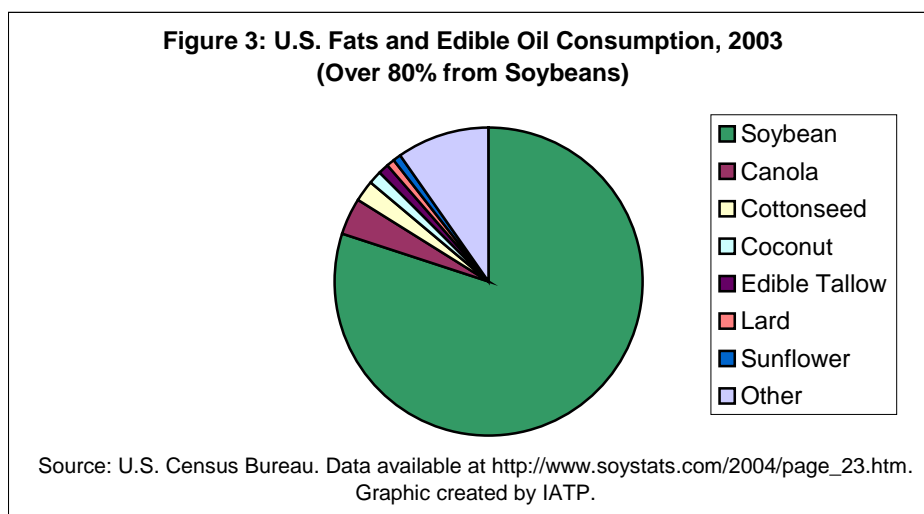
In terms of agricultural changes to the food environment, the 30-year trends are particularly striking. Over about the last 30 years, Americans have increasingly eaten a diet that diverges from what we now consider to be healthy.

In the American food supply, the per capita daily supply of added fats and oils (considered by USDA to be a proxy for consumption) increased 38 percent in the 30-year period from around 1970-74 to 2000 (Figure 2) and more than doubled from 1909.¹⁸



Added fats are those not naturally in foods such as milk or meat, but rather those consumed as margarine; as shortenings and oils used in commercially prepared snack foods and cookies; and in French fries, doughnuts and other fried foods. Shortening and margarine – also major sources of trans fats – accounted for more than a third of added fats in 2000.¹⁹

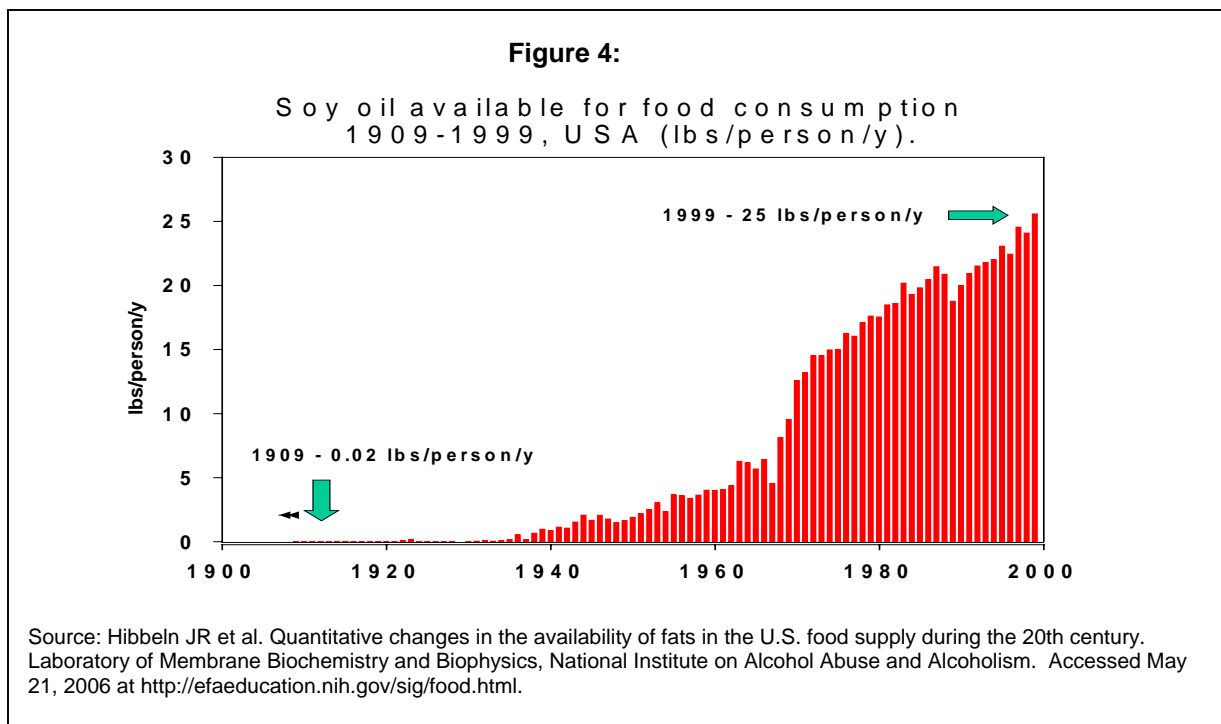
Salad and cooking oils accounted for nearly half of all added fats in 2000, at 33.7 pounds yearly per capita. Much of this comes from soybeans; soybean oil accounts for over 80 percent of oils consumed by Americans (Figure 3). Dr. Joseph Hibbeln, of the National Institutes of Health, estimates that the average American's daily intake of soy oil alone accounts for 20 percent of total daily calories.²⁰



Cooking oils used by Americans have changed in lockstep with changes in crop production. For example, early in the twentieth century, cottonseed oil was a major cooking oil.²¹ Procter & Gamble began selling cottonseed oil in 1911 as Crisco,²² a creamed shortening replacement for lard; Crisco's introduction came after researchers learned how to extract oil from cotton seeds, refine it and partially hydrogenate it, causing solidification at room temperature.

Seventy years ago, soybeans were not even grown in the U.S. Today, they are America's leading agricultural export. Much of the nation's heartland is cultivated using a two-year rotation that grows corn one year, and soybeans the next. Most soybeans are grown for oil production; U.S. production of soy oil has increased 1,000-fold over the last century.

Commercial baking and frying is the largest single category of soy oil use.²³ By the 1950s and 1960s, soybean oil had become the most popular U.S. vegetable oil, largely replacing cottonseed oil.²⁴ As shown in Figure 4, prepared by Hibbeln, per capita soy oil available for consumption accelerated over the last three and a half decades, increasing from about 10 pounds per person per year in 1969 to 25 pounds per person per year in 1999.



Until recently, most soy cooking oil had been hydrogenated. The partially hydrogenated oils preferred by the food industry for highly processed baked goods, deep frying, and salad dressings accounted for an estimated 80 percent of dietary trans fats.²⁵ Hydrogenation lends heat stability to the oil.

With concerns over trans fats and new labeling requirements, some major commercial end-users of soy oil, especially of the hydrogenated variety (trans fats), are seeking to transition to healthier cooking oils, like those from canola or sunflowers. Seed companies Monsanto and DuPont/Bunge reportedly have introduced new soybean varieties that produce oils with more oxidative stability.²⁶ Unfortunately, this is accomplished by reducing the content of healthful omega-3 fatty acids, which are heat labile, in these varieties.²⁷

Canola oil, first developed in the 1970s from new rapeseed cultivars, contains about 20 percent more of healthy omega-3 fatty acids (ALA) per serving than does soybean oil.²⁸ More heat-stable canola oils suitable for cooking have begun appearing on the market. Although increasing, canola oil production in the U.S. is still dwarfed by that of oil from soybeans. Similarly, although flaxseed oil – with five times more omega-3 fatty acid content than canola and up to 60 percent ALA²⁹ – is a particularly rich potential dietary source, flaxseed production remains tiny by comparison to either soybeans or rapeseed.

Essential fats in salad and cooking oils

Salad and cooking oils can vary in their healthfulness. Vegetable oils are some of the chief sources of essential fatty acids, including both omega-6 and omega-3 fats, in the diet. In recent years, increasing attention has been given to the health impacts when the balance of omega-6 to omega-3 fatty acids in the diet, and therefore at the cellular level, is less than optimal.

A diet overly abundant in omega-6 relative to omega-3 fats is thought to lessen conversion within the body of shorter-chain omega-3 fatty acids (ALA) to the longer-chain fatty acids (DHA) most positively associated with cardiovascular health. The recommended omega-6: omega-3 ratio of 2.3:1 is based on maximizing this conversion. Other research suggests that optimizing the balance of essential fatty acids in the diet may help reduce chronic inflammation. Inflammation is a core disease process common to many chronic diseases, including several that are diet-related such as cardiovascular disease, diabetes, stroke and arthritis. As noted by Kris-Etherton et al., the typical American diet is markedly less-than-optimal in its ratio of omega-6:omega-3 fats, and has remained so over the last 40 years. Why?

Using the same historical USDA data on the American food supply as Putnam et al., NIH physician and researcher Joseph Hibbeln argues that significant changes in the availability of specific fats in the U.S. food supply are part of the answer. Hibbeln estimates that the American food supply as a whole in 2000 supplied over twice as much energy per capita in the form of the omega-6 fatty acids, linoleic acid (LA) and arachidonic acid (AA), as was the case in 1940. Meanwhile, the per capita energy available in the form of omega-3 fatty acids, ALA and DHA, has stayed roughly the same.

Hibbeln proposes that these changes in the food supply have resulted in an increase in omega-6 fatty acids relative to omega-3 fatty acids at the human tissue level, and then points to actual tissue measures over a 40-year period to back the claim.

Some common cooking oils today, like corn or peanut oil, continue to contain few omega-3 fatty acids; corn oil has an omega-6: omega-3 ratio of 79. The soy and canola oils in common use today have more favorable omega-6: omega-3 ratios, several fold better than cottonseed or corn oil. However, soy oil generally still has around nine-fold more omega-6 fatty acids than omega-3s, or four times the recommended ratio for the diet as a whole.

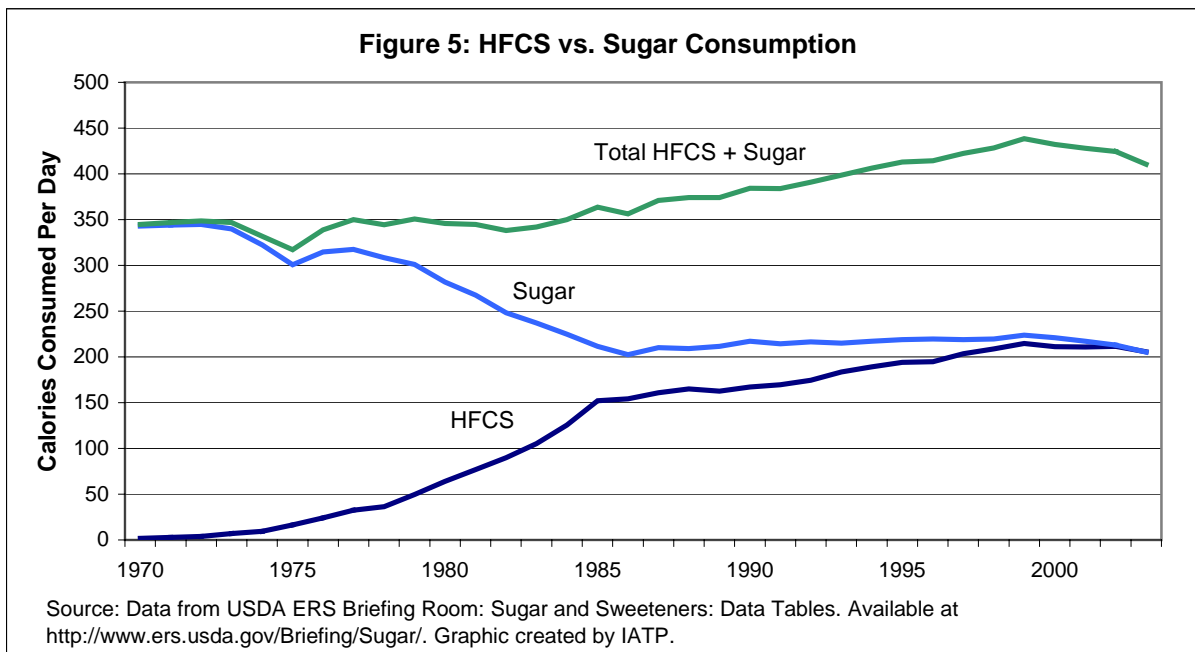
Sources:

1. Kris-Etherton PM, Taylor DS, Yu-Poth S, Huth P, Moriarty K, Fishell V, Hargrove RL, Zhao G, Etherton TD. 2000. Polyunsaturated fatty acids in the food chain in the United States. *Am J Clin Nutr* 71(suppl):179S-88S.
2. President Summary 1997. *J Lipid Nutr* 6:5-87.
3. Hibbeln JR, Lamoreaux ET, Lands WEM (undated). Presentation: Quantitative changes in the availability of fats in the U.S. food supply during the 20th century. Laboratory of Membrane Biochemistry and Biophysics, National Institute on Alcohol Abuse and Alcoholism. Accessed May 21, 2006 at <http://efaeducation.nih.gov/sig/food.html>.
4. Hibbeln JR, Lamoreaux ET, Lands WEM (undated). Presentation: Quantitative changes in the availability of fats in the U.S. food supply during the 20th century Laboratory of Membrane Biochemistry and Biophysics, National Institute on Alcohol Abuse and Alcoholism. Accessed May 21, 2006 at <http://efaeducation.nih.gov/sig/food.html>.

Trends in Added Sugars

Consumption of added caloric sweeteners also has risen (Figure 5), although not as dramatically as that of added fats and oils. The USDA estimates that total per capita consumption increased 20 percent between 1970-74 and 2000, to the equivalent of nearly 150 lbs of sugar per year.³⁰ However, consumption of one particular added sweetener, high fructose corn syrup (HFCS), has skyrocketed in that time from essentially zero – Japanese scientists only developed the product in the 1970s³¹ – to almost 63 lbs per capita in 2000. Cane and beet sugar consumption declined by a third over the same period. Within the past decade, corn sweeteners have surpassed cane and

beet sugar as the source of most added caloric sugars in the American diet. HFCS is widely used in canned fruits, condiments and baked goods, in flavored milks, yogurt, ice cream and other frozen desserts, and in soft drinks.



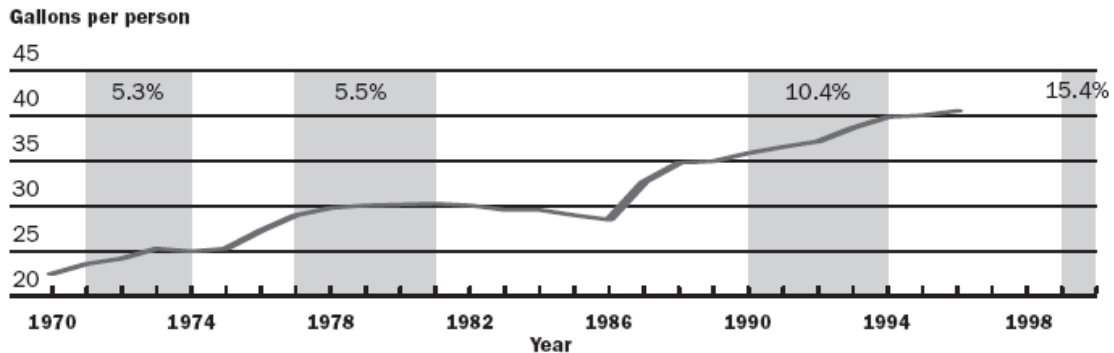
Today, nearly all added caloric sweetener in soda is HFCS. Changes in how much soda children drink, in particular, have been linked to childhood obesity.³² Over the roughly two decades prior to 1998, French et al. document a marked increase in children’s consumption of sodas, with average intake rising 140 percent, from five to 12 ounces per day.³³ Annual production of soft drinks in the U.S. increased from the equivalent of 200 12-ounce cans per person in 1967 to nearly 600 in 1998 (Figure 6).

At 12 to 14 calories per ounce, soda can easily become an important source of added sweeteners and calories in the diet. Assuming that children drink caloric and not “diet” sodas, that seven-ounce increase in children’s average soda consumption alone could account for additional 84 to 98 calories per day, depending on the soda brand.³⁴

While increased total consumption of added sugars likely adds to problems of obesity, there is no consensus on whether the replacement of sucrose with corn-derived fructose may be biologically significant.^{35, 36}

What seems beyond dispute is that the extremely low wholesale cost of corn, and therefore corn sweeteners, has fueled their widespread use by food processors and appearance in the American food supply.

Figure 6: Annual Regular (Non-Diet) Soft Drink Consumption



Notes: Shaded areas represent years over which BMI measures are available. The percentage of children overweight in those data is shown.

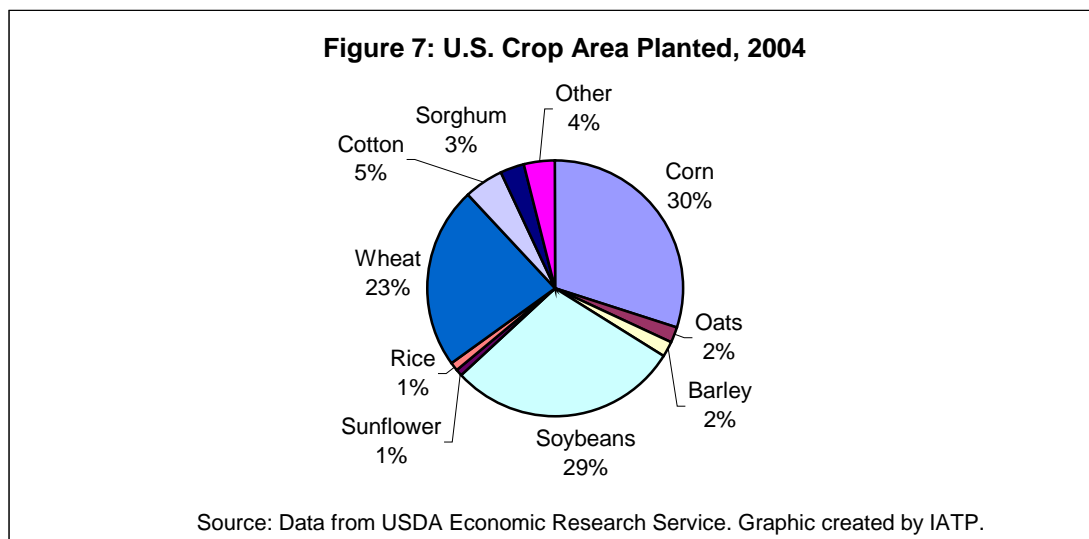
Source: Reprinted from Anderson & Butcher. 2006. *Childhood Obesity: Trends and Potential Causes in The Future of Children* 16(1): pp 19-46. Available at <http://www.futureofchildren.org>.

The low cost of corn also likely affects the pricing and marketing of corn-sweetened, processed, energy-dense foods relative to other foods, although this correlation has not been thoroughly examined. For example, HFCS is among the top ingredients in a variety of processed and snack foods attractive to children. Even if the raw ingredient costs of using HFCS represent a small portion of the total cost of manufacturing and distributing these products, these low wholesale costs likely contribute to the manufacturer's ability to set a retail price lower than that of relatively healthier foods with which it might compete – making them appear a “better value” to children and other consumers.³⁷

II. AGRICULTURAL POLICY: AN OVERVIEW

One of the most remarkable transitions in agriculture over the past half-century has been growing crop specialization. In 1998, 28 counties in the Midwest “Farm Belt” had over 85 percent of their acreage in just two crops – corn and soybeans. And that concentration appears to be increasing.³⁸

As noted in the previous section, this specialization has resulted in the products of a few crops proliferating in the U.S. food system. Subsequently, strong support has emerged for developing a more diversified food and agricultural system, for environmental, economic development, and public health reasons.



The most obvious driver of the proliferation of corn and soybean (as well as wheat) production in the Midwest is the federal system of farm payments. Farmers are subsidized for the production of these “program crops,” and payments increase as market prices fall. This system provides support for farmers when commodity prices are not sufficient for farmers to maintain economic viability, but has also been strongly criticized from world trading partners as well as U.S. taxpayer organizations.

In regards to the future of these farm payments, two dominant policy camps have emerged. The first camp has a neo-liberal free trade perspective, and is generally critical of subsidies and government intervention of any nature. The second camp argues that government policy has an important role in agriculture, but that subsidies have not been appropriately targeted toward important societal needs such as conservation or a healthy food system.

Both of these perspectives, however, have an underlying assumption that subsidies are a primary driver in the cropping decisions of farmers, and that tweaks in the system of farm payments can therefore change the direction of agricultural production. But several economic analyses indicate that the influence of farm payments may be overstated.³⁹ The current agricultural system is the result of decades of policy intervention, technological change, market development and other

economic forces. Just as turning the steering wheel of an ocean liner does not immediately turn the ship, the U.S. agricultural system is slow to respond to new policies and price signals.

Historical Perspective on the Development of U.S. Agriculture and Policy

History is essential for understanding the need for federal intervention in U.S. agriculture, as well as the evolution of policies that have led to the agricultural system we have today.⁴⁰

Midwest agricultural production began to take form almost 150 years ago. The Homestead Act of 1862 brought thousands of future farmers to the Midwest, which itself lacked the population centers to form a market for fresh agricultural products. Midwest farmers were instead forced to produce durable commodities, like grains, that could be shipped to eastern cities, and the heavily subsidized railroad industry provided the means for bringing their crops to market. This simple fate of human geography – the lack of population centers in the Midwest to consume fresh agricultural products – provided the impetus for an entire agricultural system based on the export of durable commodities.

One consequence of an agricultural system dependent on non-regional markets is that the prosperity of the system is highly influenced by external factors. History shows periods of wild fluctuation in demand and price for the products of Midwest farmers. In the 1890s, a rapid growth in agricultural production coupled with soft demand created a depression that forced farmers into heavy debt. By the early 1900s, on the other hand, exports to Europe had increased significantly, and American farmers enjoyed some of their most prosperous years. During the Great Depression, farmers were left reeling from excess supply and low prices; some grain elevators simply refused to buy corn, at any price. During the early 1970s, Russian demand drove grain prices to their highest real levels over the last half century. Unfortunately, farmers are often not suitably capitalized to endure the challenging years.

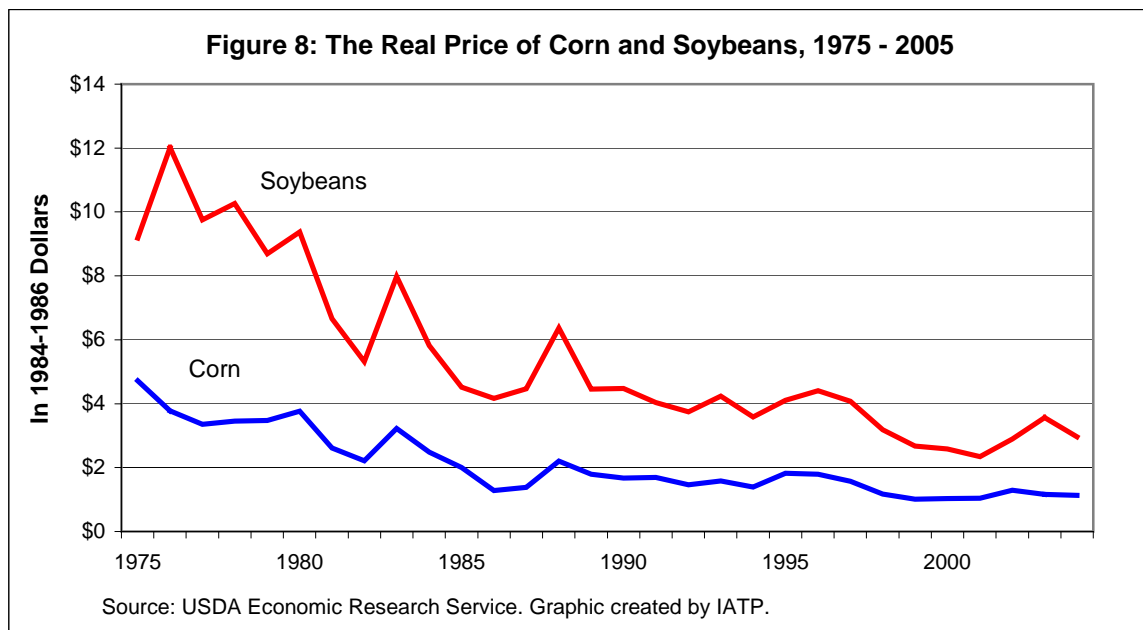
In fact, the agricultural economy is inherently volatile. On the other hand, farmers are often ill suited to respond to changing conditions, and thus to endure boom-bust cycles. Agricultural production is highly variable because two key natural forces – weather and pests – change continually, making the supply of crops a continuously moving target. Also, farmers make production decisions only once in the spring, and then are helpless to respond to market fluctuations as they wait several months for harvest. Finally, although they number in the millions, individual farmers have no ability to impact commodity markets. One of the few ways to increase farm income, then, in times of either high or low prices, is to increase farm production, thereby creating a treadmill of continually expanding production and continually depressed prices.

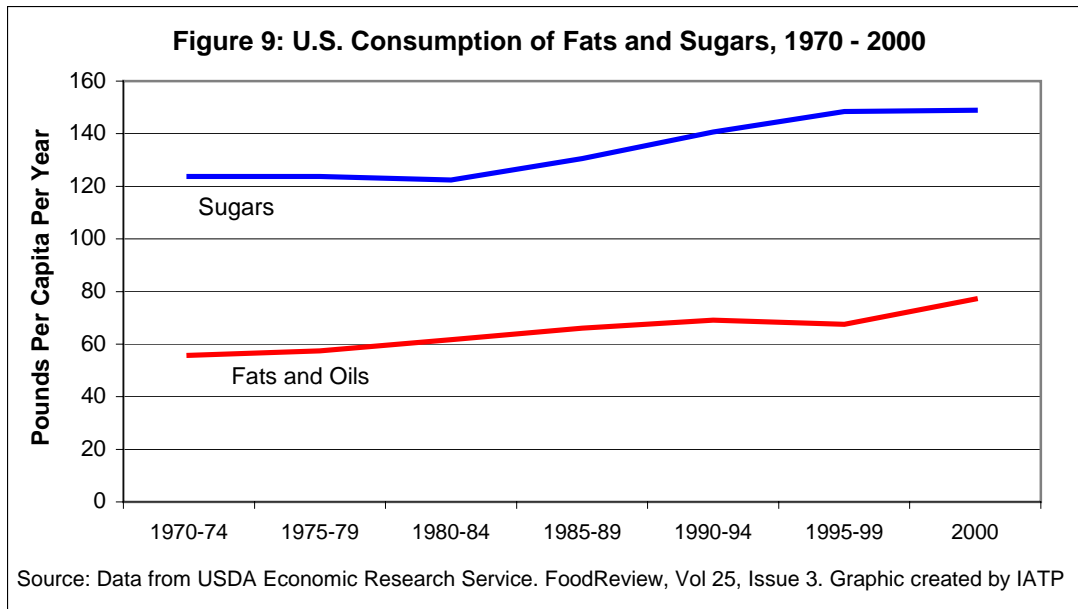
The inherent uncertainty of agriculture and the inherent constraints of farmers to adjust to price or market fluctuations are more than a mere nuisance, especially with ongoing concerns about obesity, malnutrition and food security. Overproduction of some commodity crops drives prices too low, and induces greater agribusiness investment in utilizing these crops for new purposes, such as high fructose corn syrup and hydrogenated soybean oil. The underproduction of non-durable crops like fruits and vegetables, on the other hand, results in relatively higher prices for these healthier food choices.

During the Great Depression, Henry Wallace, Franklin Roosevelt’s Secretary of Agriculture, realized that to mitigate low prices and keep farmers on their farms, he needed a mechanism for managing excess supply. Since grains and oilseeds store well, part of the harvest can be taken off of the market when prices are too low and put into a reserve. When prices recover, the crops can be sold for a profit. By buying low and selling high, the government-operated storage facilities that Wallace put into operation actually made money for taxpayers, while smoothing out the price spikes that can be devastating for farmers and consumers. Through the creation of an additional, farmer-owned reserve, Wallace’s policies also gave farmers a measure of control over the prices they received for their crops. Wallace’s agricultural policies – which managed the supply of commodities, maintaining stable prices and delivering a “fair” price to farmers (i.e. a wholesale price ensuring a reasonable profit to farmers above their cost to produce the commodity) – provided the framework for some of the most stable and prosperous decades in U.S. agriculture.⁴¹

After World War II, a relatively new and powerful constituency began to influence farm policy. The increased specialization and industrialization of agriculture throughout the second half of the twentieth century helped to create large companies, including commodity traders, food processors and distributors, industrial users of crops, and the livestock industry (the largest consumer of corn and soybeans). These emerging agribusinesses advocated against prevailing government policies, and in favor of their own self-interest – policies favoring instead the chronic overproduction and oversupply of commodities. Grain brokers, for instance, profit precisely from fluctuations in supply and price.

Above all, these industries had – and continue to have – a vested interest in keeping the prices of commodities paid to farmers low and unstable.⁴² Their success may be reflected in the steady erosion in the real market price of corn and soybeans over the last three decades (Figure 8). These declining prices roughly correlate with increases in the per capita consumption of fats and oils and sugars over the same time period (Figure 9).





The most dramatic change that shifted agricultural policy from a farmer orientation to an agribusiness orientation occurred in November 1971, with President Nixon’s appointment of Earl Butz as Secretary of Agriculture. Butz was a steadfast advocate for a “cheap food policy,” urging farmers to overproduce commodity crops by planting “fence row to fence row.”⁴³ The effect of his policies was to reward the pursuit of short-term increases in yield, via the use of chemical inputs, and to penalize agriculture practices focused on sustainability and long-term soil health, such as crop rotations and natural fertilizers and pest management practices.⁴⁴

Increasing Technology and Industrialization

Before World War II, U.S. farmers largely relied on horses, mules and oxen for power, dedicating significant acreage to growing grasses and grains for these animals. They also relied on extensive crop rotations and perennial systems, both to nourish the soil and to combat pests and disease. Farmers had little choice but to utilize natural systems to address land management and production issues.

After World War II, many technologies developed for the military were found to have agricultural applications. Farmers rapidly adopted chemical inputs to manage pest and nutrient issues, and tractors to replace the work of animals. Perhaps the technology that changed farming most was the industrial production of fertilizer. Fossil-fuel derived nitrogen fertilizers drove an increased specialization of farms and farming regions: in 1945, the average farm produced 4.5 different commodities per year; today the average farm produces less than 1.5 commodities, and entire regions are dominated by a couple of crops.

As commercial fertilizers, pesticides and tractors were incorporated into agricultural systems, they dramatically increased the productivity of individual farmers, but also reduced the local economic benefits of agriculture. By the late 1960s, mechanical harvesting of most crops had become routine, and advances in plant and animal breeding accelerated yields and growth. One net result of this technological change has been a major societal migration from rural communities to metropolitan areas. In 1945, 16 percent of the total labor force was employed in agriculture, and agriculture accounted for 6.8 percent of total GDP. Now, less than two percent of the labor force is employed in agriculture, and agriculture’s share of the GDP is just 0.7 percent.

Source: USDA Economic Research Service. The 20th Century Transformation of U.S. Agriculture and Farm Policy. Accessible at <http://www.ers.usda.gov/publications/eib3/>.

The drive 35 years ago for increased production, coupled with the subsequent deterioration in policies that helped to manage excess supply and stabilize prices, created an ideal environment for the expanded production of processed foods (as well as driving many farmers into bankruptcy during the “Farm Crisis” of the mid-1980s).

The 1996 Farm Bill, touted as “Freedom to Farm,” was the legislation that formally ended most supply management systems in the United States. At the time it was being debated, world commodity prices were very high, and many farmers and other agricultural leaders thought that growing world grain and oilseed demand would continue. It became an overriding goal of many to eliminate nearly all price supports and subsidies from agriculture – the theory being that this would allow farmers to respond to more effectively to market signals. At the time, Senator Pat Roberts, the Chair of the Agriculture Committee, stated, “We have a bold, innovative rewrite of a 60-year-old program that provides greater flexibility for farmers and takes the dead hand of government out of individual decision-making on the farm.”⁴⁵

Predictably, and by nearly all accounts, “Freedom to Farm” was disastrous policy. Farmers did not make major changes to what they grew, and the retail commodity prices paid to farmers for many crops dropped to levels not seen in decades. Congress responded by providing enormous “emergency” payments to farmers; indeed, direct payments to farmers under the 1996 Farm Bill proved to be higher than ever. From 1995 to 2004, federal subsidies to agricultural producers averaged over \$14 billion a year.⁴⁶ Policies to stabilize prices had been replaced with policies that encouraged overproduction of commodities and then simply made payments to producers to make up the difference between what the “market” would pay and what farmers needed to stay in business.

The subsequent bill, the 2002 Farm Bill, essentially institutionalized those “emergency” payments, primarily subsidizing the production of corn, soybeans, wheat, rice and cotton. While the supply management system instituted in the 1930s was designed to maintain stable, well-functioning commodity markets and cost taxpayers very little, the current system directly costs taxpayers tens of billions of dollars per year. If the indirect costs to society of diet-related disease and environmental degradation were included, the price of these policies to taxpayers would appear many times higher.

U.S. Food and Agriculture Today – the Farm Bill

Every five years or so, Congress debates a large omnibus bill known as the Farm Bill. The Farm Bill sets the course of farm policy, and today contains important provisions for forestry, conservation, rural development, research, trade and nutrition as well.

As has happened several times in the past, the Farm Bill currently being developed comes at a time when commodity prices are abnormally high, relative to historic levels. Corn prices have spiked over the past several months, mostly due to rapid growth in domestic production of ethanol made from corn. As farmers have responded by planting more corn at the expense of other crops, the prices of other commodities, such as soybeans and wheat, have also increased.

Newer watchers of agricultural markets might incorrectly assume that market forces have permanently shifted to a state of higher prices. Legislators are prone to make the same mistake. Farm policies were developed in the early 1970s based on the mistaken assumption that the Soviet Union would continue purchasing U.S. commodities, and the 1996 Farm Bill was developed with the common misperception that China soon would become an enormous export market for U.S. grains. Neither happened. While ethanol has recently provided farmers with the most prosperous harvest in several years, it is important for legislators not to assume that the chronic problem of low commodity prices has been erased.

There are 10 provisions, or titles, to the most recent (2002) Farm Bill, with an estimated cost to taxpayers of \$180 billion over 10 years. Because of the incredible breadth of the Farm Bill – and the inertia that works against significant changes to the bill – most non-government organizations focus only on a couple of its programs or titles. Lobbying groups, for example, typically have their greatest impact on shaping the Farm Bill by narrowing their focus, with environmental organizations concentrating on the conservation title, anti-hunger organizations on the food stamp program, etc. One result: the specifics of the Bill’s commodity programs are actually little known and little discussed outside of the agricultural community.

The areas of the Farm Bill most of interest to this discussion are the commodity, research and nutrition titles.

1) Commodity Programs

The Farm Bill’s commodity programs are the largest source of financial support for farmers. Previously, mechanisms existed for supporting a “floor” or minimum price for the commodity crops (“program crops”) in the programs – predominantly corn, soybeans, wheat, cotton and rice. Now prices are allowed to drop well below the cost of production, and farmers are instead provided income support to make up the difference in the form of payments, some of which are based on production, some that are simply provided for growing a certain crop, and some that are occasionally distributed based on disaster relief.

The 2002 Farm Bill actually codified some of the payments from previous years, which was essentially an admission by Congress that the attempt to get government out of agriculture in 1996 was a failure. In the past several years, annual government payments to commodity producers have ranged from \$9 billion to \$20 billion. In 2005, payments reached \$9.4 billion for corn, \$3.3 billion for cotton, \$1.1 billion for wheat, and \$560 million for soybeans.⁴⁷

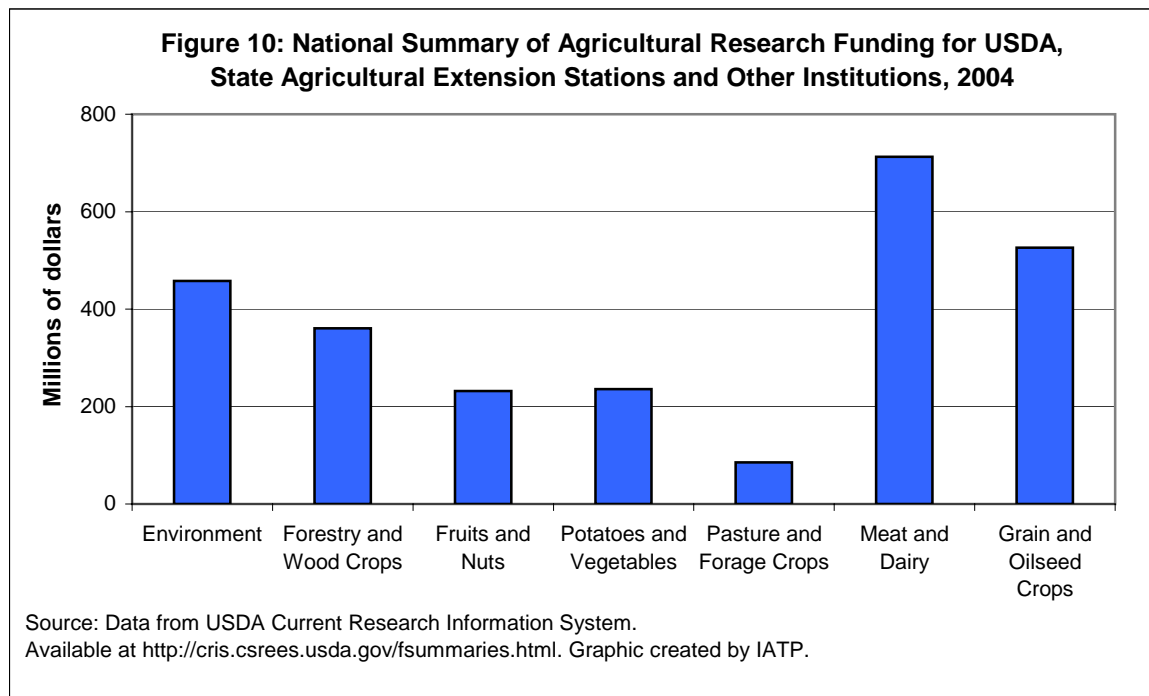
As one would expect, some of the most powerful voices supporting the Farm Bill’s current commodity program are the groups most directly benefiting from it. The National Corn Growers Association (NCGA), for example, strongly advocates for all uses of corn, whether it is fed to animals, used as a feedstock for an ethanol plant, exported to China, or manufactured into high fructose corn syrup. While public health and the environment may be components of this and other commodity groups’ perspectives, their financial interest requires that they focus on maximizing production of their commodity.

The largest buyers of agricultural commodities have a slightly different, yet complementary, policy perspective to the commodity groups. These agribusiness corporations want a constant supply of commodities at low prices. They oppose policies that limit the free movement of agricultural commodities across borders, because that would inhibit their ability to procure the lowest price products. Many agribusiness corporations actually profit from the price fluctuations and instability that can devastate farmers because they have resources to use futures and other financial markets to hedge risk while spotting opportunities to make money through arbitrage.

2) Agricultural Research

The Farm Bill authorizes \$850 million a year to federal agencies and state agricultural experiment stations for agricultural research, as well as \$200 million a year for the Initiative for Future Agriculture and Food Systems competitive grants program.⁴⁸

Historically, most agricultural research has focused on pest management and enhancing production. Only comparatively recently have federal agricultural research programs addressed issues such as natural resources, rural economic development, and farm income. Already-established agricultural industries, like the meat and dairy and grain and oilseed producing sectors, currently receive the bulk of public research monies (Figure 10). As of 1997, only about eight percent of publicly funded agricultural research focused on improved health and nutrition.



Of course, the agribusiness entities that dominate these industries also fund substantial private research. In the last two decades, privately funded agricultural research has come to surpass public research.⁴⁹

Perhaps the most quantifiable success of agricultural research can be seen in yields. All crops have enjoyed considerable yield increases over the past 50 years, but corn, soybeans and wheat have outpaced nearly all other crops. Not surprisingly, the acreage of these three crops has increased substantially over that time.

Publicly funded research best serves the public when it is directed toward activities that can further public interest goals, such as a clean environment, community development, or public health. Unfortunately, much of our public agricultural funding now goes to underwrite research for agribusiness as it tries to address management issues in part created by the shortcomings of the current food and farming system. The public interest aspect of public agricultural research – to spearhead private investment into promising areas thought to further public interest goals – has largely been lost.

3) Federal Child Nutrition and Food Assistance Programs

While federal commodity policies help determine what gets grown, federal nutrition programs also influence what foods are available for people to eat. The federal government administers some 15 domestic food and nutrition assistance programs in all, the largest of which are the National School Lunch Program, WIC (for Women, Infants, Children), and the Food Stamps Program.⁵⁰ Spending for food assistance programs hit a record \$53 billion in 2006 (Figure 11) – the sixth consecutive year in which spending increased.⁵¹ One in five Americans participates in at least one of the 15 nutrition programs each year.⁵²

Figure 11: Federal Nutrition and Food Assistance Expenditures, 2006	
Program	FY 2006 Expenditures (Billions)
Food Stamp Program	\$32.8
WIC	\$5.1
National School Lunch Program	\$8.2
School Breakfast Program	\$2.0
Child and Adult Care Food Program	\$2.1
Total All Programs	\$52.9
Source: USDA Economic Research Service. The Food Assistance Landscape: FY 2006 Annual Report.	

Federal nutrition and food assistance programs are inextricably linked to agriculture policy. Like the Food Stamps Program, which provides money for recipients to spend on foods of their choosing, some are part of the nutrition title of the Farm Bill. The Farm Bill nutrition programs also include food distribution programs like the Emergency Food Assistance Program and the Commodity Supplemental Food Program, both of which provide agricultural commodities to those in need.

Other federal nutrition programs, including those aimed specifically at children, fall outside the Farm Bill. In addition to WIC (the Special Supplemental Nutrition Program for Women, Infants, and Children) and the National School Lunch Program, these include the National School Breakfast Program and Summer Food Service Program, the Child and Adult Care Food Program and the Farmers Market Nutrition Program. But because they fall outside the Farm Bill does not mean these programs are any less linked to agricultural policy – and is why we include them in our discussion here. Many of these programs include donations of USDA-purchased surplus commodities, in addition to cash reimbursements for food served.

Perhaps most importantly, nearly all of the federal nutrition and food assistance programs – whether within and outside the Farm Bill – are administered by the U.S. Department of Agriculture (USDA). As Marion Nestle writes, since its creation in 1862, the USDA has been expected to both a) support agricultural production, and b) advise Americans on “subjects connected with agriculture in the most general sense of that word,” which has been interpreted as a mandate to provide dietary advice.⁵³ While these goals have not always been incompatible, today the same foods or crops that USDA policies encourage farmers to produce, or that USDA buys from farmers as surplus for use in food assistance and distribution programs, are often those foods that Americans already overconsume relative to what USDA’s own dietary guidelines advise.

The USDA-administered nutrition programs are no exception. Generally, they also are designed with the dual goals of providing people with adequate food and nutrition, and supporting domestic agricultural commodities. When the National School Lunch Program was first developed in the 1930s, for example, the nutritional health of children was not its primary focus; its primary goals were supporting agriculture and providing jobs.⁵⁴ Only in the 1960s, after under-nutrition among the poor gained visibility, did policymakers focus on using food assistance to help combat poverty-related malnutrition and hunger. Subsequently, federal dollars spent on food assistance programs increased by 500 percent, in real terms, from 1970 to 1994.⁵⁵ New food assistance programs, such as WIC, sprouted as well.

Like the Farm Bill itself, however, these programs were for many years focused on quantity of food rather than quality. In other words, the operating assumption was that if the programs helped to deliver an adequate quantity of food and calories to children and their families, then the nutritional health of children would improve. Similarly, the focus of the National School Lunch program remained until fairly recently on the quantity of food delivered to children, and less on the quality or nutritional value of that food.⁵⁶ It was not until the early 1990s, when studies showed that school lunches were not meeting the federal dietary guidelines, that the nutritional content of school food was given serious consideration.⁵⁷

In the past, the focus on food quantity over quality in these programs may have made some sense, as hunger and under-nutrition were a much greater concern than the over-consumption concerns we face today. On the other hand, the USDA’s first director of research, W.O. Atwater, noted at the turn of the twentieth century: “[O]ur diet is one-sided and that we eat too much...fat, starch and sugar...How much harm is done to health by our one-sided and excessive diet no one can say.”⁵⁸

There have been other federal policy initiatives related to school food as well. The nutrition title of the 2002 Farm Bill, for example, provided \$6 million for a USDA Fruit and Vegetable Pilot Program (FVPP) for the 2002-03 school year to improve fruit and vegetable consumption among the nation's schoolchildren. The FVPP provided fresh and dried fruits and fresh vegetables free to children in 107 schools in four states and one Indian Tribal Organization.⁵⁹ The program has since been expanded, but still only reaches 25 schools in each of 14 states and three Tribal Organizations.⁶⁰ The 2004 Congressional reauthorization of the WIC program also includes a provision requiring each school district participating in the federal school meal program to enact a wellness policy by opening day of the 2006-07 school year. Many schools have implemented these wellness policies, although the quality of these policies with respect to food and nutrition varies.⁶¹

For schools participating in federal school lunch programs, one component worth mentioning is their eligibility to receive bonus and commodity foods from the USDA. Schools receive from USDA more than one billion pounds of surplus agricultural commodities each year.⁶² Rather than repeat the excellent recent summaries of the school lunch program, our point here is that the program's historic deference to the USDA's commodity concerns has never been lost. Even for its School Meals Initiative, designed to bring school meal programs into alignment with the dietary guidelines, the USDA notes that "the initiative is designed to minimize impacts on agricultural commodity markets and to control program costs."⁶³

To be fair, the USDA's hands appear somewhat tied in trying to provide the healthiest possible food environment for schoolchildren. Writing in *the Future of Children*, Mary Story and colleagues note that the USDA's regulatory authority over these foods is limited. In terms of competitive foods – all foods sold in schools except for federal school meals – USDA can regulate only those foods of "minimal nutritional value," and even then its authority extends only to such foods sold in food service areas during meal periods. Such foods sold in vending machines outside the cafeteria, for example, fall beyond USDA's purview, as do all competitive foods not defined as those of minimal nutritional value but which include candy bars, cookies, potato chips and doughnuts. Each of the latter can be sold anywhere in the school at any time, including in the cafeteria itself during lunch periods. Further, competitive foods are exempt from the federal requirements applying to school meals that they meet federal dietary guidelines. Nor can the USDA under its current authority apply any restrictions.

III. CORRELATING AGRICULTURAL POLICIES WITH TRENDS IN FOOD, FOOD PRICING AND HEALTH

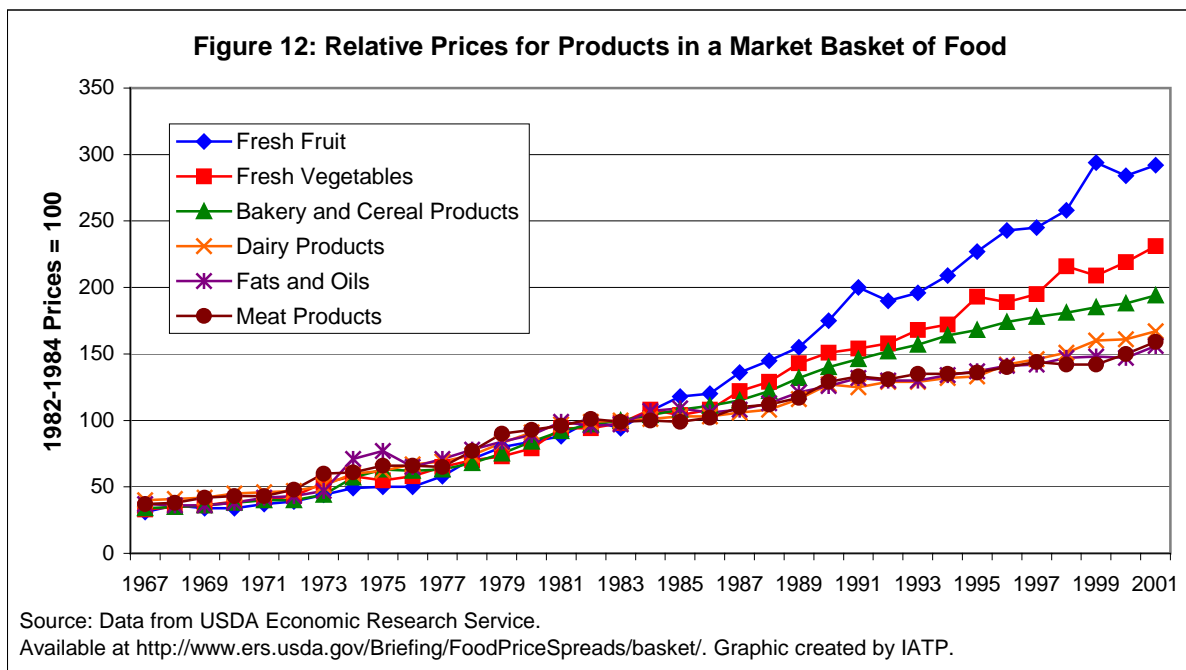
The two previous sections of this paper summarized trends in the supply and consumption of certain foods produced in America, and then looked at federal agricultural policies that impact on child health and nutrition.

The purpose of this third section is to correlate negative trends in individual health with the nutritional value of foods produced, the price of those foods, and U.S. agricultural policies that encourage their production. The final section then offers some recommendations for where short- or long-term changes in public policy, as well as new areas of research and analysis, appear to hold some promise for influencing the current negative trends in diet-related disease.

Implications of agricultural policy for the U.S. food supply: cheap food and cheap feed

Federal agricultural policies and new technologies have converged to dramatically change the U.S. food supply. Many food industry companies have developed successful business models based on current agricultural policies and existing cropping systems. In addition to abetting the transition from grass-fed to grain-fed meat and dairy products (see below), these government commodity policies likely have helped to make certain food products cheaper at the consumer level, thereby inducing more consumption than would occur in a less distorted market.

As is clear from USDA data presented in Figure 12, the relative prices for meat, fats and oils, and processed foods have increased the least of several food categories over the last four decades. Consequently, cost-conscious consumers often find it more affordable to purchase energy-dense foods than fresh produce.⁶⁴



Cheap commodities and processed foods

Extremely low market prices for commodities, like corn and soybeans (Figure 8), encourage food processors to find as many uses for these cheap raw inputs as possible, including the expanded use of high-fructose corn syrup and partially hydrogenated vegetable oils, such as in highly processed bakery products and prepared foods served at fast food restaurants. Via their overproduction and low price, the U.S. taxpayer basically subsidizes the use of corn and soybeans in these foods.

The low cost of purchasing raw commodity inputs also provides the processed food industry with an opportunity to devote more of their dollars to marketing, including marketing to children. The cost of any piece of food consists of two components – the farm value and the marketing bill. The farm value is the amount of the food dollar that goes toward the farm sector – the actual food production part. The marketing bill is the cost of everything else, including packaging, transportation, non-farm labor, advertising, etc. The food marketing industry has enjoyed enormous growth over the past 50 years, and has been able to capture an increasingly large percentage of the food dollar.⁶⁵ The farm value proportion of the food dollar has decreased to only 19 percent. That means, on average, 81 percent of every dollar spent on food goes toward the other, non-farm sectors.⁶⁶

Technology plays a synergistic role, along with price, policy and economics, in influencing the U.S food supply. Prior to the 1960s, for example, the technology for extracting high fructose corn syrup from corn did not even exist. Driven in part by their low cost, corn-derived sweeteners now constitute the majority of added sweeteners consumed by Americans. American consumption of sugar, by contrast, has declined quite dramatically (Figure 5).

A more successful federal policy, in fact, also helps account for industry's trend away from use of sugar as an added sweetener. Federal cane and beet sugar policy is one of the last remaining supply management programs in the U.S; it has been effective and inexpensive. It guarantees U.S. sugar farmers 18 cents per pound for cane sugar and 22.9 cents per pound for refined beet sugar – often higher than world prices – by limiting the acreage of U.S. sugar production and placing quotas on sugar imports.⁶⁷ And the program operates by law at no net cost to taxpayers. Of course, what is good food for taxpayers and for sugar farmers, and arguably for the health of Americans, vexes the candy, soft drink and baking industries. These somewhat contradictory government policies toward sugar and non-sugar sweeteners has probably helped drive the explosion in high fructose corn syrup production, as well as shifting some food manufacturing overseas.⁶⁸

Cheap animal feeds

Today, meat and dairy producers are the largest end users of American grains like soybeans and corn.⁶⁹ Feed costs are a very significant portion of producers' overall production costs. Low market prices for these commodities – driven by public policy and supported by U.S. taxpayers – therefore amount to a substantial subsidy for these industries. These corporate subsidies presumably also translate into lower prices on the supermarket shelf, thereby indirectly encouraging greater consumption of meat and dairy products.

From 1997 to 2005, for example, this public subsidy amounted to gains of \$11.25 and \$7.4 billion for the broiler chicken- and hog-producing industries, respectively, according to recent estimates by researchers from Tufts University's Global Development and Environment Institute.⁷⁰ During this time period, broiler feed averaged 21 percent and hog feed 22 percent below the cost of production – enabling these industries to reduce operating costs by 13% over what they would have been had the companies had to buy feed at prices equal to production costs. The single largest chicken and hog companies pocketed an estimated \$2.6 and \$2.2 billion, respectively, in savings from cheap feed grains during this time period. Producers raising animals on pasture, on the other hand, do not enjoy these subsidies. Savings to the top four hog and poultry companies, controlling roughly half of each of these markets, are shown in Figure 13.

Figure 13: Savings from Low Feed Prices, 1997 - 2005					
Top Four Hog-Producing Companies			Top Four Broiler-Producing Companies		
Company	Market Share	Total Savings, 1997-2005	Company	Market Share	Total Savings, 1997-2005
Smithfield	30%	\$2.2 billion	Tyson	23%	\$2.59 billion
Premium Standard	8%	\$589.9 million	Gold Kist	10%	\$1.13 billion
Seaboard Corp	7.5%	\$553.1 million	Pilgrim's Pride	9%	\$1.01 billion
Prestage	5%	\$368.7 million	ConAgra Poultry	8%	\$900 million
Total	51%	\$3.71 billion	Total	50%	\$5.63 billion
Source: Tufts University, Global Development and Environmental Institute. Memo: Individual Companies' Gains from Low Feed Prices. January 26, 2007.					

Implications of agricultural policy for the U.S. food supply: decreased nutritional quality

Beef and dairy

Prior to 1950, farmers grazed their dairy and beef cattle on grass pastures, as befits a ruminant animal evolved to turn the cellulose from grasses into nutrients. As the real price of corn and soybeans dropped over the last several decades, however, livestock and dairy producers found it more economically advantageous to feed cattle (in addition to hogs and poultry) grains and oilseeds rather than grass. Federal commodity policy has abetted this transition from grass-fed to grain-fed beef and dairy cattle.

There long has been interest in whether the change in animal feeds has had a nutritional impact on the meat and dairy products produced. Until recently, the science has been equivocal. In 2006, however, nutritionist Kate Clancy of the Union of Concerned Scientists completed an extensive review of the scientific literature.

Clancy found that there now is sufficient science to support some general conclusions with respect to how the diet of beef and dairy cattle impacts nutritional quality – specifically, total fat content, the content of various omega-3 fatty acids, and finally the content of conjugated linoleic

acid, or CLA.⁷¹ Emerging evidence suggests that CLAs, like omega-3s, are fatty acids with properties beneficial to health.

Her findings: Grass-fed cattle almost always produce steak and ground beef lower in total fat than do “conventionally” fed (grain-fed) cattle. The grass-fed steaks tend to have higher levels of the beneficial omega-3 fat, ALA. Grass-fed cattle also tend to produce milk with higher levels of ALA, along with consistently higher levels of CLA. Ground beef from these cattle also usually has higher CLA levels.

Given that beef and dairy cattle are raised more on grains today than they were a half century ago, the implication of Clancy’s study is that the U.S. beef and dairy supply generally may be higher in fat and lower in beneficial fatty acids than it used to be.

Produce

As noted in Section II, U.S. agricultural policy has long had an explicit focus on raising production levels of certain commodities. A quarter-century ago, Jarrell first wrote of the “dilution effect,” the notion that agricultural methods designed to enhance yield or production will tend to decrease nutrient concentrations.⁷² Hypotheses are that the heavy use of chemical fertilizers and irrigation – both heavily subsidized by the U.S. public – as well as less prevalent use of organic fertilizers that enhance the soil, may all contribute to nutrient dilution.

Donald R. Davis of the University of Texas has marshaled evidence that the content and quality of nutrients in certain foods has declined over the last half-century, as a result of how food is grown, processed and prepared. His literature survey found evidence, in particular, that in vegetables, fruits and wheat there have been median declines of about 5 percent to 35 percent in concentrations of some vitamins, minerals and protein since the mid-twentieth century.⁷³

Another body of emerging evidence suggests, on the other hand, that produce grown using more sustainable practices may offer significantly enhanced health-promoting qualities, relative to “conventionally” grown produce.^{74, 75} A recent literature summary prepared by Dr. Charles Benbrook, of the Organic Center, finds evidence that organically-raised produce has levels of antioxidants and other beneficial secondary plant metabolites, such as phenolics, averaging around 30 percent higher than produce raised with more industrial methods.⁷⁶ One *in vitro* study of human breast cancer and colon cancer cell lines found that all varieties of organically-grown strawberries were superior to four conventionally-grown varieties in suppressing tumor cell growth at statistically significant levels.⁷⁷

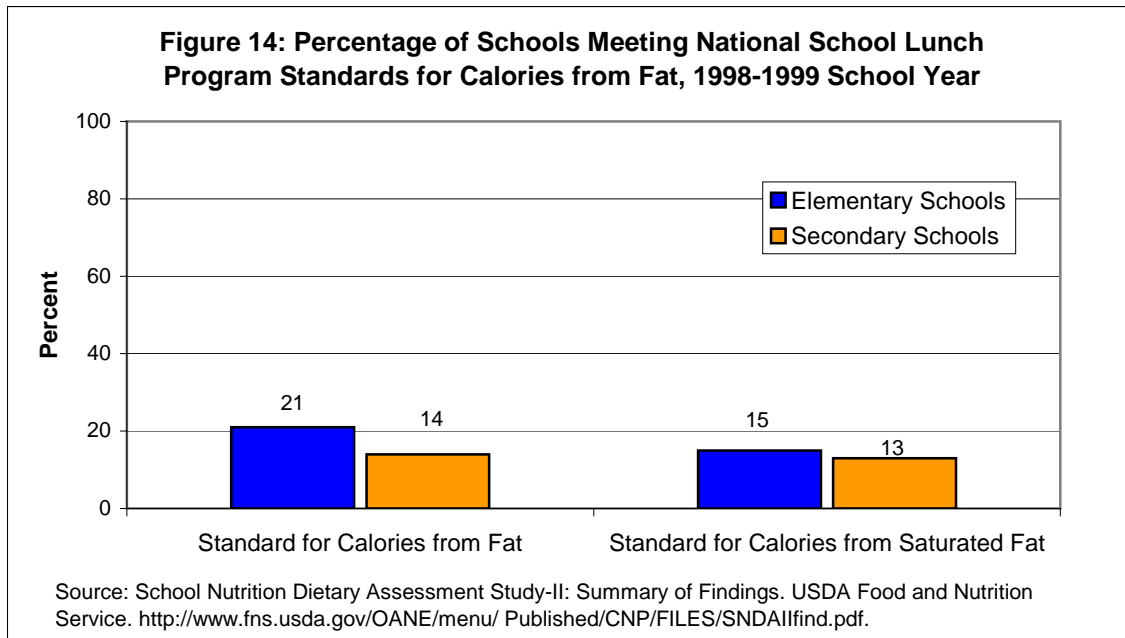
While these nutrients may not be directly linked to obesity, the new evidence for their anti-cancer and anti-clotting properties suggests that consumption of produce higher in these compounds may in fact help to avert some of the serious complications of diets leading to obesity.

Implications of agricultural policy for food assistance and nutrition programs

We previously noted a disconnect between what American farmers grow and what the federal dietary guidelines suggest Americans ought to be eating. It is especially ironic that the basket of foods included in the USDA's food assistance and distribution programs often does not align with the USDA's own dietary guidelines. Fruits and vegetables, already under-consumed by Americans, have often been underrepresented in the food baskets of these USDA programs. Furthermore, where fruits and vegetables are present, they are mostly processed rather than fresh.⁷⁸

The \$5 billion per year WIC Program is one such produce-deficient USDA program. WIC provides vouchers to low-income pregnant women, new mothers, and children to be spent on specific food items, as well as on nutrition education and health care.⁷⁹ In 2000, 54 percent of *all* American infants and a quarter of children, ages one to four, received services through the WIC program.⁸⁰ The USDA recently asked the National Academy of Science's Institute of Medicine (IOM) to critically examine the food packages in the WIC program. Previously, nearly three-quarters of those providing public comment to the USDA had asked that fruits and vegetables be added to the packages.⁸¹ It is notable that the only produce item in WIC packages is carrots, and these are offered only to breastfeeding women. In 2005, the IOM subsequently determined that changes in the WIC food packages were warranted because of changes in demographics of the WIC population, in the food supply, in dietary patterns, in health risks, and in dietary guidance and recommendations.⁸²

Similarly, to bring school food into alignment with dietary guidelines, USDA implemented the School Meals Initiative for Healthy Children in 1995, an initiative that included both improved nutrition standards and nutrition education. Under this program, the nutritional quality of school meals has improved, "but is not yet what it should be."⁸³ Less than one-quarter of schools, for example, serve lunches that on average meet the USDA dietary guidelines' recommendation that no more than 30 percent of calories come from fat.⁸⁴ In fact, the most recent survey of the nutritional quality of school meals served as part of the National School Lunch Program found that only one in five elementary schools and one in seven secondary schools met the School Meals Initiative's guidelines for calories from fat and saturated fat.⁸⁵ (These data are from the 1998-99 school year; a more recent survey has not been completed but is currently underway.)



While federal dietary guidelines are supposed to serve as the basis for the nutrition and food assistance programs, these, too, are not necessarily rooted completely in health. Federal nutritional advice, including that from the Surgeon General as well as that contained within the USDA’s dietary guidelines, is routinely shaped by politics. As Marion Nestle writes in *Food Politics* (2002), “dietary guidelines necessarily are political compromises between what science tells us about nutrition and health and what is good for the food industry.”⁸⁶ Some have questioned whether the USDA, with its acknowledged mission to support large U.S. producers and distributors of corn, soybeans and other foodstuffs already over-consumed by the American public, is the best advocate for devising dietary advice for that public.

At the same time the USDA struggles to bring its nutrition and food assistance programs into compliance with its own dietary guidelines, commodity groups advocate against any changes that might affect sales of their commodities. The dairy industry, for example, has lobbied heavily against the changes to WIC recommended by the Institute of Medicine, since increasing fruits, vegetables and whole grains in WIC packages necessarily would decrease the relative proportion of dairy products.⁸⁷ It also successfully blocked any change to the rules for the school meal program that require whole milk to be offered, despite survey data indicating that it accounts for half of all children’s fat intake.⁸⁸

In reference to its own National School Lunch Program, the USDA says, “...USDA must balance its responsibility to provide healthy school meals with its responsibility to support and promote U.S. agricultural production. Potential tradeoffs between diet quality and the use of various agricultural commodities result in seemingly competing interests, with important implications for agriculture, childhood nutrition, and federal food policy.”

Thus, while the heavy reliance of nutrition and food assistance programs on USDA-subsidized commodities may help in the short run to limit the programs’ financial costs, they also may carry longer-term costs to the health of the recipients of these programs.

Changing the course of the federal food assistance and nutrition programs, however, will not be easy. The longstanding influence of commodity policy is just one hurdle. The funding for and cost of providing food assistance also has long been an issue. Congress typically has not fully funded children's nutrition programs, even when they provide food "baskets" that are less than optimal for the health of recipients. For example, the WIC program has never been funded at a level that would enable all eligible persons to participate.⁸⁹

Even entitlement programs, like the National School Lunch and Breakfast Programs – which are required to be funded at a level that covers all eligible persons – often provide benefits that are less than sufficient for a healthy diet. For example, monthly Food Stamp allotments are based on USDA's "Thrifty Food Plan," a model diet on which people with limited budgets can meet the dietary guidelines.⁹⁰ The Thrifty Food Plan is the lowest cost of four USDA model diets, and many people feel it is insufficient to actually provide for a nutritious diet. A recent study compared the cost of two weeks' worth of meals under the Thrifty Food Plan with the cost of a healthier food basket incorporating suggestions from the dietary guidelines, such as substituting whole grains for refined grains and low-fat milk for high-fat milk. The study found that this healthier food basket would be \$32 to \$41 more expensive than that in the Thrifty Food Plan – an amount equivalent to 35 to 40 percent of a low-income person's food budget.⁹¹

For those administering school lunch and other USDA nutrition programs, the issue has been cost per meal or per person served. Schools receive both cash reimbursements for meals served and commodity donations for use in these meals. The highest reimbursement, for free lunches, is just \$2.32 per meal.⁹² These rates are intended to cover not only food costs, but also labor and overhead, often leaving schools with less than a dollar per meal to spend on the food itself. Such financial constraints can understandably lead administrators also to be penny-wise and pound-foolish.

The challenges facing our school food and other food assistance programs are a symptom of, and closely tied to, the shortcomings of our Farm Bill and other agricultural policies. It is sadly ironic that the food assistance and nutrition programs – themselves a form of agricultural policy – are needed in large part to fix the problems that other aspects of agriculture policy have created. While the federal food assistance and nutrition programs undoubtedly need to be updated to appropriately address current health concerns, the problems that vex these programs will continue to do so until we address the larger agricultural policy drivers behind them.

IV. CONCLUSION AND RECOMMENDATIONS

We are among a chorus of voices arguing that the traditional paradigms of nutrition and nutrition policy are inadequate to capture the rich intersection of social, economic and environmental factors that have contributed to childhood obesity, among other nutrition-related ills in our society.⁹³

The scientific literature has begun to reflect the new attention to ecological, potentially preventable, contributors to obesity and diet-related disease. In particular, the contributions of the built environment, especially the school environment but also transportation infrastructure and the discouragement of walking, have received a great deal of attention. In terms of children's food environments, the roles of corporate marketing, pricing and other policies have also been highlighted. We urge that the nation's framework of agricultural policies be considered an integral part of our children's food environment, as well as a driver of harmful corporate marketing policies.

Current federal policy involves spending tens of billions of dollars annually in the Farm Bill alone for agriculture, nutrition and other programs. Yet these and other food and nutrition programs collectively fail to meet even the most basic of the goals long espoused by the USDA for U.S. agricultural policy, let alone public health goals. Specifically, they somehow fail to supply Americans with enough of the domestically produced fruits and vegetables, whole grains and other foods that they need for a healthy diet. Public health goals have too often been an afterthought in the design of these programs.

Where U.S. agricultural policy has had unqualified success in recent years is in providing the U.S. meat industry with extremely cheap feed grains, and in providing U.S. grain brokers and food processors with raw inputs at prices below the actual cost of production. This is no accident. Rather, they were predictable outcomes of the U.S. abandoning successful, cost-effective agricultural policies that managed the chronic overproduction and supply of commodity grain crops – a step for which the major agribusiness and food industries had long advocated.

For the past 35 years, the general thrust of U.S. agricultural policies instead has been to support an agricultural model that maximizes production of grain crops and finds export markets for the excess capacity. It is a model that has worked well for many in the food industry, but it has also resulted in fewer farms, a less vibrant agricultural economy, growing environmental impacts, and a food system that is not producing the desired public health benefits.

What if instead, better health or obesity prevention were a primary focus of U.S. agricultural policy? What if even a portion of the farm bill's expenditures were spent based on whether they helped farmers to produce a basket of healthier produce, whole grains and other foods that both science and common sense tell us will make for a healthier population? Nutritionists and other food policy experts in the European Union already have been asking themselves that question for several years. One prominent essay from Dr. Tim Lang asks, "Is Health the Future of Agriculture?"⁹⁴

We believe that the public health community has an opportunity to shift the focus of food and agricultural policy, particularly at this time as a growing number of people question the nutritional quality and long-term health and other societal costs – including the costs of adverse impacts on the environment, on small farmers, and on the economies of developing countries – of the U.S. food system.

With this in mind, we make the following recommendations for research and policy analyses:

- 1. Develop a vision of health in agriculture.** Only recently have the enormous public health implications of food and agricultural policy been recognized. Now we face the challenge of trying to respond to this recognition by tweaking at the margins of an entire food and agricultural system that evolved over decades, and has an enormous structural resistance to change. For those reasons, there has been little work in the U.S. to articulate what is the end goal; that is, what would our desired agriculture and food system look like if public health were paramount?

Research and Policy Recommendations –

- As obesity prevention becomes an increasingly large component of public health discussions and conferences, make sure there is a conversation on how to make health the future of agricultural policy in the U.S. Conduct widespread outreach into the public health community with presentations, papers, and fact sheets.
 - A less daunting task could be to prepare a white paper articulating what would constitute a healthy school meals program – not in terms of minimum recommendations, but in terms of an optimum menu of meals.
 - Use public policy to help connect farms to schools, demonstrating ways to increase child access to fresh produce while laying the foundations for healthier, community-wide food systems where these items are more accessible. For example, when Congress reauthorized the USDA’s child nutrition programs in 2004, it included a small new section called “Access to Local Foods and School Gardens.” Though this section hypothetically could provide individual schools with up to \$100,000 to start farm-to-school projects, no funding has ever been appropriated.
- 2. Research how relative food prices impact consumption.** U.S. agricultural policies have undoubtedly contributed to the low cost of food, but not all food groups have been equally affected. Compared to fresh fruits and vegetables, grains and oilseeds are considerably cheaper than they were in previous decades. This has changed corporate behavior, and subsequently consumer behavior.

Research and Policy Recommendations –

- Determine what correlations can be drawn between changes in the relative price of various commodities and U.S. consumption patterns.
- Explore whether historic trends in food prices correlate with food consumption.
- Develop alternative policies that if adopted might represent a “win-win” in terms of reducing the price of produce relative to other foods, while supporting local

systems of farmers and distributors to grow the produce and get it from the farm to children's plates.

- 3. Broaden public discussion around health and agricultural policy to include farmers, environmental groups, and other public interest organizations.** Medical and public health professionals have little awareness of how agricultural policy intersects with the community and individual health of their patients. And so far, the groups most active in the development of agricultural policy have not been convinced that incorporating a public health agenda strengthens their lobbying abilities.

Currently, the focus of many family farm and environmental groups is quite narrow – simply to shift agricultural payments to rewarding farmers for providing environmental services. This “green payment” philosophy can and should be broadened to include providing incentives for public health benefits, such as the production of more fruit and vegetables. In a similar vein, the public health community needs to have a food system perspective broad enough to engage with other, non-health groups around agricultural policy in a constructive way. Conventional nutritional paradigms around food safety and food security, for example, likely are too narrow to accommodate the interests in the sustainable agriculture community around long-term soil quality and health, living wages for farmers and farm laborers, etc.

Research and Policy Recommendations –

- Develop strategies for engaging mainstream professional groups involved in nutrition, pediatrics, endocrinology and other clinical disciplines around the issue of agricultural policy as an important environmental contributor to trends in obesity and diet-related disease.
 - Further develop common concepts and messages for bringing together diverse communities in agriculture and human health around common concerns about the health of the U.S. food supply. The Prevention Institute's report, *Cultivating Common Ground*,⁹⁵ is an excellent beginning to this work.
 - Identify targeted opportunities for these health and medical groups to provide input into Farm Bill discussion on the need for U.S. agricultural policies to reflect public health concerns, including rising childhood obesity.
- 4. Explore the relationship between commodity prices and corporate marketing to children.** Low commodity prices are what feed the fast food industry and other highly processed foods. These industries have developed ways of maximizing the use of corn, soybeans, and other below-cost commodities. The gains of these industries come at the direct expense of traditional meals. Effectively reducing the consumption of fast foods and other unhealthy options cannot be done without creating a level playing field for healthier food products.

Activists often, with good reason, call attention to corporate marketing campaigns that promote calorie-dense, sugar-laden foods to children. But these corporate decisions are strongly influenced by the profit potential of different foods, and U.S. farm policy has helped make these junk foods the most profitable. To address the obesity epidemic, the public health community could focus on getting a stronger message out about healthy food choices, but

that would likely simply be drowned out by the enormous advertising strength of food corporations. A better strategy is to shift the profit motivations of the food corporations, so that they place more emphasis on healthier food choices in their advertising and marketing campaigns.

Research and Policy Recommendations –

- Determine how food corporations make marketing decisions regarding what foods to promote.
- Survey food corporations to determine how much of an impact commodity prices have on food composition and marketing, and assess how readily corporations could introduce healthier product lines.
- Assess the feasibility of a regulatory approach to food marketing.

- 5. Develop a more nuanced discussion of commodity subsidies.** In public debate leading up to the 2007 Farm Bill, calls to eliminate federal subsidies to farmers will likely become a key point of discussion, as they have been for the last several years. But much research points to the conclusion that removing these payments will do little if anything to change cropping systems. Subsidies are a symptom of, and not the driver behind, the low prices and overproduction that characterize much commodity crop production today. Debate over subsidies only distracts from the more important question of whether the Farm Bill will address public health issues like increasing trends in obesity. Further, decreased support to families continuing to try to live on the farm and produce food will only contribute to serious health problems in rural communities.

Research and Policy Recommendations –

- Provide policymakers with a broader environmental nutrition and prevention perspective on the costs of current food and agricultural policy. For example:
 - We conservatively spend \$71 billion annually to address the direct health impacts of obesity. If we had the opportunity to spend that \$71 billion addressing the root causes of obesity, what would such a policy look like?
 - A billion pounds of surplus agricultural commodities are purchased by the USDA and distributed to schools each year. Compare quantitatively and qualitatively the economic benefits and distribution of those benefits from taxpayer support of this school commodity program against the estimated future costs to society from the nutritional impacts of incorporating these commodities into schoolchildren's diets.
- Develop a policy paper that quantifies the true drivers of agricultural and food production. The paper could start with a theoretical target, such as having agricultural production produce the appropriate quantities of foods to match USDA dietary guidelines. Then work backwards from those numbers, to assess how to best make that major transition in U.S. agriculture.

- 6. Research the drivers and goals of public funding of agricultural research.** Agricultural research is increasingly dominated by private, not public, sources of funding. Of the public portion, it is likely that less than 10 percent has a focus on improving health and nutrition, while the bulk supports sectors of food production that are already oversupplied in the

American diet – the meat and dairy industries, as well as the dominant feed grains and oilseed industries.

Research and Policy Recommendations –

- Examine where public research dollars go. Looking more broadly than just USDA, determine how much public funding of agricultural research is currently directed towards the production of foods for which we already have good evidence that greater production and consumption would improve children’s health – such as fruits and vegetables, nut crops and oils, canola and flaxseed. Compare public funding of these underproduced/underconsumed foods with categories of foods oversupplied in the U.S. relative to USDA’s dietary guidelines.
 - Explore how research priorities are determined for federal agricultural research funding. Determine who and what sets the direction of public research. Also address the question of: if addressing childhood obesity is a national policy priority, then what steps with respect to such funding might make sense, perhaps including: a) creating new agricultural research programs where promoting the production of healthier foods for children could be an explicit component of an RFP; or b) making public health agencies a more important source of agricultural research funding, perhaps helping to redirect the focus of current funding away from higher yields of already-overproduced food groups and crops, and from agribusiness interests with disproportionate influence at the USDA.
 - Research linkages between production methods to nutrient content. Look at mechanisms for directing more public funds to federal testing of the nutrient content of meat and dairy from cattle fed grass versus grains, and of fruits and vegetables raised organically or using other traditional methods versus those raised under more “conventional,” more chemically-intensive methods.
 - Research private funding of agricultural research. Examine questions such as: Who funds private agricultural research, and what kinds of research are supported? What kinds of crops or foods are involved, and what are the potential impacts on children and others consuming those foods? To what degree does private funding of research at public, land grant universities dictate the direction of overall research programs there? Where do public health goals fit into the increasingly important private funding of agricultural research, and are there opportunities to promote more health-supporting agricultural research in the private sector?
7. **Explore the pros and cons of USDA having regulatory authority over nutrition and food assistance programs affecting child nutrition**, including those in the Farm Bill, as well as other programs like the National School Lunch Program. USDA advocates for U.S. agricultural interests, which more and more are dominated by large agribusiness entities with vested financial interests in the continued overproduction and low prices characterizing commodity crops like corn and soybeans. In other words, USDA’s continued advocacy for production of these crops at current levels conflicts with its own dietary advice to the nation.

From a policy perspective, there may be federal agencies better suited to advocate for school lunch and other child nutrition programs where the primary goal is child health, uncomplicated by agribusiness interests. Potential agencies include the Food and Drug Administration, the Centers for Disease Control and Prevention, or perhaps a new agency with a single food safety focus.

Research and Policy Recommendations -

- Fully explore the impacts on schools and on child health of the commodity portion of the school meals program. Topics to be considered could include: the types of commodities included in the program and how well they comply with federal dietary guidelines, as well as whether it makes sense to distribute commodities purchased by USDA from excess stocks, and therefore likely already representing foods present to excess in the American food supply.
- Develop recommendations for policy changes to programs offering surplus commodities to children, including whether the programs might be eliminated and the funds better used in some other capacity to support children's health. For example, could equivalent federal funds be used to purchase seasonal produce directly from local farmers, under the arrangements similar to what individuals contract for when they purchase shares in CSA farms?
- Develop rationale and suggested policy recommendations for ensuring the USDA would have sufficient regulatory oversight to ensure competitive foods in schools achieve at least a minimal nutritional value. Further, consider alternative mechanisms for bringing competitive foods offered in schools into compliance with federal dietary guidelines, as school meals must be.

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