A Bill of Goods: Agricultural Policy, Trade and Technology Innovation Since the Mid-1990's

By:
Charles Benbrook*

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Before focusing on some contemporary problems with the American food system, lets acknowledge and be thankful for the many things that are right about the system.

Food is never scarce. It comes in a dizzying array of forms and combinations – fresh, frozen, canned, dried, stewed, pureed, TV dinners, and snack packs. It is getting easier to find really excellent, fresh and tasty food and drink, both for consumption at home and away from home.

For most Americans food is affordable. Most agribusiness input and food companies are profitable. They pay good wages and offer their employees meaningful benefits. Agricultural and food exports play a major role in keeping a worrisome international trade deficit from becoming a disastrous one.

Tremendous strides have been made in reducing some categories of pesticide, mycotoxins, and microbiological risks. Innovation is alive and well in the biological sciences supporting food safety. The organic food industry is expanding more rapidly that any other part of the food system and more and more companies are now trying to build both economic value and principle-based values into their business activities and food products.

The good news is that the American food system's glass is surely more than half full. But given the great wealth of resources and infrastructure, knowledge and experience and human talent within the system, why is the glass not over-flowing?

The bad news is that there are some systemic problems with the American food system, some of which are getting worse.

The economic performance of the food system depends far too much on the exploitation of –

- Natural resources, farm animals, and landscapes.
- Farmers, workers, competitors, and rural neighbors.
- The federal treasury, via subsidies and tax breaks.

Food safety is clearly slipping in parts of the food supply, particularly animal products. BSE is not the only emerging concern. Antibiotic resistance with roots on the farm is posing enormous medical care costs on society. Our desire for faster food, more packaged and ready to eat food, and more convenience has shifted the burden for assuring the safe handling and preparation of food from us, in our homes, to private industry and institutions. When people

* Chuck Benbrook is a consultant to "The Organic Center" and is focusing on development of the center's scientific program. He also runs Benbrook Consulting Services, based in Sandpoint, Idaho. Contact Chuck at benbrook@hillnet.com or 208-263-5236. This paper is posted at http://www.biotech-info.net/MOSES.pdf

working in a processing plant, packing shed, or cafeteria are careless, or when some process or machine malfunctions, many hundreds, even thousands of people may pay the price.

Like a chair, the American food system has four legs –

- Input industries that sell farmers the tools of their trade.
- Farmers and ranchers.
- Food handlers, shippers, and manufacturers.
- Retailers, food service, and restaurants.

Perhaps the most intractable problem facing the American food system is that the three parts of the system that are growing and making respectable, if not handsome profits, do so at the expense of just one of the legs, the American farmer.

There are three other huge problems with our food system. Like an iceberg, these are ominous but just visible to most Americans –

- Our food system is an accomplice in the erosion of personal health and well-being via excess consumption of calories, fat, sugar, and salt.
- It is not doing its fair share to improve environmental quality and in some regions, large scale animal farms and related factories are a blight upon the land and a divisive curse within rural communities.
- Increasingly, we expect the rest of the world to accept our food exports and food aid, our farming technologies, our policy priorities, and our subsidies and surpluses "no questions asked" regardless of the harm they cause to other people trying to work their way to a more food-secure future.

A. The Mythology of the American Food and Agriculture System

American farmer and public are blinded by a series of myths that lull us into a sense of complacency based on the notion that the American food system and our food supply is safest and cheapest in the world.

The mythology of American agriculture has been built consciously. It has taken public and private institutions, our government, and leading "thinkers" several decades to get the average American farmer and most of the public to accept these myths uncritically.

Our myths are super-sized. Collectively across our population, they take peoples' breathe away. They make us feel privileged to be an American consumer and proud of the American farmer.

How many times have we heard that our agricultural system is the envy of the world? Have you ever really thought about whether this is really true and what would happen if we tried to feed the world with our agricultural system and food consumption patterns?

Myths are the organic matter of wishful, sloppy thinking. They act like a sedative and bred complacency among individuals, communities, political parties, and public institutions.

This morning my goal is to help us all become a bit more conscious of the myths that most Americans and many farmers have embraced. I want to focus on agricultural mythology because it has such a big impact on our policies and priorities as a nation. Our myths keep us from asking some hard questions and predispose us to certain solutions when problems arise. Somehow we have to get beyond, under, or around our myths to discover how to fill our food system's glass to the brim.

Lets start with technology.

A. Favorite Myths About Technology

The most damaging technological myth in American agriculture is that for every pest, disease, animal health, or fertility problem created by farm management and animal husbandry systems, there is a mechanical, chemical, genetic, or biological solution waiting to be discovered.

Belief in the silver bullet still runs deep in the veins of American agriculture. It dominates the "thinking" process in many land grant university agronomy, plant breeding, crop science, pest management, and animal health departments, where the pursuit of elegant, patentable, single-gene solutions remains the holy grail of intellectual and academic achievement.

Farmers have done their fair share in perpetuating the myth of the silver bullet. Let's face it -- silver bullets are great as long as they work, and are greater still when they are affordable. But the biological and ecological vulnerability of silver bullets arises from the fact that they almost invariably entail a simple solution to a complex problem.

Silver bullet technologies like subtherapeutic antibiotics for stressed out animals in factory farms, BGH to boost milk production, and herbicide tolerant soybeans for mindless weed management appear attractive and profitable when first adopted and working optimally. But the devil is in the details of dynamic, cause and effect relationships within agricultural systems, where the rules and mysteries of ecology and biology are both unavoidable and supreme.

Science has both given us agriculture's silver bullets and more recently, the ability to understand some of their unforeseen and unintended consequences.

Often invisibly, silver bullet solutions trigger all sorts of complex ecological and biological adaptations, for reasons we cannot begin to fathom. One of Mother Nature's undiscovered universal truths is that –

"One good silver bullet deserves another, but mine will be stealth-like, microscopic, genetically promiscuous, opportunistic, and capable of wrecking havoc up the food chain and the evolutionary tree."

Need I mention any names? For example, MRSA (Methicillin-resistant *Staphylococcus aureus*), AIDs, BSE, SARs, avian influenza.

Mechanical Technology

There are two universal myths of the machine.

First, define an agronomic or food industry problem, and there is a machine waiting to be invented to make it go away, or at least make it "manageable."

A current breathtaking example is the "Optimizer." Out in California where soils were once naturally fertile, the average row crop or vegetable field requires six to eight passes with tillage equipment before a single root is sunk. All that tillage takes time, burns fuel, wears out equipment, and increases wages. It releases tons of particulate matter into the air and pulverizes organic matter. But what a seedbed at the end of the day -- pig heaven for a germinating seedling.

Many enterprising farmers, equipment engineers, and companies have tried to develop tillage machines that reduce the number of passes required to produce California-quality seedbeds. After 25 years of effort, Kevin McDonald of Tillage International Inc. has finally achieved the impossible – a one-pass tillage tool for California agriculture. Ladies and

gentlemen, meet "The Optimizer," the "Swiss Army knife of tillage implements – it has everything but a moldboard plow" according to *California Farmer* (January 2004 issue).

This behemoth is 18 feet wide, 45 feet long, weighs 50,000 pounds, and requires a 450 horsepower tractor. It costs $160,000.00.

According to farmers that have used it, the Optimizer –

- Tills 8 acres an hour.
- Eliminates four to six tillage passes.
- Cuts fuel consumption 50 percent to 70 percent and time spent tilling two-thirds or more.
- Cuts PM-10 dust emissions by up to 80 percent.

Lets suppose the "Optimizer" delivers on all its promises. What else might it do? Get stuck? Compact the soil? Accelerate consolidation of control over cropland? Tear up roads and farmyards?

The second universal myth of the machine is that bigger and faster machines always and irrevocably make people more productive.

This is a tricky one because it seems so self-evident. Most people disking a field with a 12' foot implement behind a 4020 looks over the fence at a 8530 and 24' disc with envy, especially as it pulls away.

Yes, that 8530 and 24' disc is more productive per hour if the measure of productivity is simply "acres covered." But such simple measures are seductive and dangerous, not because they are wrong on the surface, but because of what they leave out.

Farming is a biological process governed by ecological principles and interactions. When our machines allow us to go faster and push yields higher than the biology of our farms can sustain, webs of life become fractured or overwhelmed. Bad stuff then begins to happen, like too much nitrogen in the system, which has to go somewhere and wherever it goes, it causes problems of one sort or another.

Economists call this "stuff" externalities and generally don't study it very deeply because it is so complicated, plus biological scientists rarely agree on what causes what. Externalities are like inflation, they silently take away what people thought they had.

Chemical Technology

Pesticides and animal drugs have their own unique set of myths. There are many versions of chemical mythology that are deeply ingrained in the genome of American agriculture and our attitudes about food.

For every new bug or pathogen, there will be a newly discovered pesticide or drug that prevents excessively economic loss on the farm and disease in the U.S. population.

The modern way to deal with a biological problem is with a chemical solution.

Smart use of chemistry can free mankind from paying attention to Mother Nature, or from worrying about the relationship between caloric intake and energy use, or how we feed and care for farm animals, or manage pests.

Another set of myths specific to soil chemistry and fertility have done great harm to soil quality. I'll mention just one example.

A farmer can maintain soil fertility and productivity by replacing the N-P-K nutrients removed by the crop each year, and keeping pH balanced.

If only it was that simple.

Genetic Technology

The biotech revolution in agriculture has done more to both create and shatter mythology than the mechanical and chemical revolutions combined.

Some of my personal favorites are that –

Engineering crops to produce pesticides in every cell, season long, reduces pesticide use.

Crops genetically engineered to withstand over-the-top applications of herbicides will reduce herbicide use.

Genetic engineering of plants is no different from classical plant breeding.

Genetic engineering techniques are precise.

Genetic engineering will speed up progress in the development of improved varieties.

Today's genetically engineered crops are "substantially equivalent" to conventional varieties, and hence safe.

It would take days to do justice to the myths of agricultural biotechnology. This morning, I will address only a few.

First, lets explore the assertion that herbicide tolerant technology reduces herbicide use. I recently projected the impacts of herbicide tolerant and *Bt*-transgenic corn, cotton, and soybeans on pesticide use over the first eight years of commercialization. (The full report is freely accessible at <http://www.biotech-info.net/technicalpaper6.html>).

Roundup Ready technology was introduced commercially in 1996 and worked well for the first few years on most farms. Based on USDA pesticide use data, I calculated that Roundup Ready (RR) soybeans reduced herbicide use by about one-third of a pound per acre in 1996 and 1997, reducing total soybean herbicide use by about 5.2 million pounds.

But in 1998, the average acre of RR soybeans was treated with 0.07 pound more herbicide than the average acre planted to conventional soybeans. This shift resulted from two factors –

- Farmers applied more glyphosate per acre, with the average rate increasing from 0.79 pounds to 0.9 pounds.
- Average herbicide use on non-RR acres went down from 1.23 pounds per acre to 1.05 pounds, as a result of wider use of low-dose chemistry and regulatory changes.

Since 1998, weed shifts and resistance in soybean production systems have become more widespread and serious, despite the fact that RR technology still works well in many regions and thousands of farmers still swear by it.

The February 2004 *Farm Journal* has an article entitled "The Top 10 Weeds" that drives home the magnitude of problems undermining the efficacy of RR technology. This article is based on a ranking of the worst weeds by leading weed scientists at land grant universities. The

article identifies the top 10, along with where and why these weeds have become so difficult to control. Here's the list and some excerpts –

1. Waterhemp

"….it's no surprise this weed got the most votes…[resistant to several common herbicides and]…Some say it is becoming resistant or tolerant to glyphosate herbicides…"

2. Common lambsquarter

"Post-applied herbicides, including glyphosate, don't always knock it down…"

3. Giant foxtail

4. Velevetleaf

5. Giant ragweed

"…it also has a knack for scoring over most herbicide defenses sooner or later…"

6. Morningglory species

"One weed scientist notes it can be 'controlled' with glyphosate but has thrived since Roundup ready soybeans became popular."

7. Kochia

Note – while the *Farm Journal* article does not mention resistance to Roundup in kochia, many reports have surfaced of tolerance, if not resistance in some locations.

8. Common cocklebur

9. Horseweed

"This weed got double votes cast in Eastern states – one as a weed and one as a glyphosate-resistant weed…resistant biotypes continue to roll out of Dellmarva into the eastern Corn Belt, Tennessee, Arkansas, and Mississippi."

10. Woolly cupgrass

Out of the top 10 weeds plaguing farmers, six have emerged as major problems largely or partially in response to Roundup Ready technology. Think of all the extra herbicide applications that will be required this summer because of these incrementally more difficult to control weeds. One or more of these weeds will be found on most of the 170 million acres that will be planted this year to corn, cotton, and soybeans. They will force farmers to apply 100 to 200 million more acre-treatments with a distinct herbicide active ingredient (often two or more at once in a tank-mix). At an average rate of 0.5 pounds of herbicide per acre per treatment, that's 50 to100 million extra pounds of herbicide.

Returning to the impact of RR soybeans on herbicide use in the last three years, an estimated 66 million more pounds of herbicides have been applied, compared to the volume of herbicides that would likely have been applied if the land was planted to conventional varieties.

Over the first eight years of commercial use, herbicide tolerant corn, cotton, and soybeans has increased herbicide use an estimated 70.2 million pounds, or by a couple of percent. As Roundup resistance weeds proliferate across the country, farmers will respond by

adding new herbicides into their tank-mixes. Dicamba and 2,4-D, two of the more dangerous herbicides on the market, are the products of choice to deal with glyphosate resistance marestail. These active ingredients have recently been implicated as risk factors for birth defects and reproductive problems in the Midwest.

Here is another popular biotech myth –

Herbicide tolerant technology is efficient and good for farmers because it has reduced their herbicide costs.

It is true that RR technology has saved farmers a few hundred million dollars each year on herbicides, and that is a good thing. Proponents of biotechnology usually do not mention that most of these savings have been shifted to cover rising soybean seed costs. Nor do they point out that the herbicide cost savings to soybean farmers, both those planting RR beans and conventional varieties, has nothing to do with the efficiency of the technology and everything to do with the impact of glyphosate going off-patent on herbicide prices.

The average price of an acre treatment with soybean herbicides has declined over 40 percent since the introduction of RR soybeans. The price of glyphosate has fallen from between $12.00 to $14.00 per acre treated to $5.00 to $7.00. Price reductions improve cost-effectiveness, not efficiency. And what farmer is not well aware of the universal law of farm input markets –

> What falling prices add to the bottom line in one year, increasing prices can and eventually will take away.

B. The Cost of Food

There are many popular versions of the myth about food being so cheap in the United States. Some of the most common are –

- Americans pay less for food than citizens of any country.
- Food is cheaper in America than anywhere else.
- Food is a great bargain in America.

Lets talk about fast cars to gain some new perspective on what these statements mean and really reflect.

The Fastest Car

Imagine a group of teenagers hanging around the La Crosse 7-Eleven parking lot having a free-wheeling, intellectual conversation about who has the fastest car.

John has the fastest car because it can make it form Madison to La Crosse in the shortest amount of time.

Bill has the fastest car because it goes from 0 mph to 60 mph in the least amount of time.

Andy has the fastest car because it made it across the country the quickest.

Then the wise-guys speak up. The fastest car is the one that moves through the assembly line the quickest. And a personal favorite –

The fastest car is the one that biodegrades the quickest when parked for the last time in the junkyard.

The point is there are many ways to define and measure "fast," just as there are many ways to define and measure economic value or costs, or performance measures like efficiency or productivity, or concepts such as innovation, progress, and health.

With this in mind, lets look at just two ways to measure the cost of food across countries, in order to see which country really has the cheapest, most affordable food in the world.

Per Capita Expenditures on Food

Table 1 ranks 34 countries based on the share of per capita income spent on food. The U.S. ranks number one in this ranking, spending the smallest share of per capita income on food of any country. Does that make food "cheap" in America? It depends on whether you are buying American food with an average American income, or the income of people living elsewhere. What this ranking really reflects is not whether food is expensive or cheap, but whether it is affordable.

Table 2 ranks the cost of food in another, equally logical way across the same 34 countries – according to the dollars spent per 1,000 calories consumed in a given day. In reality, this is a more accurate international measure of whether food is expensive or cheap. America ranks 23rd out of 34 countries in this measure of the cost of food. Given that most people in developing countries spend far less on 1,000 calories worth of food than U.S. consumers, some 90 percent of humanity spends less per calorie of food than Americans.

Of course, Americans are buying a lot of convenience, packaging, and services with their food dollars. And we are paying a lot more for it as a result.

Table 1. Ranking of Thirty-Four Countries by Percent of Per Capita Income Spent on Food, Smallest to Largest Share, Late 1990s

Rank	Country	Per Capita Income (U.S. Dollars)	Percent per Capita Income Spent on Food
1	US	$ 31,872	9.7%
2	Canada	$ 26,251	11.7%
3	Sweden	$ 22,636	13.3%
4	Japan	$ 24,898	14.9%
5	Australia	$ 24,574	15.1%
6	New Zealand	$ 19,014	15.2%
7	UK	$ 22,093	16.4%
8	Italy	$ 22,172	16.6%
9	Israel	$ 18,440	17.7%
10	Hungary	$ 11,430	22.5%
11	Brazil	$ 7,037	22.7%
12	Chile	$ 8,652	23.0%
13	Uruguay	$ 8,450	25.3%
14	Zimbabwe	$ 2,876	25.6%
15	Mexico	$ 8,297	26.6%
16	Thailand	$ 6,132	28.6%
17	Venezuela	$ 5,495	29.5%
18	Peru	$ 4,622	31.3%
19	Korea, Republic	$ 15,712	31.6%
20	Argentina	$ 12,277	32.8%
21	Jamaica	$ 3,561	34.8%
22	Fiji	$ 4,799	36.3%
23	Bolivia	$ 2,355	42.5%
24	Romania	$ 6,041	45.3%
25	Kenya	$ 1,022	45.8%
26	Pakistan	$ 1,834	47.0%
27	Egypt	$ 3,420	48.1%
28	Philippines	$ 3,805	48.4%
29	Mali	$ 753	53.3%
30	Bangladesh	$ 1,483	56.1%
31	Nepal	$ 1,237	57.9%
32	Yemen	$ 806	61.1%
33	Sierra Leone	$ 448	62.1%
34	Tanzania	$ 501	73.2%

Table 2. Ranking of Thirty-Four Countries by Daily Expenditures Per 1000 Calories, Least to Largest Expenditures, Late 1990s

Rank	Country	Percent of Per Capita Income Spent on Food	Per Capita Income (US Dollars)	Per Capita Food Expenditures per Day	Per Capita Calories Consumed per Day	Daily Expenditures per Person for Each 1,000 Calories Consumed
1	Sierra Leone	62.1%	$ 448	$ 0.76	1968	$ 0.39
2	Mali	53.3%	$ 753	$ 1.10	2379	$ 0.46
3	Tanzania	73.2%	$ 501	$ 1.01	1954	$ 0.51
4	Kenya	45.8%	$ 1,022	$ 1.28	2036	$ 0.63
5	Yemen	61.1%	$ 806	$ 1.35	2046	$ 0.66
6	Nepal	57.9%	$ 1,237	$ 1.96	2422	$ 0.81
7	Pakistan	47.0%	$ 1,834	$ 2.36	2461	$ 0.96
8	Zimbabwe	25.6%	$ 2,876	$ 2.02	2048	$ 0.98
9	Bangladesh	56.1%	$ 1,483	$ 2.28	2122	$ 1.07
10	Bolivia	42.5%	$ 2,355	$ 2.74	2215	$ 1.24
11	Jamaica	34.8%	$ 3,561	$ 3.39	2680	$ 1.27
12	Egypt	48.1%	$ 3,420	$ 4.51	3336	$ 1.35
13	Brazil	22.7%	$ 7,037	$ 4.38	3000	$ 1.46
14	Peru	31.3%	$ 4,622	$ 3.96	2597	$ 1.53
15	Fiji	36.3%	$ 4,799	$ 4.77	2780	$ 1.72
16	Mexico	26.6%	$ 8,297	$ 6.05	3141	$ 1.93
17	Chile	23.0%	$ 8,652	$ 5.44	2818	$ 1.93
18	Thailand	28.6%	$ 6,132	$ 4.80	2452	$ 1.96
19	Venezuela	29.5%	$ 5,495	$ 4.44	2257	$ 1.97
20	Uruguay	25.3%	$ 8,450	$ 5.85	2838	$ 2.06
21	Hungary	22.5%	$ 11,430	$ 7.06	3422	$ 2.06
22	Philippines	48.4%	$ 3,805	$ 5.04	2374	$ 2.12
23	***US***	***9.7%***	***$ 31,872***	***$ 8.50***	***3726***	***$ 2.28***
24	Romania	45.3%	$ 6,041	$ 7.49	3283	$ 2.28
25	New Zealand	15.2%	$ 19,014	$ 7.91	3187	$ 2.48
26	Israel	17.7%	$ 18,440	$ 8.94	3532	$ 2.53
27	Sweden	13.3%	$ 22,636	$ 8.22	3148	$ 2.61
28	Canada	11.7%	$ 26,251	$ 8.40	3176	$ 2.64
29	Italy	16.6%	$ 22,172	$ 10.08	3652	$ 2.76
30	UK	16.4%	$ 22,093	$ 9.91	3349	$ 2.96
31	Australia	15.1%	$ 24,574	$ 10.15	3092	$ 3.28
32	Argentina	32.8%	$ 12,277	$ 11.03	3182	$ 3.47
33	Japan	14.9%	$ 24,898	$ 10.15	2759	$ 3.68
34	Korea, Republic	31.6%	$ 15,712	$ 13.62	3073	$ 4.43

C. Myths About Agricultural Trade

Any discussion of the mythology of American agriculture would be incomplete without acknowledging the richness and staying power of trade mythology. This morning though, I will just touch upon a few of the most commonly encountered and deeply held.

The export market is the key to the financial prosperity of the American farmer.

One sign of progress is the fact that this myth is getting harder and harder for the American farmer to swallow. Later, in discussing farm policies and the 1996 farm bill, I present some data that shows how fickle export markets have proven to be.

Trade agreements like NAFTA and GATT will open markets, expand trade, and increase economic well-being for citizens in all countries.

The Carnegie Endowment's widely cited study of the impact of NAFTA concluded that in Mexico, real wages had fallen despite gains in productivity, income inequality has increased, the agricultural sector lost 1.3 million jobs, and immigration to the U.S. has soared.

The adverse impacts of NAFTA have been roughest on rural Mexico. As part of the agreement, Mexico gradually opened its markets to U.S. corn and reduced its domestic support for its corn farmers. As world market prices fell in the late 1990s, cheap U.S. corn devastated rural areas dependent on maize, a crop that provides nearly half the calories in the Mexican diet. Remember, every bushel of corn exported to Mexico from the U.S. in the late 1990s was sold well below the cost of production. Those exports would not have happened without USDA commodity program subsidies.

A major World Bank study estimated that ending trade-distorting agricultural policies in the U.S. and Europe would expand global wealth by a half-trillion dollars and lift 150 million people out of poverty by 2015. A billion people on Earth spend less money each day on food than Europeans spend on the subsidies supporting a single cow. The magnitude of the adverse impacts of developed world agricultural and trade subsidies on farmers in the developing world provoked the New York Times to label these subsidies as "…weapons of mass destruction" in a December 30, 2003 editorial.

I'll note two more trade myths without comment.

Overbearing worker safety and environmental rules are undermining the international competitiveness of American food manufactures.

Trade policies supported by Cargill, ADM, and Conagra are good for America and the American farmer.

D. Myths About Food Safety

In responding to the detection of a cow with BSE last December, Secretary Veneman and other U.S. agricultural leaders repeatedly stated that the U.S. food system produces the safest food in the world, or alternatively, "…the U.S. food supply is the safest in the world."

All of us in the agricultural world have heard this statement a million times, but have you ever heard anyone explain the basis for such a claim?

Over the years I have thought about how one might develop a fact-based international ranking of food safety across countries and I have looked into the availability of data to make

comparisons. A ranking system would need to include, at a minimum, measures of the degree of risk in foods associated with –

- Pesticide residues.
- Animal drug and hormone residues.
- Foodborne pathogens and parasites of animal origin.
- Microbiological contamination.
- Natural toxins expressed by plants.
- Antibiotic resistant bacteria.
- Mycotoxins like aflatoxin.
- Transmissible spongiform encephalopathy, including BSE.
- Mercury, other heavy metals, dioxins, and other environmental toxicants.

I do not know of a single study in any of these nine areas by any U.S. government agency, private organization, or any international body that compares the safety of the food supply in various countries around the world. There has never been such a study because there is no way to carry one out.

I follow scientific developments in most of these areas, and I am pretty certain that if and when someone does such an analysis, they would conclude that the U.S. food supply is at the top in terms of safety, or near the top in four of the nine areas -- pesticide residues, natural toxins, mycotoxins, and mercury and other environmental toxicants.

But in four other areas, the U.S. food supply would not rank in the top 10 percent of countries, and maybe not even in the top one-third. These would include foodborne pathogens of animal origin, animal drug and hormone residues, antibiotic resistant bacteria, and TSEs. I am not sure how the ranking would turn out in the incredibly complex and dynamic ninth area – microbiological contamination.

In Europe, the Nordic countries, Denmark, France, the Netherlands, even Great Britain and definitely Japan, major commitments and investments have been made to enhance food safety. Safety standards and monitoring systems are much stricter and more comprehensive than in the United States. Much more public money is spent on epidemiological research to trace human illnesses back to their roots, often to a specific farm and herd of animals.

In three or four of the nine major food safety areas, several of these countries have reduced the prevalence and/or severity of food safety problems more so than in the U.S. Moreover, they are doing much more than us to make their food supply even safer.

Ultimately, deciding which country has the safest food supply in the world will come down to the relative importance one places on various categories of risk and how one deals with scientific uncertainty in the estimation of risks. It will be much more complicated than figuring out which La Crosse teenager has the fastest car.

One thing is certain though, when the Secretary of Agriculture, or anyone else says that the U.S. food system is the safest in the world, the basis of their claim is more a widely shared belief, not a science-based analysis. To get beyond misplaced faith in the effectiveness of our current food safety laws, policies, and technologies, we must admit that we have some problems and some catching up to do. The U.S. is likely to slip farther behind food safety leaders internationally as long as our leaders and public institutions remain in denial that the way we raise, manufacture, distribute and cook food has opened the door to some significant new risks.

E. The Ag Policy "Bill of Goods"

The 1996 Federal Agriculture Improvement and Reform Act (FAIR) farm bill was passed with great fanfare in a period of heady optimism. Market prices were at a ten-year peak, farm income was way up, and world export markets seemed like they were finally taking off.

The government needed to save some money to deal with budget deficits and free-market Republicans had solid control of the Congress. As the debate on the 1996 farm bill got underway in the spring of 1995, Dr. Ford Runge, an agricultural economist at the University of Minnesota, gave a speech at a Washington D.C. press briefing where a new report, "Ending Agricultural Entitlements: How to Fix Farm Policy," was released. The report was written by Runge, former Minnesota Congressman Tim Penny, and an old-school ag policy expert, John Schnittker.

In his May 15, 1995 comments Dr. Runge said –

"[Without vision and change]…we are condemned to continue the recurrent exercise in government waste represented by our farm programs."

"The U.S. has spent billions of dollars on these [export] subsidies, the benefits of which flow indirectly, and only marginally, to farmers, while reducing export earnings because of give-away prices."

"…the lack of fairness and the inefficiency of current agricultural policies calls out for reform. Opposition to these changes will come in the name of the small family farmer, but will be designed to preserve a grant welfare system for mostly large and well-to-do farmers and landowners."

The 1996 Farm Bill

In the FAIR farm bill, Congress ended set-asides and counter-cyclic supply controls, merged acreage bases, allowed farmers to plant whatever program crop they wanted on base acres, or none at all, while still receiving per acre payments that were to be phased out over five or so years. The bill was designed to get the government out of micro-managing agriculture. The hope was that it would unleash the productivity of American agriculture, allow farmers to respond to world market signals, and put an end to costly and hard-to-defend farm subsidies.

As Daryl Ray and other policy experts have now shown in excruciating detail, the 1996 FAIR bill was designed to function in a fictitious world. Soon after passage, world markets, and in particular China, did not behave as the USDA's baseline projections had shown they would. Prices started declining here and worldwide, yet farmers kept right on planting. By 1998, prices were down about 35 percent on average across the farm bill's eight major crops. Farm income followed, of course, and farmers tried to hold on by covering more acres, cutting costs and corners, and seeking out new alliances and technology.

Instead of declining, "emergency" and "disaster" farm program payments shot through the roof, rising from under $10 billion when the FAIR bill was passed to well-over $20 billion three years later.

And what about freeing the farmer from dependency on farm programs? Official USDA production costs and returns survey data tell the story, as shown in Table 3. In 2000, the average market price for corn was $1.77 per bushel. It cost the farmer $2.72 to raise the bushel, or a loss of $0.95 per bushel. The government covered most of the loss -- $0.79 per bushel. Compared to soybean and wheat growers, corn farmers did well, losing only $0.16 per bushel, instead of $0.56 or $0.31.

In soybeans, the market paid $4.45 per bushel for beans it cost $6.20 to produce, resulting in a $1.75 loss per bushel. The government covered about two-thirds of this loss, or $1.19. Wheat, same story. The market paid $2.46 for a bushel that cost $4.62 to raise, with USDA kicking in $1.85 per bushel.

Table 3. Per-Unit Market Prices, Total Average Cost of Production, and Government Payments for Selected Crops for 2000 and 2001

	Corn		Soybeans		Wheat	
	2000	2001	2000	2001	2000	2001
Price	1.77	1.84	4.45	4.15	2.46	2.76
Total Avg. Cost of Production	2.72	2.39	6.20	6.14	4.62	5.31
Average Gross Income	-0.95	-0.55	-1.75	-1.99	-2.16	-2.55
Government Payments	0.79	0.58	1.19	1.26	1.85	1.53
Average Net Income	-0.16	0.03	-0.56	-0.73	-0.31	-1.02

Source: Daryl Ray et al., "Rethinking US Agricultural Policy: Changing Course to Secure Farmer Livelihoods Worldwide," Agricultural Policy Analysis Center, Univ. of Tennessee, 2003.

The 1996 FAIR act was very successful in driving down prices both in the U.S. and abroad. It eliminated production controls, removed the floor beneath prices, and badly miscalculated the response of farmers worldwide to dropping prices. The 2002 farm bill did little to change the fundamental problems with commodity policy, although baby steps were taken toward restoring some counter-cyclic capacity into the policy mix.

Today, prices are rising a bit and government payments are coming down, but the enormous and negative impacts of American farm policy on farmers in the developing world have become a magnet for international criticism and animosity. Our cotton and rice programs are the worst offenders, driving down world market prices of these commodities by about a third according to most independent analyses that have been completed in recent years.

Saving the Family Farm

Returning to the domestic impacts of farm policy, let's turn to one of the most pernicious myths in the policy arena.

The goal of U.S. farm policy is to preserve the family farm system of agriculture.

If that were truly our policy goal, farm policy has been a dismal failure for forty years. The percentage of acres and total agricultural output produced on very large farms has grown steadily and now accounts for about two-thirds of total production. Of course, whether it is one-half or two-thirds or three-quarters depends how one defines and measures a "very large farm," or conversely, how one defines and measures a "family farm." Regardless of definitions, the share of acres and farm income captured by corporate-scale farms is large and rising and the share accounted for by small and mid-scale family farms is relatively small and shrinking.

I refuse to believe that the failure of agricultural policy to preserve the economic viability of small and mid-scale farms has been inadvertent. For decades, farm policy has both encouraged and accommodated consolidation in a variety of ways, some overt and others less obvious.

For example, with every farm bill there is an incrementally more impassioned debate over payment limitations. In the end, the rules attempting to target program payments to mid-size farms are tightened a bit and made more complex, and large-scale farmers and farm corporations figure out ways to get around them.

Fixing this problem is as easy as one, two, three. If Congress really wanted to target farm subsidies to support family farming, and justify ongoing payments to the general public, it would –

- Target payments to family farm units living on a farm and deriving a minimal percent of income from farming through active participation in farm management and tasks.
- Build in a means test and size limits, so that the largest payments go to farmers who really need the support to keep a family farm viable.
- Link payments to natural resource conservation and environmental stewardship commitments.

Farmland managed by large-scale operations would not meet these criteria. Larger farms managed and run by extended families, where four or six or eight family members are making most of their living off the income generated on the farm, would qualify, but only up to a point. Tom Dorr's 200,000 acre Iowa grain-livestock farm of the future would have to make it on its own in the marketplace.

Dairy Policy: Muddling Toward a Sustainable Lose-Lose Strategy

Policy also profoundly impacts the costs of production for a given commodity in different regions of the country. Take dairy farming and milk production. We have an ongoing national crisis in the diary industry driven by over-production, erratic prices, misplaced technological priorities, and the collapse of mid-size dairies in the Northeast and Midwest. I have heard that Cornell University experts are projecting that of the 23,000 dairies still in business in New England today, some 4,000 will remain in a decade or so. I am sure many in the audience this morning can report on similar trends here in Wisconsin.

Dairy farming is without a doubt the best, most productive and sustainable use for much of the farm land in the Northeast and Upper Midwest. Plus, look at all the infrastructure already in place, the schools and churches supporting by those dairy farm families, the milk plants, the truckers and vets, and the critical role of dairying in maintaining the rural landscape. So why is national policy so hell-bound to dismantle this industry by pushing so many farms to fail?

The problem in the dairy industry is excessive growth in capacity in the west, where CAFO-scale dairies dominate. Even with depressed prices, these mega-farms can make a small profit per cow, largely because of government subsidized water, and hence government-subsidized alfalfa. Out west, private property rights trump the public's interest in clean air and water and the wide-open spaces are used to dispose of manure in as cheap a way as possible. It isn't pretty and smells like…well, badly.

Our national diary policy, which encompasses western water and environmental policy, appears determined to perfect a bi-coastal lose-lose strategy that serves no one's long-term interests. These policy issues and impacts have been well studied and understood for 20 years, yet we cannot seem to find a way out of this mess. Are we paralyzed by our faith in the laws of supply and demand? Are the mega-farms really more efficient and benefiting America by providing consumers with cheaper, higher-quality food?

Sound Science

A vast array of regulatory policies and standards of performance and quality shape the food system and agricultural practices. As any Secretary of Agriculture says whenever asked, USDA policies are all based on sound science. If only that were true.

The Union of Concerned Scientists issued a chilling report last week. "Scientific Integrity in Policymaking: An Investigation into the Bush Administration's Misuse of Science" is worth

reading. You will learn about an Agricultural Research Service microbiologist who tried to publish and present results documenting the presence of antibiotic resistant bacteria in dust around Iowa hog farms. He was told repeatedly by his superiors that his research could not be published in the peer-reviewed literature and he was told he could not present, or even discuss his findings at scientific meetings.

It gets worse. Appendix B in the report presents the "USDA 'Sensitive Issue' List." This is a list of 28 "sensitive issues for ARS manuscript review and approval by National Program Staff – February 2002 (Revised)." As one might guess, a half-dozen involve biotechnology, many involve environmental impacts of farming, several food safety and public health issues are listed, and even a few sleepers like Sudden Oak Death and citrus stem canker.

Just two days ago, the New York Times ran a story entitled "U.S. Scientist Tells of Pressure to Lift Bans on Food Imports." The story quotes a senior USDA scientist who witnessed first hand misstatements regarding science that the USDA had done and pressure from the Secretary's office to come up with scientific justification for policy decisions made on the basis of something other than science.

The handling of the BSE crisis by USDA is another telling example. To her credit, the Secretary convened an experienced advisory group of international experts in Mad Cow disease and the risks to humans right after the cow was found, and asked them to advise the Department on further measures needed to reduce the spread of TSEs via animal feed and into the human food supply. They did just that, drawing on Europe's extensive research and its long and tragic history with this disease, and the Secretary then basically ignored their recommendations.

There is so much at stake at the interface of science and public food policy. The USDA is working to revise the well-known food pyramid and the government's basic dietary advice. Obviously, this is an extremely important public health initiative, given the trends in overweight and obesity, and the costs posed on society by diseases related to excessive consumption of food.

The process, however, has become highly political, with USDA inviting in all the usual suspects to lobby for dietary recommendations favorable to their interests. It has already become messy. Remarking on the flow of comments by food and commodity lobbyists delivered at a January 28, 2004 public forum on the revised guidelines, the national editor of "The Packer," Tom Karst, wrote in the February 6, 2004 issue –

> "The term 'sound science' has become a misnomer and now nearly translates into the precise opposite of its apparent meaning."
>
> "There will never be enough sound science to prompt any industry association promoting salt, sugar or beef to agree that consumers should eat less of their commodity."

Emerging Myths About Organic Food and Farming

With passage of the 1990 farm bill, Congress established the new National Organic Program and set in motion a wild ride that is ongoing. Policy decisions have shaped the Department's performance in implementing the legislation, developing the infamous national rule, and getting the new USDA organic label into the marketplace.

It was a policy decision that led the USDA to decide that its public position will be that organic farming is a production system claim with no impacts or linkages to food safety or quality.

In other words, the USDA is claiming that how food is grown and processed does not affect food safety and quality in any meaningful way. How's that for some new-age mythology!

If USDA wants to preserve some semblance of credibility in the international arena, it will have to begin acknowledging what sound science has already shown. Organic food is safer than conventional food. It contains far fewer pesticide residues and average levels tend to be lower. Plus, recent pesticide residue data suggest that organic food is getting cleaner, while conventional food, particularly some categories of imported food, is getting dirtier.

Organic meats and dairy products don't contribute to the problems caused by antibiotic resistant food borne pathogens, or problems from residues of animal growth hormones in food, or TSEs.

Organic food often is more nutritious and tastier. As part of my work with The Organic Center, we are developing a series of "State of Science Reviews" on the proven and potential benefits of organic food and farming systems. The scope and volume of new science underway around the world on the unique attributes of organic food and farming is both encouraging and promising. While few scientists in the U.S. are involved in such research or paying attention to it, this is not holding the rest of the world back.

New research is showing that organic fruits and vegetables, and some grains, contain higher concentrations of secondary plant metabolites that can confer health benefits in several ways. Some are anti-inflammatory and help relieve pain and prevent cardiovascular disease. Others are anti-proliferative and have been shown to slow the growth of a variety of cancer cells.

Scientists have much work to do to sort out all the factors that impact the levels of secondary metabolites and polyphenols in food. Even more work will be needed to fully explore their physiological significance for people, from young to the elderly, among healthy people and those dealing with disease. But already, there is a buzz building in the scientific and nutrition communities because it appears that we have not exhausted all possible ways to promote human health and well-being through easy-to-accomplish changes in agriculture and food manufacturing.

This is good news for consumers and organic farmers, yet the USDA will probably just add polyphenols and secondary metabolites to its "sensitive issues" list.

The American food system can and should produce safer food, while more effectively conserving resources and the environment and providing a fair price and a good living to family farmers. But to move from here to there, we have to get beyond some cherished myths, admit mistakes and miscalculations, rediscover and live by sound science, and think more systematically about the impacts of policy on true national needs and civic priorities.

We need a focused national dialog, designed to reach a firm consensus on what is really important to the average American and what they are willing to pay for. Then, policy experts and communities of interest will have to figure out how to bring about needed changes. In theory that is how our system of government is supposed to work and in practice it is still worth fighting for.