

# The Economic Argument Against GMOs: a Top Ten List.

Analysis of Vandana Shiva's "Real Economies of the GMO Equation"

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*Ask an economist to give an opinion about any controversial subject in society, and they'll turn to the data and start digging for answers. While I've covered the [economics of GMOs](#) in the past, [Dr. Vandana Shiva](#), on a recent visit by the visionary sustainability guru to my home state of Hawaii, opened my eyes to the real economics in the GMO equation, and the picture isn't pretty. Just like [coal \(which you are heavily subsidizing every day\)](#), the GMO food system relies on government handouts and many other subsidies in order to maintain its grip on the global food supply.*

Dr. Vandana Shiva is an author ([Earth Democracy](#)), and was trained as a physicist. As such, she is a systems thinker. In her recent talk, she described the commodification of life as an affront to all of mankind, and described the system-level view that confronts us as we grapple with the GMO challenge.

The first truly eye opening description she made was that of our system of war. Carcinogenic compounds like Agent Orange have largely been repurposed into the agricultural chemicals of today. For instance, 2,4-D, an extremely potent chemical defoliant and component of Agent Orange, was originally developed to destroy Japan's rice fields during World War II. It has been used in large scale monoculture style agriculture since the 1940s.



Corn photo from Shutterstock

The same basic premise of war applies to our food systems today, according to Dr. Shiva: it's a war against nature. Think about it. Companies genetically modify food crops to be resistant to chemicals (like 2,4-D, glyphosate, Roundup, dicamba, imidazolines, and so forth). They then sell the seeds to farmers, and also supply them with the chemicals needed to wipe out everything else except that GMO crop. A smart business model, perhaps, but would it work if you didn't ignore all the costs that society bears as a result?

Top ten externalized costs ([externalities](#)) in GMO agriculture:

1. Soil erosion



In Molokai, where much of the GMO corn seeds are produced, Monsanto's extensive "farms"

generate what local residents refer to as “[fugitive dust clouds](#)”. The dust clouds come from uncovered topsoil, a cornerstone of GMO field trials here in Hawaii, since all ground cover is removed by chemical application. The dust clouds contain high levels of pesticide residues, and go wherever the wind blows, bringing pesticides onto neighboring farms, communities, and into watersheds where it inevitably enters drinking water. In addition, when Monsanto or another GMO agribusiness leaves an area after farming for many years, this topsoil erosion is so bad it may take 20 years to regenerate even in ideal conditions, until which time the land is more or less economically unproductive.

The process of monoculture style agriculture itself is nothing less than a war against nature. Upon arriving in Hawaii, Dr. Shiva was given a helicopter tour by a local (non-GMO) farmer. Looking down on the landscape, it was so clear to see the local farms were integrated into the landscape around them, hardly standing out from other landscapes. But the GMO “farms” were like an extension of the military barracks, she said. Straight lines, obliteration. And it’s the same everywhere that monocultures are grown. According to Dr. Shiva, 10% of the formerly fertile agricultural land in the province of Punjab in India are now just dead zones. Nothing can grow there without heavy chemical additions of fertilizer because the soils have nothing left to give.

## 2. Deliberate inefficiency built into the GMO food model



(image from 80/20 vision)

Did you know that only 2% of GMO soy is actually eaten by people? Or that most of the corn grown in the U.S. is actually not even edible? Or that just 10% of corn ends up being used directly in foods, and about half of that is in the form of high fructose corn syrup? The GMO industry claims that GMOs are needed to feed the world (look at any of their websites and you’ll see this claim as a defense of their agricultural methods). But it’s simply not true. Most GMO corn is either processed into gums, pastes, additives, fillers, ethanol or other products. According to Shiva, 80% of our actual food comes from small farms, whereas only 20% comes from these monocrops that are claimed to be the answer to global hunger. That 20% goes to factory farms as animal feed. Beyond the 2% of soy eaten by people, for example, the rest is factory farms (~70%) and biofuels (~25%). Normal (boring) economists like to look at ROI, but Inspired Economists like to look at EROEI, or [Energy Return on Energy Invested](#), as a holistic metric for sustainable economic development.

As for return on the energy put in, according to Shiva, when we grow GE corn and soy and feed it to animals before we eat the animals, we go from 100 units to 1 unit. If we just grow organically, she said, diverse food on small farms, we go from 100 units to 200, 300, 400.... While the Biotech industry claims GMOs are necessary for feeding the world, the plain truth is that that is simply a bald faced lie. While [food waste](#) in the U.S. amounts to 20 pounds per household per month ([costing them \\$2200+ per year](#)), and the completely inefficient channeling of our crops through farm animals, one can only logically conclude that the deliberate overproduction of GMO corn and soy in the U.S. has only one purpose: more money.

Corn ethanol is another great example. It needs just as much energy put into it as it delivers on the other end, so its EROEI is about 1. Basically, to be economically viable, any EROEI has to be quite a bit higher than 1, so how does GMO corn survive the free market? (segue to

number 3).

### 3. The subsidies

In economic parlance, there are incentives, and then there are perverse incentives: money that flows from the government purportedly for public benefit but that has the opposite effect. Think about highway spending: [\\$52 billion in 2010 alone flowed from government coffers into maintaining the US highway system](#). It's kind of good for people in that they are able to drive wherever they want without stopping to pay tolls (they're paying tolls through their taxes), but at the same time, it has subsidized the movement of goods from China such that cheap imports outcompete locally manufactured goods. Here's a post about [why we should privatize highways](#), in case you're interested.

 The subsidies received by the agribusiness giants are overwhelming. According to Shiva, there are \$400 billion in subsidies (globally) for chemical agriculture. In the U.S., large scale [meat and dairy operations get 73.8% of all food subsidies](#) over a decade from 1995 to 2005, whereas fruits and vegetables got 0.37%.

What does that mean to GMO corn growers? Huge markets, that's what. If you look at the EROEI of calories we consume in a cow, it's mindbogglingly bad. It takes anywhere from 10 to 16 pounds of grains (GMO corn and soy mostly) to produce one pound of beef in the U.S. So we're subsidizing this inefficient process at every level in the supply chain. If factory farms weren't receiving ~75% of all subsidies from the government, a Big Mac would cost a heck of a lot more than a salad. And that leads us to...

### 4. Health effects

According to Dr. Shiva, *"When it comes to owning the seed for collecting royalties, they [GMO companies] say, "It's mine." But when it comes to contamination, cross-pollination, health problems, the response is "we're not liable." Monsanto has trumpeted the relative lack of toxicity in its keynote product, Roundup, for years. But it has health effects, such as some studies suggesting there are [birth defects caused by Roundup](#) (evidence is not conclusive on this, but there's a feeling that the burden of proof shouldn't be on those affected by the chemicals to prove that their birth defects were directly caused by Roundup). According to Dr. Shiva, the heavy use of chemicals has left a terrible legacy in Punjab. The green revolution was applied there first and Dr. Shiva describes a train there that locals call the "cancer train".*

Every day, a trainload of cancer patients who've been exposed to chemically intensive agriculture leave Punjab to go to Rajasthan for treatment. "It's an epidemic," said Shiva, and indicated that if you do a map, the areas where chemical farming is the most intensive, it lines up perfectly with where cancer rates are the highest. How much is that costing society? And who pays for it? Certainly not the chemical companies.

But, is the "food" itself even safe? The answer is....who knows? So it is that safety testing for GMOs are only done by the GMO companies themselves. There is supposed to be oversight by the FDA, but that's "regulation", and you may have heard, there are a lot of people who use that word as a boogeyman to scare voters. Not only do politicians (usually from the Republican Party, but not always) cry foul about regulations of any stripe, but they go so far as to make sure that even when regulation happens, it's completely stripped of all but the thinnest veil of legitimacy. How? By appointing none other than the fox himself to guard the

henhouse. GMO lobbyists routinely pepper the halls of Washington, but [appointing a former GMO lobbyist to head up the Food and Drug Administration](#)? Now that's just crazy enough to be true. Putting a dollar figure on the health side effects of GMO foods and monocultures is virtually impossible. But be assured, that dollar figure is a big one. And guess who pays for it? Not them. Us.

#### 5. Then there's the farmer.

The biggest loser in GMO agriculture is a difficult question, since there are so many negatives and so many people, ecosystems, and markets negatively affected. But a strong argument can be made that it's the farmers themselves that buy GMO seeds and the chemicals needed to grow them that are screwed the most. First, they're tricked with deceptive advertising. Here's one I saw advertised on one of the sites where I was doing GMO research:

❌ High yield as a result of Roundup Ready crops. What could be wrong with that? Dr. Shiva pointed out that the GMO companies love talking about "yield", because they can increase yield in the short term, but it's to the detriment of "output". What's the difference? Output is the plant's total growth. Yield is just the crop itself. So while they can produce a little more corn (or "corn"), GMO agriculture actively reduces other output from the plant (seeds, leaves, stalks, roots, etc.).

The other aspects of the plant, in a healthy agricultural system, serve as food for detritivores, earthworms, fungi, and beneficial insects that turn it into fertilizer for the next crop. But GMO agriculture's dependence on chemical inputs can decimate the communities of organisms that create soil, so that the farmer is stuck wondering why their soil fertility drops every year. It's a one-two punch. The chemicals kill beneficial organisms, and then output is reduced as well, so there's little to nothing to break down into food for more plants. Ahhh...this is where the business model comes in. Now chemical companies can also sell the farmers fertilizer! Brilliant! Farmers get pinched financially from several angles. Add this to the health problems faced by farmers exposed to chemicals, and the suicide rate among farmers is at an all time high, according to Dr. Shiva. She said you can trace a "suicide belt" across the map of India, where [250,000 farmers have committed suicide since 1995](#). While there are always many factors involved in such sad statistics, one important one is that many of these farmers were so in debt from buying and then becoming reliant on chemical agriculture that promised improved yields (but couldn't sustain them as the soils started to die). In a dramatic and bitterly ironic way, many of these farmers have taken their own lives by drinking the same chemicals that put them in a hole financially to begin with.

#### 6. Then there's the economy

A full 2/3 of India, a country with 1.1 billion people (and one of the fastest growing) is still farming. "Where will all those people find jobs if we move India toward America's economy (2% farmers)?" asked Shiva. "Agriculture must be the most important vocation for human beings. From a distance you can spray poison. But if living there, you can only give love and support to the land. You have to". Going from 600 million farmers to 20 million farmers would mean 580 million Indians looking for work. What industry is creating 580 million jobs these days? Wind and solar are growing fast, but there's no way any industry, or even combination of industries, could absorb 580 million people in one country alone with decent, livable work.

## 7. Then there's the shirked liabilities



In 1984, the Union Carbide plant leaked pesticides, in Bhopal. It was one of the biggest environmental and health disasters in Indian history. Thousands of people have died painful deaths from cancer, and many more have been disabled from this one incidence. But it's not just one incidence: according to Shiva, it has spanned through multiple generations. Shiva spoke about being back last year in Bhopal for the anniversary, and seeing children aged 4, 6, 15, etc., crippled still by the chemical legacy in Bhopal. To date, there is still not an admission of liability in any way from Union Carbide (which is now owned by Dow Chemical, a GMO giant). [The merger was worth billions](#)...the people of Bhopal have received little to no financial help for the epidemic illness caused, and still being caused by one single accident involving agricultural chemicals.

## 8. Viva la resistance!!!

Resistance to chemical agriculture is growing, but not what you might first expect. True, consumers are starting to turn their noses up on GMOs and insisting on labeling laws for GMOs. But more importantly, natural resistance is also growing. It's just like antibiotics in factory farms. When you douse enough of something at a natural population, eventually that natural population will have a few of its members adapt and evolve some resistance to the killing agent you douse on them. The same thing is happening on GMO crops. Bt resistant crops are causing bollworms (in India) and corn rootworm (in the U.S.) to become resistant. [Herbicide resistant crops are breeding superweeds](#). [Superbugs are evolving](#) and growing in strength. According to Mother Jones, [more than half of U.S. farms are now plagued with superweeds](#). According to Shiva, now the chemical companies are talking about doubling down to have two genes producing resistance. Don't believe they'd be that crazy? Just see the [USDA's pending applications for patents on GMO](#) crops, many with multiple-herbicide resistance. Dow's got a new soybean with 2,4-D AND glufosinate tolerance. Bayer has a new one with Glyphosate AND isoxaflutole tolerance. Take a moment here to recall Einstein's definition of insanity: believing that we can use the same thinking that created a problem to get us out of the problem.

The costs associated with superbugs and superweeds are hard to even begin to fathom. But once again, the only ones paying those costs will be everyone except those who caused them.

## 9. The costs of getting a label

Speaking of GMO labeling laws...isn't it silly that the United States lags behind so many other countries around the world in terms of protecting its citizens? More than 50 countries around the world require GMO labels. Some have banned GMOs outright. So what gives? According to Fred Perlak of Monsanto, a label for GMOs would confer that there was something wrong with GMOs, so they fight against the labels. It's so interesting how when asked about whether they should have legal rights to own life, Monsanto and their ilk respond with absolute certainty. But when asked about the health effects of GMOs, they respond as if there's literally no difference from one corn variety to another. How can it be so different you can patent it, and then so not different that there should never be a question about health effects?

Regardless, fighting labeling laws is expensive business. [The "No on 37" campaign spent](#)

[over \\$50 million on deceptive advertising to defeat the measure. Monsanto alone spent over \\$8 million.](#) Advocates for the law spent less than \$7 million total. Why should we have to spend \$7 million to know what's in our food? And why would they (as an industry) spend more than \$50 million preventing a labeling law? Could you think of any better use for the combined \$60 million that was spent on that one small statewide initiative?

10. Finally, there's the silencing of the spring



According to Shiva, 75% of species destruction is due to industrial farming. This figure includes pollinators, vital organisms that provide billions of dollars in economic activity for free every year. [Honeybees pollinate 30% of our food](#), and the collapse of their populations is directly tied to chemically dependent agriculture. Insecticides? They kill insects. Indiscriminately. Including the good ones. In addition, according to Shiva, chemical agriculture has contributed to 75% of soils in the world now being considered degraded. And from a global perspective, 40% of all GHGs come from industrial agriculture.

So what is the answer? Dr. Shiva summed it all up well. "In Indian philosophy, all of creation is an expression of the divine. At its most basic level, that is what the GMO question is about: the destruction of life, but also the commodification of life. The only sustainable farming is farming of rotation and seasonality. It's as perennial as the ocean, forest, and prairie, because it is doing everything that those ecosystems are doing in terms of nutrient cycling."

Shifting our food consumption to small, local, organic farms would help every one of these problems go away on its own. But as long as the side effects of chemical agriculture have no cost to the producers, there is little hope that large scale change will come anytime soon. So how do we change the game on GMO companies? Here's how.

Top Ten Ways to Challenge GMO companies, which are economically hurting us so much by externalizing the costs of their dirty business:

- A. Stop eating factory farmed meat. It financially supports 16 pounds of GMOs for each Big Mac you buy.
- B. Start a garden. Plant some organic seeds. Grow some of your own food.
- C. Buy organic. Anything labeled organic is by definition not GMO.
- D. Shop at Farmer's markets and health food stores.
- E. Avoid packaged junk food and sodas (assume it's all GMO). Eat more vegetables and whole grains. Your Mom was right about that.
- F. Support the [Center for Food Safety](#).
- G. Support GMO labeling laws wherever they are, and help mobilize support for your state to label GMOs.
- H. Get to know the big offenders: corn, soy, and cotton, and look for organic alternatives. Products like [Wesson are all GMO](#), despite their deceptive labels marking them as 100% natural.
- I. Boycott, boycott, boycott. Look for Conagra foods and never buy them again. Look for [companies that oppose GMO labeling laws](#) and take your money away from them.
- J. Educate your friends and family about GMOs (ahem, feel free to send them this link). It's just bad business for everyone except the

companies making chemicals.

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