Viewpoint: Documentary ‘Modified’ peddles falsehoods about GMOs, pesticides and ‘corporate control’ of food

Propaganda has been manufactured and promulgated through the ages, and in modern times it flourished during the Great Depression and World War II when useful lies became preferred to harmful truths.

That still rings true today, with the explosion of propaganda wars aided by the Internet, texting, social media, and the emergence of Internet-based trolls and bots. A U.S. Senate-commissioned analysis by a cybersecurity firm released last December found that Russia’s infamous troll factory, the Internet Research Agency (IRA), is conducting “relentless modern information warfare.” Renee DiResta, the research director of the firm, described the IRA’s battle plan as a “cross-platform attack that made use of numerous features on each social network and that spanned the entire social ecosystem.” The targets of those attacks include not only certain political campaigns, but also products or technologies at which the U.S. is preeminent, such as fracking, genetic engineering, and vaccine development.

Often financed by the organic agriculture and food and “natural products” industries, activists in the West have been mobilized to sow suspicion about and aversion to modern genetic engineering in agriculture — the production of so-called “genetically modified organisms,” or “GMOs.” (See numerous examples here)

One recent example is a shockumentary/docudrama film called “Modified.” Disguised as a tender, sentimental story of a Canadian woman learning over many years from her mother the value of home-grown, homemade food – a sort of culinary version of “Anne of Green Gables”– it is nothing more than a propagandistic screed intended to provide fodder for the anti-science, anti-corporate echo-chamber that relentlessly attacks the application of modern genetic engineering to agriculture.

For anyone familiar with the ongoing, decades-long pseudo-controversies over “GMOs”– a misleading, meaningless term – the film depicts an obsession akin to that of Captain Ahab, Flat-Earthers, and people who are convinced they were once abducted by extraterrestrials.

This piece of repugnant propaganda deserves to be dissected, point by point.

First, a brief primer on terminology. In spite of its frequent use colloquially, the term “GMO,” or “genetically modified organism,” does not have a clear definition, at least in the regulatory and scientific communities of the United States. One reason is that except for wild game, wild mushrooms, and wild berries, and fish and shellfish, virtually all the foods in our diet – including those grown organically, harvested, cooked and consumed so reverently in “Modified” – have been intentionally, but most often crudely, genetically modified over time. The term “GMO,” which usually refers to the use of molecular techniques to craft new varieties, is often used pejoratively to imply that genetic modification *is* an actual category—a new, discrete, and meaningful grouping whose members might present significant, or at least uncertain, risks.

Now to the film…

The mother of filmmaker Aube Giroux is shown doting on her backyard garden and preparing gorgeous, mouthwatering dishes, but one day she awakens with sudden angst over molecular genetic engineering, or GE (terms we will use instead of the pejorative "GMO"), applied to food production. Much of her discomfiture is because "some of the world's largest chemical companies are patenting these new genetically engineered seeds and controlling the seed market."

Such concerns are ill-founded and misleading. Healthy, nutritious food is widely available, and not just from home gardens; large-scale agriculture has made food abundant, safe, and affordable. Many seeds, both GE and non-GE, are patented, so the suggestion that only GE seeds can be patented is simply untrue and intended to mislead. Many research universities regularly patent new plant varieties and their seeds; and a few are significant sources of revenue for those institutions. Consider this from the website of the University of California, Davis:

> Since its inception in the 1930s, the UC Davis Public Strawberry Breeding Program has developed more than 60 patented varieties, turned strawberries into a year-round crop and increased strawberry yield from about 6 tons per acre in the 1950s to more than 30 tons per acre today.

Those varieties were developed with "conventional," not molecular, genetic engineering, but, by any reasonable definition, they are certainly genetically modified. More on that below.

Endless repetition of the falsehood that there is something unique, or particularly worrisome, about molecular genetic engineering is part of the activists' – and the film's – strategy, which is first to isolate, then disparage and ultimately annihilate a new, superior, important technology that creates better seeds for the benefit of farmers and consumers. They have had some "successes": The efforts of anti-GE activists, trolls, shills, and bots – both domestic and foreign – have prevented many of these seeds from ever making it out of research centers and into the hands of the people who need them most.

Note also that the concerns about big agribusiness companies "controlling the seed market" via patents conveniently ignores that in the marketplace, nobody compels a farmer to use a patented product, whether it is Windows software, an Apple Watch, a GPS device for a tractor (one of which is purchased by filmmaker Giroux's brother in the film), or a GE seed. If a person doesn't want to use it, there's always the option of an older, less expensive (and often inferior) alternative.

A recurrent theme in the film is that money talks, enabling big agribusiness companies to control politicians and public policy, thereby, to keep their products virtually unregulated. Money and lobbying are influential, to be sure, but the conclusory part of the statement is, emphatically, false, which in several ways gives the lie to the basic thrust of the film.

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Image: Zara Danjuma Foundation

First, ironically, politicians' and regulators' willingness to accede to industry's wishes have actually resulted in *too high*, not too low, a regulatory bar: During the 1980s and 1990s, the big agribusiness companies argued for – and got – *sui generis* and unnecessarily burdensome regulation by USDA, EPA, and FDA, in order to make it more difficult for small start-ups to compete with them in getting products to the marketplace.

Second, although money can exert influence, the fake news it inspires in this instance isn't coming mainly from big agribusiness; it's coming largely from the organic agriculture and "natural products" industries and their enablers, many of whom are featured–always admiringly–in "Modified." Those industries have deep pockets.

In 2016, Jay Byrne, president and CEO of the marketing agency v-Fluence Interactive, examined the IRS filings, annual reports, and other financial sources of companies, trade organizations, and NGOs involved in the effort to discredit modern agriculture. Based on that information, he estimated that in 2011 the groups tracked by his company spent $2.5 billion campaigning against genetic engineering in North America alone. Globally, advocacy groups targeting agriculture probably spent over $10 billion—attacking other sectors as well, including vaccines, pesticides, and herbicides and other chemicals.

These expenditures go to a variety of activities, including lobbying, the commissioning and writing of op-eds, films such as "Modified," and other active efforts to disparage and disadvantage their competition (i.e., conventional agriculture) and academic science communicators. One of the most aggressive campaigns by the anti-genetic engineering groups has been the adoption of government-imposed mandatory labeling of foods that contain ingredients from genetically engineered plants—a theme endlessly promoted in "Modified." ("We have the right to know what's in our food…" ad infinitum, ad nauseam.) Such labeling raises the costs of those foods, because of the need for sequestration through the food-production chain from farm to fork, and increases legal liability for even inconsequential errors in labeling.

Higher food costs are the real threat to the public interest: When food is more expensive, many consumers tend to seek cheaper, less nutritious sources of calories, and they have less disposable income to use for health-promoting purposes. Moreover, labeling unrelated to health or safety is

misleading, because it implies a warning, or at least some sort of material difference. As Barbara Keating-Edh, representing the consumer group Consumer Alert, testified before the U.S. National Biotechnology Policy Board in 1991:

> For obvious reasons, the consumer views the technologies that are *most* regulated to be the *least* safe ones. Heavy involvement by government, no matter how well intended, inevitably sends the wrong signals. Rather than ensuring confidence, it raises suspicion and doubt" .

Another inaccuracy in the film concerns the "scathing report" released by the Royal Society of Canada regarding the supposedly shoddy way that genetically engineered organisms are regulated; an interviewee in this shockumentary comments that in the United States, they are "virtually unregulated." In fact, those assertions turn reality on its head.

In spite of a wide and long-standing consensus that molecular genetic engineering is an extension, or refinement, of older, less precise, less predictable techniques, GE plants are the *most intensively regulated* of all new plant varieties. According to Wendelyn Jones at DuPont Crop Protection:

> regulation

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> A survey completed in 2011 found the cost of discovery, development and authorization of a new plant biotechnology trait introduced between 2008 and 2012 was $136 million. On average, about a quarter of those costs ($35.1 million) were incurred as part of the regulatory testing and registration process.

Paradoxically, government regulation of plants made with older, less precise, less predictable methods is virtually nonexistent, and the regulatory costs are minimal. This anomaly in regulatory policy inhibits innovation with the best available technologies. Although many research universities have developed scores of innovative GE crops with useful traits, the regulations are so burdensome and obstructive that the marketplace is largely limited to huge-scale commodity crops created by the same large multinational corporations that the film seeks to demonize. Ironically, because the onerous regulation sought by filmmaker Giroux and her fellow-travelers acts as a market-entry barrier to smaller companies, it would actually favor the big agribusiness companies they vilify.

The film also muddles a brief discussion of “pleiotropic effects,” the phenomenon of one gene being responsible for or affecting more than one trait. It conveniently ignores traditional crop breeding, which by definition involves “genetic modification” to enhance or introduce desirable traits, or to diminish undesirable ones. Except for wild berries and wild mushrooms, virtually all the fruits, vegetables, nuts, and grains in our diet have been genetically improved by one technique or another.

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Those techniques include the irradiation of seeds to obtain mutants; and “wide crosses,” hybridization that moves large numbers of genes from one species or genus to another in ways that do not occur in nature, a phenomenon that is pointedly ignored in the film. (These more primitive, imprecise techniques of genetic modification are even acceptable in organic agriculture, including in the Girouxs’ garden.)

Here’s the punchline. . . Because of the imprecision of these processes and the large number of genes that are moved or modified in old, or conventional, genetic modification, pleiotropy is far *more prevalent and significant* than when molecular techniques are used; and unexpected traits–such as a potato variety with toxic levels of an alkaloid and corn with unexpectedly high susceptibility to a fungal pathogen–have emerged only in organisms modified with the older genetic techniques. Once again, the makers of “Modified” have turned reality on its head. (Some would call it “lying.”)

Yet another misleading assertion is the film's insistence that consumers overwhelmingly demand labeling of food products that contain "GMOs." In fact, most consumers have no idea what the term "genetically modified" implies, which is hardly surprising inasmuch as the term is ambiguous and arbitrary, and does not circumscribe a meaningful category. They certainly have no idea that virtually everything in their diet would fit that description.

A reflection of how befuddled they are is a survey by the Oklahoma State University Department of Agricultural Economics which found that over 80 percent of Americans support "mandatory labels on foods containing DNA," about the same number as support mandatory labeling of foods "produced with genetic engineering." (There's DNA in every plant and animal.) Even so, voters have turned down state referendum issues that would have required labeling, such as California's Proposition 37.

Various characters in "Modified" deride the claims that GE will "feed the world." According to *one* Canadian organic farmer, his yields are higher than his conventionally farming neighbors. (Organic agriculture bans plants made with molecular genetic engineering techniques—although old, less precise, less predictable methods are okay.) The data argue otherwise.

The fatal flaw of organic agriculture is its low yields, which cause it to be wasteful of water and arable farmland. Plant pathologist Dr. Steve Savage analyzed the data from the U.S. Department of Agriculture's 2014 Organic Survey, which reports various measures of productivity from most of the certified organic farms in the nation, and compared them to those at conventional farms, crop by crop and state by state. His findings are extraordinary: Of the 68 crops surveyed, there was a "yield gap" — poorer performance of organic farms — in 59. And many of those gaps, or shortfalls, were impressive: strawberries, 61 percent less than conventional; fresh tomatoes, 61 percent less; tangerines, 58 percent less; carrots, 49 percent less; cotton, 45 percent less; rice, 39 percent less; peanuts, 37 percent less, and so on.

In developing countries, where the baseline of crop yields is lower, we can expect to see even greater increases with the introduction of GE crops. Moreover, the availability of more-resilient crops – drought-, heat-, flood-, and insect-resistant – will dramatically increase food security there. What the poor desperately want and need is access to GE crops with desirable traits, as illustrated by the recent civil disobedience in India, with thousands of farmers illegally planting insect-resistant cotton and brinjal (eggplant)

Another benefit derives from herbicide-resistant GE crops, which makes possible more no-till farming, with consequently less runoff of chemicals and soil erosion and release of CO. And contrary to the claims in "Modified," GE crops have enabled farmers to apply *far fewer* agricultural chemicals, and where they are necessary, to shift to less toxic ones.

"Modified" is an elaborate lie. It serves only to create confusion and apprehension about genetic

engineering in viewers who have no idea they are being led down the garden path. Unless such pernicious propaganda is exposed and derided, we will find ourselves increasingly in an era dominated by “alternative facts” and fake news about science as well as politics.

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