

Who is Vandana Shiva and why is she saying such awful things about GMOs?

Vandana Shiva is a prominent Indian-born environmentalist who, for the past decade, has emerged as an international icon in the movement criticizing conventional agriculture and biotechnology. In the most recent sign of her celebrity status, in January, Beloit College in Wisconsin [conferred](#) on her a prestigious honor as the Weissberg Chair in International Studies, calling her a “one-woman movement for peace, sustainability and social justice.”

Whether that accurately describes Shiva is debatable—there appears to be a sizable gap between her self-representations and the subjects she claims to be an expert on. However her status as a celebrity activist is not in question. Shiva’s unbridled opposition to GMOs has made her a favorite in liberal and environmental circles. She hopscoches the globe, making frequent appearances [at anti-GMO rallies, on college campuses](#) and on lecture tours, such as in [Costa Rica](#) earlier this year.

Shiva has been referred to as a an [“eco warrior goddess”](#) by the e-Zine Punk Rock Permaculture, a [“rock star in the global battle over genetically modified seeds”](#) by journalist Bill Moyers and a [“global sustainability expert”](#) by the University of Kentucky. *Time* Magazine called her an “environmental hero” in 2003 and *Forbes* identified her as one of the [Seven Most Powerful Feminists on the Globe](#) in 2010. She has more than 23,000 followers on [Twitter](#) and 43,000 on [Facebook](#).

Shiva is perhaps best known for claiming that the introduction of genetically modified cotton seeds in India has led to mass genocide by poor farmers seduced by the [‘false promise’ of GMOs](#).

“270,000 Indian farmers have committed suicide since Monsanto entered the Indian seed market,” she has said. “It’s genocide.”

That’s a remarkable claim, and if true it is a tragedy of staggering proportions.

Shiva’s celebrity and her claims

Vandana Shiva was born in the valley of [Dehradun](#) in India in 1952. A Brahmin, she was raised in prosperity. Educated in her homeland, she pursued graduate studies in Canada, receiving an MA at Guelph and a PhD at the University of Western Ontario. A dedicated environmental activist, she eventually founded Navdanya – meaning “Nine Seeds” – more than two decades ago. According to its website, its organizational mandate is “to protect the diversity and integrity of living resources, especially native seed, and to promote organic farming and fair trade.” Under her guidance Navdanya has evolved into a national movement.

Shiva is an energetic campaigner against globalization and a vocal critic of agricultural genetic engineering—GMOs, invoking religious imagery rather than science to defend her beliefs. “G.M.O. stands for ‘God, Move Over,’ we are the creators now,” she said in a speech earlier this year. She has written more than 20 books. In *Biopiracy*, *Stolen Harvest* and *Water Wars*, she examined the social, economic and ecological costs of corporate-led globalization. *The Violence of Green Revolution* and *Monocultures of the Mind*

challenged what she referred to as the dominant paradigm of non-sustainable, reductionist Green Revolution agriculture.

Many prominent intellectuals herald her as a forward-thinking scientist and visionary opponent of genetic engineering. When Beloit conferred its honorarium upon her, and in accompanying news releases and the [website](#) announcement touting her selection, it prominently noted her “PhD in nuclear physics,” calling her “a recognized expert on agriculture and biotechnology.”

shiva

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Are those claims accurate?

Shiva apparently believes so. “I am also a scientist... a Quantum Physicist”, she writes on her Navdanya website. Most of her books claim: “Before becoming an activist, Vandana Shiva was one of India’s leading physicists.” The speakers bureau that represents her [identifies her](#) as “a trained physicist.” Hundreds of organizations and prominent journalists, from universities to [Bill Moyers](#) to [National Geographic](#) (which [referred](#) to her as a “nuclear physicist turned agro-ecologist”), have represented her that way.

But those representations are incorrect. She is not a physicist let alone a prominent one. According to the University of Western Ontario, where she received her PhD, her doctorate is not in the discipline of physics, as she claims, but in philosophy. It focused on the highly technical and often politicized debate over a central notion in physics known as Bells’ Theorem, which has been called the “most profound” theory in science.

Perhaps foreshadowing her current contentious views about modern agriculture, Shiva concluded that quantum mechanics in physics was philosophically invalid and factually doubtful. The main thesis of quantum mechanics that she challenged has since been confirmed by experimental physics, meaning that her thesis stands at odds with factual reality. Independent of the quality of her philosophical research, it is a substantive leap to go from earning a PhD in the Philosophy of Science to self-identifying as a

“scientist,” “nuclear physicist” or “quantum physicist”—the various ways she refers to herself.

Shiva also claims to have written more than 300 papers—a factoid echoed in almost every article or news release about her, including on Beloit’s site. A query of Thomson Reuter’s [Web of Science](#) (research platform for information in the sciences, social sciences, arts and humanities) returns only 42 records of peer reviewed papers or publications authored by Shiva since 1980.

Shiva subsequently abandoned her formal pursuit of philosophy, switching her focus to agriculture, plant breeding, genetics, biology, toxicology, microbiology, nutrition, social sciences and economics—subject areas about which she has no academic training and has not done any formal research.

Some argue that advances often come from those outside the mainstream of science and therefore she deserves to be heard regardless of her credentials or how they may be represented by her or others. Fair enough, let us consider a few of Shiva’s most prominent arguments.

Failed ‘Green Revolution’?

Golden Rice is rice genetically engineered with higher levels of provitamin A. It was developed by Ingo Potrykus of the Swiss Federal Institute of Technology and Peter Beyer of the University of Freiburg. Shiva calls [Golden Rice](#) a [hoax](#), a [myth](#) and a false solution referring to it as “a blind approach to blindness prevention.....”

“By focusing on only one crop, rice, which by itself does not provide all the nutrients, including higher quantities of Vitamin A than Golden Rice, the Golden Rice pushers are in fact worsening the crisis of hunger and malnutrition,” she writes on Navdanya. “Promoters of Golden Rice are blind to diversity, and hence are promoters of blindness, both metaphorically and nutritionally.”

Is Golden Rice a “hoax,” as Shiva claims?

Almost 700,000 children under the age of 5 die every year from Vitamin A deficiency disease. Golden Rice has been genetically engineered with enhanced production and accumulation of β -carotene in the grains. The *American Journal of Clinical Nutrition* [reports](#) that Golden rice contains up to 35 micrograms of β -carotene per gram of rice. A bowl of ~100-150 grams of cooked Golden Rice [can provide as much as 60% of the recommended nutrient intake](#) of vitamin A for 6-8 year old children. As little as 20% of the recommended daily allowance can mitigate or eliminate clinical symptoms such as blindness. Golden Rice also has a [better conversion ratio for Provitamin A](#) (which is turned into Vitamin A in our bodies) than leafy vegetables, carrots and other crops.

Shiva’s alternate proposed solution for promoting a ‘diversity of diet’ has not worked for the very poor who cannot afford to buy vegetables or fruits, or cannot devote the land on their subsistence farm to grow more of them.

Golden Rice is a product of the public sector with the realistic hope of [saving the lives and sight of millions of children in the developing world](#). Despite its promise to help alleviate hunger, blindness and malnutrition, the vitamin enhanced rice has been met with significant opposition from environmental and

anti-[globalization](#) activists, including Shiva. In August of 2013, [activists converged on an experimental field trial](#) of Golden Rice in the Philippines and violently ripped up the plants.

Shiva is equally dismissive of the Green Revolution. That's the term given to a series of initiatives pioneered by Norman Borlaug beginning in the late 1940s and blossoming in the 1960s that increased agriculture production worldwide, particularly in the developing world, by promoting high-yielding varieties of cereal grains, expansion of irrigation infrastructure, modernization of management techniques, distribution of hybridized seeds and making available advanced synthetic [fertilizers](#) and [pesticides](#) to farmers.

By 1991, Shiva was publicly calling the Green Revolution "[a failure](#)." More recently, she suggested that it has [caused hunger](#). Industrially produced crops, she writes, are "...nutritionally empty but loaded with chemicals and toxins" She claims that "The Green Revolution is chemical-intensive, capital-intensive and fossil fuel-intensive. It must, by its very structure, push farmers into debt and indebted farmers off the land."

She summarily rejects the role of advanced technology in improving yields and reducing the toxicity of fertilizers and other agricultural chemicals. As Michael Specter [noted](#) in his profile of Shiva in *The New Yorker*, "Shiva wrote that the billions of dollars the foundation has invested in agricultural research and assistance poses "the greatest threat to farmers in the developing world."

The disjunction between the success of the Green Revolution and the role of modern technology in boosting yields, and Shiva's disparaging characterizations, is startling, turning reality on its head. Focusing on her native country of India, she has gone so far as to assert that technology has caused problems rather than solved them, repeatedly claiming that it has brought nothing to India except "[indebted and discontented farmers](#)." She believes that organic farming can literally 'save the world'. "Until the 1960s, India was successfully pursuing an agricultural development policy based on strengthening the ecological base of agriculture and the self-reliance of peasants," she writes in "The Violence of the Green Revolution."

Despite her romantic view of India's past, in the 1950s, this vast and desperately poor country was a global agricultural basket case. Prior to the introduction of Borlaug's technological innovations and new seed varieties, it had suffered more than 60 million famine related deaths. After the Green Revolution took hold, between 1965 and 1970 alone, wheat [yields nearly doubled](#) in the countries of India and Pakistan as a result of the embrace of modern agricultural techniques.

The agricultural turnaround in India may have saved hundreds of millions of lives. In 2012-2013, the country produced almost 250 million tons (mt) of food grain, and productivity is still growing. Famine has all but been eradicated and farmers can now cope with predictable periods of drought.

Most controversially, Shiva is also a vocal promoter of the [much disputed claim](#) that the introduction of GMOs in India has prompted the suicides of hundreds of thousands of impoverished Indian farmers.

"Suicides have intensified after the introduction of GMO Bt cotton [in India]," [she has written](#). "...[S]eed

monopolies... the collection of super-profits ...has created a context for debt, suicides and agrarian distress which is [driving the farmers' suicide epidemic](#) in India."

As *Discover* blogger and New York University journalism professor Keith Kloor [recently noted](#), Shiva's claims have resonated with anti-GMO activists around the world. She is credited with inspiring a 2011 [movie](#) called *Bitter Seeds* which claimed to document the genocide supposedly perpetrated by Monsanto, who developed the Bt cotton seeds. The green online magazine *Grist* extolled the documentary for revealing the "tragic toll of GMOs in India." Foodie favorite Michael Pollan, who often [recklessly recommends](#) anti-GMO propaganda to his legion of followers, called it "a powerful documentary on farmer suicides and biotech seeds in India."

But Shiva is flat out wrong. She alleges a link between farmer suicides and the adoption of Bt cotton in India where [no causal link actually exists](#). The International Food Policy Research Institute (IFPRI) reviewed the government data, academic articles and media reports about *Bt* cotton and suicide in India [in 2008](#) and [2010](#), concluding that farmer suicides predated the introduction of GMOs, reflect the broader trend in suicides in the general population and have in fact leveled off in the agricultural sector in recent years.

"[I]t is nonsense to attribute farmer suicides solely to *Bt* cotton," wrote Dominic Glover, an agricultural socio-economist at Wageningen University and Research Center in the Netherlands in an [article in *Nature*](#) last year. "Although financial hardship is a driving factor in suicide among Indian farmers, there has been essentially no change in the suicide rate for farmers since the introduction of *Bt* cotton."

[graph](#)

Source: *Nature*, May 2013

Kloor provides a [contextualized deconstruction](#) of the ‘suicide myth’ and an analysis of what really has been going on in India’s farm belt in a superb article in the current *Issues in Science and Technology*, a publication of the National Academy of Sciences.

Is Shiva a demagogue?

Mark Lynas, the British journalist who campaigned for years arm in arm with Greenpeace against crop biotechnology, but more recently abandoned his views refers to Shiva as part of the “lunatic fringe” of the anti-GMO movement. A year ago last January, after Lynas renounced what he now calls his ‘anti-science’ past, Shiva rebuked him for saying that farmers should be free to use GMO crops, saying it was like giving rapists the freedom to rape.

[tweet](#)

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“That is obscene and offensive,” Lynas responded, noting a string of bizarre comments by Shiva—many of them eagerly embraced by her followers and disseminated by credulous journalists from Bill Moyers to Bill Maher. In her public statements, he notes, Shiva often oscillates between exaggeration and deliberate falsehoods. Consider her comments on the so-called terminator, the name given to describe seeds that could be designed to be sterile, so they can only be used once. Shiva constantly invokes the specter of “suicide genes” as part of her stump speech criticism of GMOs.

“The danger that the terminator may spread to surrounding food crops or the natural environment is a serious one,” Shiva has said. “The gradual spread of sterility in seeding plants would result in a global catastrophe that could eventually wipe out higher life forms, including humans, from the planet”.

One problem with Shiva’s argument: terminator genes have never been developed; they are a fiction of the anti-GMO movement, perpetuated by Shiva and her followers and the journalists that enable her. As Lynas has written, “You don’t need the intelligence of a Richard Dawkins or indeed a Charles Darwin to understand that sterility is not a great selective advantage when it comes to reproduction, hence the regular observed failure of sterile couples to breed large numbers of children. As Shiva’s case so clearly

shows, if we reject data-driven empiricism and evidence as the basis for identifying and solving problems, we have nothing left but vacuous ideology and self-referential myth-making.”

That’s only one of many clearly misleading or outright wrong statements that Shiva makes on her adulatory-laden tours through the anti-GMO movement. One of her favorite gambits is to link GMOs to autism and other diseases, whose incidences have increased in recent years. “If you look at the graph of the growth of G.M.O.s, the growth of application of glyphosate and autism, it’s literally a one-to-one correspondence,” Specter quotes her as telling an adoring audience in Canada earlier this year “And you could make that graph for kidney failure, you could make that graph for diabetes, you could make that graph even for Alzheimer’s.”

But as Specter writes: “Hundreds of millions of people, in twenty-eight countries, eat transgenic products every day, and if any of Shiva’s assertions were true the implications would be catastrophic. But no relationship between glyphosate and the diseases that Shiva mentioned has been discovered. Her claims were based on a single research paper, released last year, in a journal called *Entropy*, which charges scientists to publish their findings. The paper contains no new research.”

Shiva confuses correlation with causation. The recorded increase in the incidences of some diseases, but not others, also tracks identically with the increased consumption of organic foods, an even closer correlation. Most experts believe the rising numbers reflect that many of these diseases are being tracked more carefully. Meanwhile, diseases that might credibly be linked to food consumption—stomach cancer for example—are actually trending downward.

Vandana Shiva’s influence in the worlds of politics, agriculture, technology and development shows no signs of waning. She continues to receive accolades in the media, [collects](#) humanitarian awards and is regularly bestowed with honorary degrees from universities across North America (most recently an Honorary Doctorate of Laws from the University of Victoria in Canada).

Shiva says Golden Rice can’t work but published studies show that it does work. She claims Indian farmers commit suicide because of Bt cotton while careful academic studies show that Indian farmers who plant Bt cotton earn more money per hectare and are no more likely to commit suicide than organic farmers. She claims that seed companies are distributing ‘terminator genes’ that will bankrupt them when no such seeds exist. She claims that no famine existed in India before the Green Revolution when the Indian government itself has published the data on lives lost to starvation.

In overstating her credentials and in spreading her political agenda, Vandana Shiva asks the public to believe she is an expert in agriculture, crop production and genetic engineering. She influences the public debate. She is called upon as an expert witness as legislators, oh so sensitive to public opinion, debate how to best regulate agricultural technology. That’s concerning. At best, Vandana Shiva is a provocative lay observer. She deserves to be judged and listened to based upon the quality of her arguments and the evidence.

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