

ECOLOGICAL AGRICULTURE

A woman with a bindi, wearing a red and yellow patterned shawl, is smiling and holding a green plant in a green cup. She is standing in a field with rolling hills in the background. The text 'SEED FREEDOM AND THE FUTURE OF FARMING' is overlaid on the bottom left of the image.

SEED FREEDOM
AND THE FUTURE
OF FARMING



IN AN ERA OF CLIMATE CHANGE, REJUVENATING AND REGENERATING THE SOIL THROUGH ECOLOGICAL PROCESSES HAS BECOME A SURVIVAL IMPERATIVE FOR THE HUMAN SPECIES.

**An interview with
Vandana Shiva**

Illustration by **Luis Alves**

Vandana Shiva is a world-renowned Indian scholar, environmental activist and author of over twenty books. She has been involved in grassroots movements against genetic engineering across the world, and has successfully led multiple campaigns against various multinationals and international institutions seeking to monopolize and privatize indigenous seeds, traditional knowledge and natural resources. ROAR editor Joris Leverink spoke with Vandana Shiva about the role of industrial agriculture in climate change, the challenges faced by farmers in the Global South and how to avoid the imminent environmental disaster threatening our existence on this planet.

ROAR: For many years you have actively resisted, both in your writing and in your activism, the global transformation of agriculture from an agro-ecological paradigm to an industrial paradigm. In your latest book *Who Really Feeds the World?* (Zed Books, 2016) you also point out that “the industrial paradigm of agriculture is causing climate change.” How should we conceptualize the difference between the two paradigms, and what is the role of the latter in driving climate change?

Vandana Shiva: There are two distinct agricultural paradigms. The first is industrial agriculture, which has been designed and developed by the “poison cartel” of chemical companies and factories that emerged during World War II and that was in control of the production of chemicals used in explosives, as well as the mass extermination of human beings. After the war, they repurposed these very same chemicals as agrochemicals — pesticides and fertilizers — and they convinced us that we can’t have food without these poisons. The second paradigm is the agro-ecological system that evolved over 10,000 years and works together with nature according to ecological principles.

There are two alternative futures of food and farming at the conclusion of each paradigm. One leads to a dead end: a lifeless, poisoned planet as a result of chemical monocultures with farmers committing suicide to escape their debt-induced misery, children dying due to lack of food and people suffering of chronic diseases spreading through nutritionally empty, toxic commodities sold as food while climate havoc wipes out human life on earth. The second paradigm leads to the rejuvenation of the planet through a restoration of biodiversity, soil, water and small farms that produce diverse, healthy, fresh, ecological food for all.

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Industrial globalized agriculture is one of the single biggest contributors to climate change. It contributes around 24 percent of the three major greenhouse gases: carbon dioxide (CO₂) from the use of fossil fuels, nitrogen oxide (N₂O) from the use of chemical fertilizers, and methane (CH₄) from factory farming. According to the Intergovernmental Panel on Climate Change (IPCC), atmospheric concentration of CO₂ has increased from a pre-industrial concentration of about 280 parts per million to 403.3 parts per million in 2016 as a result of human activities. When the level of CO₂ was this high 3.5 million years ago, global temperatures were 2-3 degrees warmer and the sea level was

10-20 meters higher. The global atmospheric concentration of methane has increased from pre-industrial concentration of 715 parts per billion to 1,774 parts per billion in 2005. The global atmospheric concentration of nitrogen oxide — largely due to use of chemical fertilizers in agriculture — increased from about 270 parts per billion to 319 parts per billion in 2005.

The extraction of fossil fuels (dead carbon) from the Earth, burning it and releasing uncontrollable emissions into the atmosphere leads to the rupture of the carbon cycle and a destabilization of climate systems. To capture more living carbon from the atmosphere, we need to intensify our farms and forests biologically — in terms of both biodiversity and biomass. The more biodiversity and biomass there is, the more the plants capture atmospheric carbon and nitrogen, reducing both emissions and the stocks of pollutants in the air. Carbon is returned to the soil through plants. That is why the connection between biodiversity organic farming and climate change is an intimate connection.

You have said that “the future lies in the soil.” What do you mean by this? And what, in your view, are the main lessons we can draw from indigenous knowledge and practices in agriculture, in terms of confronting the ecological crises we are facing today?

We are soil. We are earth. We are made of the same five elements — earth, water, fire, air and space — that constitute the universe. What we do to soil, we do to ourselves. And it is not a coincidence that the words “humus” and “humans” have the same etymological root. All indigenous cultures recognized that we are one with the Earth, and taking care of the soil is our highest duty. As an ancient *veda* says: “In this handful of soil lies your future. Take care of it, it will take care of you. Destroy it, it will destroy you.”

This ecological truth is forgotten in the dominant paradigm of industrial agriculture, which operates on the false premise that we are separate and independent of the Earth and which defines soil as dead matter. If soil is dead to begin with, human action cannot destroy its life, it can only “improve” the soil with chemical fertilizers. And if we are masters and conquerors of the soil, we determine the fate of the soil — soil cannot determine our fate.

History, however, is witness to the fact that the fate of societies and civilizations is intimately connected to how we treat the soil. We have a choice how we relate to the soil, through the Law of Return or through the Law of Exploitation and Extraction. The Law of Return, of giving back, has ensured that societies create and maintain fertile soil which can support civilizations for over thousands of years. The Law of Exploitation, of tak-

ing without giving back, has led to the collapse of civilizations. Contemporary societies across the world stand on the verge of collapse as soils are eroded, degraded, poisoned, buried under concrete and deprived of their life.

Industrial agriculture, based on a mechanistic paradigm and the use of fossil fuels has created ignorance and blindness to the living processes that create a living soil. Instead of focusing on the soil-food web, it has been obsessed with external inputs of chemical fertilizers and mechanization, creating the imperative for monocultures — biology and life have been replaced with chemistry. By exposing the soil to the elements, monocultures expose it to erosion by wind and water. Since organic matter creates soil aggregates and serves as binding material, those soils depleted of organic matter and artificially enriched with chemical fertilizers are most easily eroded.

Degraded and dead soils, soils without organic matter, soils without soil organisms, soils with no water-holding capacity create famines and food crises — they do not create food security. This is especially true in times of climate change. Not only is industrial agriculture responsible for almost a quarter of the greenhouse gases contributing to climate change, it is also more vulnerable to it. Soils rich with organic matter are more resilient to drought and climate extremes. And increasing organic matter production through biodiversity intensive systems is the most effective way to get the carbon dioxide out of the atmosphere, into the plants, and then into the soil through the Law of Return.

Soil, not oil, holds the future for humanity. The oil-based, fossil-fuel-intensive, chemical-intensive industrial agriculture has unleashed ecological and social processes that are killing the soil, and hence putting our future at risk.

Clearly there is a need to take on the immense power of the major agricultural and agrochemical corporations, which in turn receive significant backing from some of the world's most powerful states. The struggle of small-scale farmers against multinational companies like Monsanto looks like a typical case of David vs. Goliath. Where do you see this highly asymmetrical struggle going? Where do you find hope? Do you see any opportunities emerging for society to take back control over its own food production, in the face of this vast concentration of agricultural capital?

The poison cartel, which through a series of mergers has been reduced to a cartel of three poison makers — Monsanto Bayer, Dow Dupont and Syngenta ChemChina — developed the chemicals used by the Nazis in their extermination camps. After the war, these very same chemicals that were once used to kill humans were now repurposed as pesticides to be used in industrial agriculture. They then tried to take control of our seeds through genetic engineering and patenting.

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But there is a way to reclaim our seeds: through seed freedom, where the control of seeds lies with farmers, instead of a system that views seeds as corporate intellectual property. Every place and every plate can be the site of a revolution against the poison cartel, which is responsible for a century of ecocide and genocide. It is time to sow the seeds to make peace with the earth, and reclaim our freedoms. *Satyagraha*, “the force of truth”, or nonviolent civil resistance as promoted by Mahatma Gandhi, is more important than ever in our “post-truth” age. *Satyagraha* was, and has always been, about awakening our conscience, our inner power, to resist external, brute force. It is an autopoietic response to an externally imposed cruel and unjust system. As Gandhi said, “*Satyagraha* is a ‘No’ that stems from our highest conscience.”

Gandhi’s 1930 Salt *Satyagraha* inspired Navdanya’s contemporary “Seed *Satyagraha*” and the Seed Freedom movement. Since 1987, when I first heard corporations talk of owning seeds through intellectual property rights, my conscience did not accept it. I made a lifetime commitment to saving seeds, and not to co-operate with the intellectual property rights regime that makes seed-saving and seed exchange a crime.

Bija Satyagraha, or the Seed *Satyagraha*, is a people’s movement for the Resurgence of the Real Seed, of the intelligence of farmers to be breeders and to coevolve with the intelligence of the seed towards diversity, resilience and quality. It is a movement that springs from the higher laws of our being members of the Earth Community, *Vasudhaiva Kutumbkam*, from the higher laws of our duty to care, protect, conserve, share. The *Bija Satyagraha* pledge that our farmers take states the following:

Navdanya

Navdanya is a women-centered grassroots movement in India that was founded in 1987 by Dr. Vandana Shiva to promote peace and harmony, justice and sustainability. It focuses on the food security of small-scale farmers and the preservation of India’s biodiversity.

In the battle against multinational corporations Navdanya has set up over a hundred seed banks and trained hundreds of thousands of small-scale farmers to convert to organic farming.

Navdanya’s vision is that in order to protect our ecological environment as well as the communities that rely upon it, it is of crucial importance to protect the sovereignty of our seeds, food and water and not let these be patented or monopolized by multinational corporations.

The organization’s core mission is to meet people’s needs while protecting the earth, defending ecological and intellectual heritage and strengthen livelihood and food security.





We have received these seeds from nature and our ancestors. It is our duty to future generations to hand them over in the richness of diversity and integrity in which we received them. Therefore we will not obey any law, or adopt any technology that interferes with our higher duties to the Earth and the Future Generations. We will continue to save and share our seeds.

Over four-and-a-half decades I have participated in many Satyagrahas, and worked for real freedom — the freedom of nature, and of the last person in society. My commitment to our common freedoms grows deeper with time. The Planetary Satyagraha we need today is for each of us to break free of the prisons in our minds created by the 1 percent through constructs and illusions, while we unleash our intelligence and latent powers to begin the Resurgence of the Real, or rethinking our real relations with the Earth and with each other.

Today's non-cooperation movement begins with not subscribing to the fictions and falsehoods through which we are colonized, and not cooperating with the structures of violence and domination built through these fictions to uphold the structures of extraction and exploitation. Breaking free of the 1 percent is the Satyagraha of our times. It is a Satyagraha to stay alive and celebrate the real. To live free according to the higher laws of Gaia, and the higher laws of our humanity and our Dharma.

You often point to the relation between the patenting of seeds — turning them into commodities that are subject to private property rights — and the indebtedness of local farmers, which in India alone has led to the suicides of over 300,000 people. Could you perhaps say a few words on the impact that the introduction of capitalist rationalities

has had on food production in the Global South, and what some of the social consequences have been?

India is a land rich in biodiversity. For over 10,000 years Indian farmers have used their brilliance and indigenous knowledge to domesticate and evolve thousands of crops, including 200,000 rice varieties, 1,500 wheat varieties, 1,500 banana and mango varieties, hundreds of species of dals and oilseeds, diverse millets and pseudo-cereals, vegetables and spices of every kind.



Corporations breed seeds that respond to their chemicals, which need monocultures to work optimally and cost-effectively, which in turn are vulnerable to the consequences of climate change.

This brilliance and diversity in breeding was abruptly stopped when the Green Revolution was imposed on us in the 1960s by agrochemical companies and factories that in the wake of World War II were desperately looking for new markets for synthetic fertilizers made in the explosives factories of the war. In a similar vein to the colonization process of the past, our intelligence in seed-breeding and agriculture was denied, our seeds were called “primitive” and we were displaced. A mechanical “intel-

ligence” of industrial breeding for uniformity, for external inputs was imposed. Instead of continuing to evolve varieties of diverse species, our agriculture and our diet was reduced to rice and wheat.

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Genetic engineering of seeds was started by the poison cartel because they saw an opportunity to collect rents from farmers by imposing patents on the use of seeds in free trade agreements. As one Monsanto representative said, “We were the patient, diagnostician, physician all in one.” And the problem they diagnosed was that farmers save seeds. The case of Monsanto and its genetically modified cotton seed called “Bt cotton” provides a clear example. In order to force farmers to use Bt cotton seeds, it established a monopoly that prevented farmers access to alternative cotton seeds. By now, 99 percent of the cotton planted is Bt cotton. Meanwhile, Monsanto has raised the price of seeds by nearly 80,000 percent, forcing farmers to put themselves in extreme debt simply to buy the most basic element to grow their crops.

Bt cotton — sold in India under the name Bollgard — was presented as pest-resistant, eliminating the need for farmers to use pesticides. But as pests have become resistant to Bt cotton over time, the use of pesticides in certain Indian states have increased up to thirteenfold after the introduction of the genetically modified crop. As a result, hundreds of farmers have died due to pesticide poisoning and many thousands more have committed suicide as a result of the debt-trap they landed in.

Farmers’ seed sovereignty is at the heart of solutions to the epidemic of farmer suicides. Only when farmers have access to their own seeds will they be free of debt. And only through seed sovereignty can farmers’ incomes be increased. Organic cotton farmers earn more by avoiding costly seeds and chemicals. Organic cotton is the future.

People living in the Global South — especially those whose livelihoods depend directly on their surrounding natural environments — are disproportionately affected by the effects of climate change. In your view, what immediate action should be taken in order to minimize the threat that climate change poses to these vulnerable populations, considering that the governments of some of the world’s richest countries do not appear to be very interested in deviating from business as usual?

Tragically, it is those who have contributed the least to greenhouse gas emissions who are suffering the most because of climate chaos — communities in the high Himalayas that have lost their water resources as glaciers melt and disappear, peasants in the Ganges basin whose crops have failed because of droughts or floods, coastal and island communities that face new threats of sea-level rise and intensified cyclones.

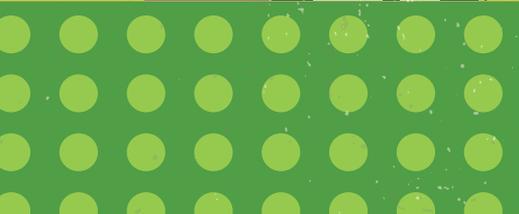
Climate change, extreme natural events and climate disasters are becoming ever more frequent reminders that we are a part of the Earth, not apart from her. Every act of violence that disrupts ecological systems also threatens our lives. As citizens of the Earth, each of us can act to protect her. Industrial agriculture is a major contributor to climate change. A shift to organic agriculture is an imperative for our health as well as the planet’s health, for climate justice and Earth democracy.

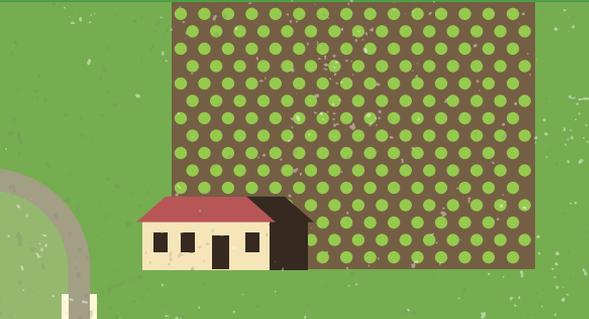


SMALL-SCALE FARMERS
FEED A MAJORITY OF
THE WORLD WITH
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THAN A QUARTER
OF THE FARMLAND

THE FUTURE OF FARMING

The philosophy and practice of industrial agriculture, which perceives seeds and soil as nothing but resources that can freely be exploited in order to maximize profits, is rapidly depleting the earth of its ability to regenerate itself. The alternative, ecoagricultural farming, which for many centuries has been feeding a majority of the global population, is based on diversity, reciprocity and a maintenance of the organic relations between humans and their natural environment.





ECOAGRICULTURAL



SMALL-SCALE, INTEGRATED ORGANIC FARMS ARE MORE RESILIENT IN THE FACE OF CLIMATE CHANGE



REGENERATIVE ORGANIC FARMING COULD SEQUESTER MORE THAN 100% OF ANNUAL CO2 EMISSIONS

BIODIVERSITY

LOCAL VARIETIES

KEEP CARBON IN THE GROUND, REBUILD SOIL FERTILITY AND SUSTAIN YIELDS OVER TIME

PROVIDING A BASIS FOR SECURE FARM LIVELIHOODS.

MONOCULTURE

GENETICALLY UNIFORM VARIETIES

WIDESPREAD DEGRADATION OF LAND, WATER & ECOSYSTEMS

FAVOR BIG CORPORATIONS OVER SMALL SCALE FARMERS

INDUSTRIAL

DIVERSIFIED AGROECOLOGICAL SYSTEMS CAN ALSO PAVE THE WAY FOR DIVERSE DIETS & IMPROVED HEALTH.



CONTRIBUTE TO PERSISTENT HUNGER AND MICRO-NUTRIENT DEFICIENCIES AND RAPID RISE OF OBESITY AND DIET-RELATED DISEASES

BENEFITING FARMERS & LOCAL COMMUNITIES

PROMOTING FOOD SOVEREIGNTY OF LOCAL FARMERS AND PRODUCERS

BENEFITING MULTINATIONAL CORPORATIONS & LARGE BUSINESSES

REINFORCING ECONOMIC & POLITICAL POWER OF GLOBAL ELITES

That is why at the Paris Meetings on Climate Change (COP21), we collectively planted a garden and made a pact to protect the Earth. Each garden might be small, but when millions join hands, it starts to make a shift beyond fossil carbon, which should be left underground, to living carbon, which we should grow everywhere to heal the earth, create climate resilience and rejuvenation

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Industrial agriculture is a major contributor to climate change. A shift to organic agriculture is an imperative for our health as well as the planet's health, for climate justice and Earth democracy.

Humankind recently passed a very significant threshold, in that more than half of the world population now lives in urban areas. This appears to create a conflict between the environmental benefits of small-scale ecological farming, and the need to feed a population of billions of people who cannot — and often do not want to — grow their own food in their immediate environments. How can we solve this paradox?

Protecting the planet and ensuring food for all are not in opposition to one another. The industrial system that is destroying the health of the planet is also causing hunger, malnutrition and disease. Industrial agriculture has clearly failed as a food system.

Contrary to the myth that small farmers should be wiped out because they are unproductive and we should leave the future of our food in the hands of the poison cartel, surveillance drones and spyware, small farmers are providing 70 percent of global food using 30 percent of the resources that go into agriculture. Industrial agriculture is using 70 percent of the resources to create 24 percent of the greenhouse gas emissions, while providing only 30 percent of our food. This commodity-based agriculture has caused 75 percent of the destruction of soils, 75 percent of the destruction of water resources, and pollution of our lakes, rivers and oceans. Finally, as I set out in my book, *Who Really Feeds the World?* (Zed Books, 2016), 93 percent of crop diversity has been pushed to extinction through industrial agriculture.

At this rate, if the share of industrial agriculture and industrial food in our diet is increased to 45 percent, we will have a dead planet. There will be no life, no food, on a dead planet. That is why rejuvenating and regenerating the planet through ecological processes has become a survival imperative for the human species and all beings. Central to the transition is a shift from fossil fuels and dead carbon, to living processes based on growing and recycling living carbon.

Navdanya's work over the past thirty years has shown that we can grow more food and provide higher incomes to farmers without destroying the environment and killing our peasants. Our study, "Biodiversity-based Organic Farming: A New Paradigm for Food Security and Food Safety," has established that small biodiverse organic farms produce more food and provide higher incomes to farmers.

Moreover, biodiverse organic and local food systems contribute both to mitigation of and adaptation to climate change. Small, biodiverse, organic farms — especially in Third

World countries — are totally fossil-fuel free. Energy for farming operations comes from animal energy. Soil fertility is built by feeding soil organisms through the recycling of organic matter. This reduces greenhouse gas emissions. Biodiverse systems are also more resilient to droughts and floods because they have higher water-holding capacity and hence contribute to adaptation to climate change. Navdanya's study on climate change and organic farming has indicated that organic farming increases carbon absorption by up to 55 percent and water-holding capacity by 10 percent, thus contributing to both mitigation and adaptation to climate change.

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Biodiverse organic farms produce more food and higher incomes than industrial monocultures. Mitigating climate change, conserving biodiversity and increasing food security can thus go hand in hand. Three decades of Navdanya have shown that using native seeds and practicing agro-ecology, small farmers of India can produce enough, healthy, nutritious food for two Indias, and by not spending their precious money on buying poisons, and poison producing GMO seeds, they have the potential of enhancing their incomes tenfold, and stopping farmers suicides. A poison free, debt free, suicide free, hunger and malnutrition free India and world is what I work for. ★

VANDANA SHIVA



Vandana Shiva is an Indian scholar, environmental activist, food sovereignty advocate and alter-globalization author. Shiva, currently based in Delhi, has authored more than twenty books, among which Who Really Feeds the World? (Zed Books, 2016).