

The Future of our Daily Bread



REGENERATION

OR

COLLAPSE

The Future of Our Daily Bread: Regeneration or Collapse?

by

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with

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The Future of Our Daily Bread: Regeneration or Collapse?

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PART 1

Two Futures of Food and Farming: The Dead End Road of Industrial Food Systems or the Diverse Paths of Ecological Renewal and Resilience

There are two distinct futures of food and farming—one leads to regeneration of our planet, our soils, our biodiversity, our water, our rural economies and farmers livelihoods, our health, our democracy.

The second road leads to collapse-of the planet's ecosystems and of socioeconomic systems that sustain rural communities and society. With the speculative, unstable financial system controlling the future of food and farming, we also witness financial collapse triggering a food crisis as in 2008.

The future of diverse species, our common human future, and our daily bread depends on which road we take.

The regeneration path reverses the degradation of the earth, our food, our freedom. It paves the way for a liveable future, building on the multiple, diverse, ecological paths through which food and agriculture systems in diverse cultures have evolved over 10,000 years and can continue to evolve into the future. **This is farming in nature's ways as co-creators and co-producers, with diversity, respecting nature's ecological cycles and people's rights.** It is based on recognising the web of life is a food web, and maintaining it is the first objective of agriculture. **Care for the earth and community is the most important investment in regeneration of our degraded land, food, democracy.** Food is the most basic need, and the right to food is a fundamental right. Food Sovereignty is our birthright. Food produced ecologically and distributed democratically ensures that good food contributes to the health of the planet and people. It also ensures that no one goes hungry, and no one is condemned to eat poisoned bread. It is based on diversity of knowledge systems, including the knowledge within living systems and local economies. It is based on diversity of food economies, from the local to the regional to the planetary. It is based on democracy.

Diversity and democracy create resilience. In food systems the resilience created through diversity is multidimensional. Biodiversity creates ecological resilience of ecosystems. Biodiverse organic farming mitigates climate change and contributes to climate resilience. Biodiversity creates health resilience—from healthy soils to healthy plants and healthy people. Small farms with diversity create ecological resilience. When combined with local circular and cyclical economies, small ecological farms create socially and economically resilient communities.

The second road is a dead end road of industrial agriculture and industrial food systems based on a war against the earth, leading to ecological collapse of ecosystems and ecological processes that sustain life, economic collapse of rural economies and destruction of livelihoods of farmers who care for the earth and provide food. The paradigm that has led us down this road is the violent and obsolete paradigm of the mechanistic, militarised, monoculture mind that sees itself at war with the earth, with biodiversity, with farmers. It defines human progress as removing care and responsibility from the economic system and food system. It defines efficiency and productivity in terms of replacing farmers who grow real food with care, by chemicals and machines, without assessing their impact on nature and society, and without taking any responsibility for the impact.

The dead end road is industrial, and was paved by the Poison Cartel, which was born during the war to create chemicals that can kill people. After the wars they redeployed war chemicals as agrichemicals – pesticides and fertilizers. We were told we can't have food without poisons. Explosives that were made by burning fossil fuels at high temperature to fix atmospheric nitrogen were later used to make chemical fertilizers. The slogan was that there would never again be scarcity of food because we can now make 'Bread from Air'.

There was the exaggerated claim that artificial fertilizers would increase food production and remove all ecological limits that land puts on agriculture. Today the evidence is growing that artificial fertilizers have reduced soil fertility and food production; and contributed to desertification, water scarcity and climate change.

The third world was pushed onto this road with the Green Revolution. The Green Revolution destroyed Punjab (Vandana Shiva, *The Violence of the Green Revolution*). Left over war chemicals were retooled as agrochemicals and the first Green Revolution was imposed through funding and conditionalities. It has left Punjab and every land it touches in ruins—ruined and desertified soil, depleted and polluted water, indebted and dispossessed farmers (Vandana Shiva with Andre Leu, *Biodiversity, Agroecology, and Regenerative Organic Farming*). Corporate industrial agriculture failed as the Green Revolution as the tragic example of Punjab shows. Yet Bill Gates is trying to spread it in Africa through AGRA, the Alliance for the Green Revolution in Africa.

Contrary to the myth that small farmers should be wiped out because they are unproductive, small farmers are providing 50% of global food using just 30% of the resources that go into agriculture. Industrial agriculture is using 70% of the resources to create 50% of the greenhouse gas emissions while providing only 20% of our food.

<https://www.reuters.com/article/us-foundation-food-farming/family-farms-produce-80-percent-of-worlds-food-speculators-look-for-land-idUSKCN01516220141016>

<https://www.sciencedirect.com/science/article/pii/S0305750X15001217>

<http://www.fao.org/3/a-i4040e.pdf>

Commodity-based industrial agriculture has caused 75% of the destruction of soils, water resources, and pollution of our lakes, rivers and oceans, 93% of crop diversity has been pushed to extinction through industrial agriculture. Soil, water, biodiversity, and climate systems are the very basis of food and agriculture. Imposing systems of negative productivity in which resource, energy and financial inputs outstrip the value of what is produced is ecologically, socially, economically non-sustainable. The industrial model has destroyed the livelihood of small farmers who produce 80% of the food we eat. This uprooting and displacement is at the root of the agrarian crisis and crisis faced by family farmers world wide, and is driving the exodus of uprooted communities as refugees as well as farmers suicides across the world. And even though the justification for the imposition of industrial agriculture and food systems is “feeding the world”, by transforming food from nourishment to a toxic commodity, it has undermined food sovereignty and contributed to both hunger and the chronic disease epidemic. A billion people are permanently hungry in this system, and more than 2 billion suffer from food related diseases.

The Poison Cartel has already pushed billions of small farmers off the land into slums and refugee camps, and millions of species to extinction and created a health emergency for the planet and people. The destruction of biodiversity creates ecological vulnerability. But it is also creating a health vulnerability with the explosion of chronic diseases. And the same industrial food system driving the sixth mass extinction is driving climate change.

Experts working on Biodiversity recognise that industrial agriculture has a major role in the destruction of biodiversity.

According to the Inter Governmental Panel on Biodiversity and Ecosystem Services (IPBES)

“Rapid expansion and unsustainable management of croplands and grazing lands is the most extensive global direct driver of land degradation, causing significant loss of biodiversity and ecosystem services – food security, water purification, the provision of energy and other contributions of nature essential to people. This has reached ‘critical’ levels in many parts of the world.”

Prof. Robert Scholes (South Africa), co-chair of the assessment with Dr. Luca Montanarella (Italy) warned *“With negative impacts on the well-being of at least 3.2 billion people, the degradation of the Earth’s land surface through human activities is pushing the planet towards a sixth mass species extinction, ”*

<https://www.ipbes.net/news/media-release-worsening-worldwide-land-degradation-now-‘critical’-undermining-well-being-32>

According to the IUCN overexploitation and agriculture are the ‘big killers’ with the greatest current impact on biodiversity.

(Living Planet Report pg 28 <https://www.worldwildlife.org/pages/living-planet-report-2018>)

A recent German study shows, 75% insects have disappeared (Insects decline dramatically in German nature reserves: study October 18, 2017 <https://phys.org/news/2017-10-three-quarters-total-insect-population-lost.html>)

Another study from France has called the disappearance of birds in France as a biodiversity oblivion. (France’s Bird Population Collapses Due to Pesticides, <https://returntonow.net/2018/03/25/frances-bird-population-collapses-due-to-pesticides/> MARCH 25, 2018 AT 4:51 PM,)

The interrelated aspects of the ecological crisis are creating new vulnerabilities for food and farming. According to a recent Living Planet report from WWF 2018, since 1970 when industrial agriculture and chemicals spread, we have wiped out 60% of the animals on the planet, and fresh-water species have declined by 83% in the same period. Since 1960, the global ecological footprint has increased by more than 190%. Globally, the extent of wetlands was estimated to have declined by 87% since 1970

<https://www.wwf.org.uk/updates/living-planet-report-2018>

“We are sleepwalking towards the edge of a cliff”

Mike Barrett

As my book *Soil, not Oil* and other reports show, 50% of the Greenhouse gas emissions come from an industrial food system.

<https://www.navdanyainternational.it/en/publications-navdanya-international/other-publications-navdanya/444-seeds-of-hope-seeds-of-resilience>

<https://www.grain.org/article/entries/4357-food-and-climate-change-the-forgotten-link>

The IPCC has warned that we have twelve years to limit climate change catastrophe

<https://www.theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report>

<https://cleantechnica.com/2018/10/09/ipcc-6-climate-change-report-we-only-have-12-years-to-fix-this/>

Technological hubris and false narratives of “Feeding the world”

The second step on the dead end road was the Second Green Revolution based on merger of agrichemicals with GMO seeds, and patents on seeds for rent collection from life through royalties (Vandana Shiva, *Origin, The Corporate War on Nature and Culture*; Vandana Shiva, *Biopiracy, The Plunder of Nature and Knowledge*)

In the 1990s we were told we would starve without GMOs which were brought to us by the same Poison Cartel. There was an exaggerated claim that GMOs would remove all limits of the environment, grow food in deserts and toxic dumps. Today we have only two GMO applications: herbicide resistance and Bt toxins in crops. The first was claimed to control weeds. It has created super-weeds. Bt crops were supposed to control pests. They have created new pests and super-pests. Bt cotton has pushed thousands of farmers to suicide.

The second Greed Revolution based on GMOs was to have been imposed globally, but the Convention on Biodiversity, and the Biosafety Regulations prevented its unregulated deployment. Thus most countries are GMO free. Where it was imposed without regulation as in US, or illegally, as in India, it is failing as a technology to control pests and weeds, and has instead created superpests and superweeds. That is why **there is a push for new GMOs based on gene editing, both to try and bypass regulations, and to give GMOs a “natural” makeover.**

In spite of the first two industrial agriculture revolutions failing because they failed to take into account nature’s laws, nature’s intelligence and nature’s

economy, there is a push for the next industrial revolution and the next attempt at mastery and conquest of nature.

Hyper concentration of corporate power and convergence of technologies of digitalisation, financialisation, commodification for total control on our daily bread, typifies the next step of the drive for profits.

There is now an attempt to impose the next step of industrial food systems on nature and people as if the corporate definition of progress and corporate agenda of profits **at any cost** is **inevitable**. The fourth industrial revolution, on which the corporations plan to base the future of the industrial food system rests on the assumption that we should leave our food future in the hands of the Poison Cartel – with surveillance drones and spyware –to control farming and farmers to transform them into consumers of external inputs -“big data” on soil, on seed, on climate - and stop being cocreators and coproducers with nature, with deep coevolutionary knowledge of their biodiversity, their ecosystems, their soils; and with the food they grow. Mega mergers among the Poison Cartel, new GMOs based on gene editing and gene drives, genome mapping; the entry of Walmart and Gates in the seed sector with the industrial paradigm of “improvement” and the consequent erosion of seed sovereignty; digital dependence of farmers on purchase of data as a commodity with the resulting erosion of knowledge sovereignty; commodification of food and the erosion of food sovereignty; and climate bonds which impose standardisation on farmers on the one hand, and debt on the other hand with the deepening of the debt crisis and the erosion of farmers economic sovereignty and self reliance.

False narratives on feeding the world have been the misleading sign posts on the dead end road.

First they said chemicals will feed us.

Then they said GMOs will feed us.

The people and planet were left poisoned.

Now we are being told ‘Big Data’ will feed us

If the first colonisation was based on *Terra Nullius*, **empty land**, the second colonisation through patents on life and Biopiracy was based on the assumption of *Bio Nullius*, **empty life**, the new digital colonisation through Big Data is based on *Mentis Nullius*, **the empty mind** (mentis for “logic, reason, mind”)

Monsanto calls it ‘Digital Agriculture’ based on Big Data and Artificial Intelligence. It has started to talk

about 'farming without farmers'. This is why the suicide epidemic of Indian farmers has drawn no response from government. Because they are blindly paving the next phase on the dead-end highway.

Monsanto's partnership with Atomwise allows making a guess about which molecules will give Monsanto the next possible pesticide. This is not the intelligence for sustainable management of pests, but the narrow bet on the next poison. It is turning life into a digital casino. It is like playing poker on the deck of the Titanic while the ship is sinking.

In 2013 Monsanto acquired the world's largest climate data corporation Climate Corporation for \$1 billion. In 2014 it acquired the world's largest soil data corporation, Solum Inc. Climate Corporation does not bring to farmers the knowledge that the solution to climate change lies below our feet, in the soil. It sells data. Solum Corporation does not work with farmers to understand the rich soil food web: the bacteria, the fungi, the earth worms. It sells data. (The Technology Machine of the 1%, in Vandana Shiva *Oneness vs the 1%*)

But data is not knowledge. It is just another commodity to make the farmer more dependent. The farmer is being told he or she must outsource his or her mind to Monsanto/Bayer/Blackrock. This is the next step in a dead-end future that ignores the intelligence of seeds, plants, soil organism, our gut bacteria, our farmers, our grandmothers.

Digitalisation is leading to displacement of real knowledge with "big data"- data on climate, soils, genetic resources, controlled by corporations, now sold to farmers as a new commodity. Knowledge reduced to data thus becomes a new external input, making the farmer more dependent and driving farmers deeper into debt.

Agriculture as Agroecology is based on Diversity. Through diversity, nature creates balance and harmony, and provides ecological services for regulating climate, pests, weeds, diseases. "Digital Agriculture" is also being called "precision agriculture", an inappropriate term for violent manipulation of living systems which are based on diversity, complexity, and self-organisation.

Those who put us on the dead end road are now putting us on a fast forward to the precipice, blinded by limitless greed, profits and control, indifferent to the costs and life threatening vulnerabilities they are forcing the earth and people to bear.

Our daily bread on the financial casino

Digital finance or FinTech (the marriage of finance and technology) is putting money and the money machine in the drivers seat to decide whether farmers grow real food for real people, or commodities for Big Retail, and whether we eat real food or fake food packaged as "natural".

"Financialisation of ecological services" are the new vocabulary for food and agriculture paradigm separated from the social, ecological, ontological and epistemological fabric of farming.

The concentration of corporate control over our daily bread through mega mergers of giant seed and chemical corporations as well as convergence of tools of digital and financial technologies, and the integration of the entire food chain from the seed to our table through these interconnected technologies implies higher vulnerability of the food system as a whole. An instability in one part can trigger instabilities throughout. And while the instabilities begin in the word of finance, they translate into vulnerability of real people and real lives.

Wall Street speculation created the 2008 financial crisis. And Wall Street gained by bringing food to the global casino.

The entry of investors like Goldman Sachs, AIG Commodity Index, Bear Sterns, Oppenheimer Puneo, Barclays allowed agribusiness to increase its profits. In the first quarter of 2008, Cargill attributed its 86% jump in profits to commodity trading. Conagra sold its trading arm to a hedge fund for \$2.8 billion.

In a cover story for Harpers's Fredrick Kaufman wrote about the *Food Bubble "How Wall Street starved millions and got away with it."* The history of food took an ominous turn in 1991, at a time when no one was paying much attention. That was the year Goldman Sachs decided our daily bread might make an excellent investment".

Gambling on the price of wheat for profits took food away from 250 million people. Speculation had separated the price of food from the value of food. As Austin Damani told Fred Kaufman "we're trading wheat, but its wheat we're never going to see. Its a cerebral experience".

Food is an ecological experience, a sensory experience, a biological experience. With speculation it has been removed from its own reality. Grain markets have been transformed, with futures trading by the

grain giants in Chicago, Kansas city and Minneapolis combined with speculation by investors. And as Kaufman says, “imaginary wheat bought anywhere affects real wheat bought everywhere”. (Harpers’s Magazine, Fred Kaufman, the *Food Bubble*, July, 2010)

And if we do not decommodify food, and reclaim our food sovereignty and food democracy, more and more people will be denied food, as more and more money is poured into the global casino for profits and more people’s daily bread gets linked to a speculative, unstable financial economy.

At the time of finalising this report, Blackrock, the biggest investment fund with \$6.3 trillion dollars of assets had lost 30% of its value. No one is assessing how many people have lost their daily bread (*A Vast Money Machine Sputters*, Financial Times, 20th October, 2018).

When food and agriculture are put on the financial casino, the collapse of the financial systems immediately translates into a collapse of the food system.

Food and Farming are too important to be left to financial speculators. They need to be rooted in the earth, her ecological systems and processes, and the knowledge of those who cocreate food with the earth.

Our daily bread needs to be in the hands of women and small farmers who invest care in the earth, their communities and the future of their children.

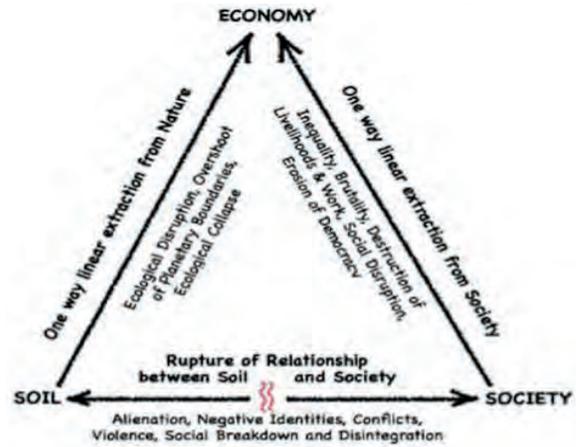
We need to grow the economy of care and shrink the economy of greed.

Corporate control of seed and food leads to social and ecological vulnerabilities, and finally collapse

Corporate control of our food systems is leading to a new level of concentration of economic power both through mergers within each sector, and through technological integration across sectors with biotechnology, information and digital technology, and financial technology become one technological continuum. It is further distancing and separating food as a commodity from its sources in seed, soil, water, and the creative contributions of small farmers who invest care for the earth. It is distancing “data” from reality, and displacing real knowledge rooted in experience, practice, care, and diverse intelligences that allow the space for choices which guide evolution and contribute to resilience.

The earth and our food systems are becoming more vulnerable and more undemocratic as resources and power is extracted from the earth community and food communities.

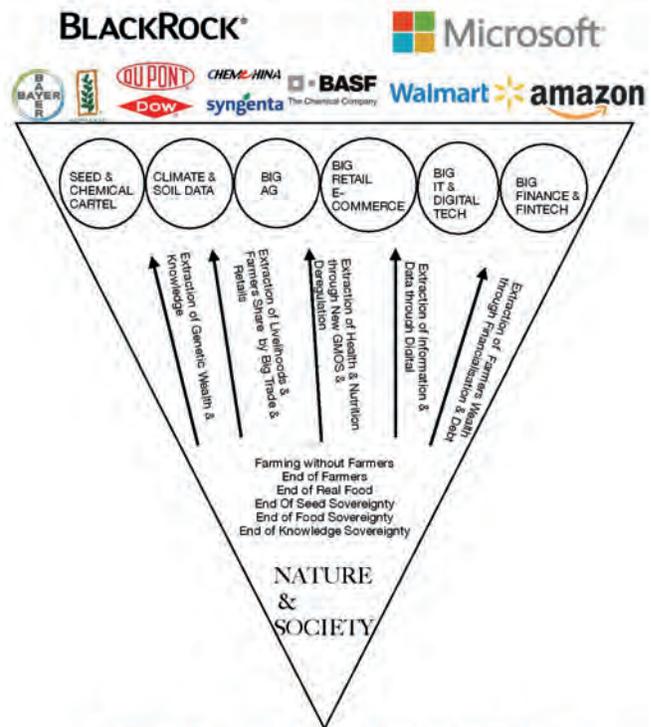
Diagram on Extractive Economy



Concentration and centralisation, distancing and separation of food producers from consumers, and data from knowledge are creating an inverted pyramid of unstable power which can topple with small perturbations which magnify rapidly because of concentration and integrations.

The Inverted Unstable Pyramid of Power in the Industrial Food System

Horizontal & vertical integration of the food system through Financialisation and Digitalisation



Extractive Economy that Erodes the Ecological and Social Foundations of Food in Nature & Society

The intensity of concentration translates into increase in different dimensions of social and ecological vulnerability.

The first vulnerability is rooted in the reductionist mechanistic scientific paradigm which fails to take into account the complexity and diversity of living systems, creating false narratives about the food system, thus causing harm, then covering up the harm.

The second vulnerability is related to the power of Big Money to influence knowledge generation and research.

A third vulnerability is rooted in deregulation which dismantles the regulatory systems put in place to prevent harm.

The mechanistic paradigm exaggerates the power to predict and control living systems through misleading reference to “precision technology” both for GMOs and digitalisation. Illusions are used to guide policy instead of assessment, evaluation and evidence. This makes the food system more vulnerable.

Vulnerability for small farmers increases as integration and monopoly control of Big Biotech, Big Trade, Big Retail, Big IT, Big Finance over the food system increases.

Bigness also promotes centralisation. Centralisation looses adaptive capacity and makes systems more vulnerable.

Bigness promotes monocultures. Monocultures and uniformity are more vulnerable.

These trends towards unregulated “bigness” are increasing.

We need to remember that unregulated bigness is the logic of the cancer cell which kills the organism it invades.

Accelerating further down the dead end road will lead to increased ecological, social, economic, political vulnerability and finally, **collapse**. If we continue on the industrial path, climate chaos, biodiversity loss, the sixth mass extinction driven by poisons and industrial monocultures will wipe out conditions for human life on Earth. There will be no food, no people, on a dead planet. Meantime multiple crises and multiple vulnerabilities will deepen - a deepening water and desertification crisis; farmers committing suicide due to debt for seeds and chemicals; children dying due to lack of food; people dying because of chronic diseases spreading due to nutritionally empty, toxic commodities sold as food. The democratic rights of farmers as producers, as conservers of biodiversity and ecosystems, as savers and breeders of seed destroyed through forcing non sustainable technologies and dependence on external inputs which trap them in debt. And the democratic rights of citizens to good, healthy, local, culturally appropriate food destroyed by force feeding fake food,

toxic food with chemicals and GMOs.

Farmers vulnerability and debts will deepen as they get locked into high cost external input systems-from, seeds and chemicals to big data, and falling prices as supermarkets, Big retail and Big Ag squeeze profits at the cost of farmers survival. The food and nutrition vulnerability of the poor will increase as financial vulnerability and crisis creates a food crisis. Biodiversity of cultures, crops and ecosystems will be further eroded to grow monocultures of commodities for corporations like Walmart who have a history of maximising their profits by robbing farmers of their incomes.

The future vision of industrial agriculture is farming without farmers, with chemicals, machines with spyware, surveillance drones collecting data, and food becoming further and further removed from the ecological web of life which is a food web. Separated from the ecological and social systems that produce and distribute real food that nourishes biodiversity in the soil and our gut, food becomes non food, anti food, fake food.

Diversity and decentred self organising are characteristics of living systems and their resilience, including living seed, living soil, living food, living knowledges, living economies, and living democracies. External inputs, external control, uniformity, monocultures, centralisation and concentration create vulnerability, and unstable and non sustainable systems prone to breakdown.

The corporate vision for the future of food an agriculture is an end of farming, an end of food, an end of freedom, an end to the human future on earth.

“Some scientists have argued that humanity could escape a ravaged Earth to colonies established on other planets. Here is what Martin Rees a well-known astronomer has to say:

“It is a dangerous delusion to think that space offers an escape from Earth’s problems; we have got to solve them here. Coping with Climate Change may seem daunting but it is a doodle compared to terraforming Mars. No place in our solar system offers an environment as clement as even the Antarctica or the top of Everest. There’s no Planet ‘B’ for ordinary risk averse people.”

(Shyam Saran, Former Foreign Secretary of India, and Special Envoy on Climate Change, Keynote speech on Building An Ecological Civilization at International Biodiversity Congress, 4th October, FRI, Dehradun)

What we eat, how we grow the food we eat, how we distribute it will determine whether humanity survives or pushes itself and other species to extinction.

Key features of the forced transition to industrial food systems

The key features of the food and agriculture paradigm that have put humanity on the dead end road to collapse of ecosystems, rural livelihoods, and planetary and human health are the following:

1. **Internal Input to External Input systems:** Agriculture is transformed from internal input living systems into an external input industrial system dependent on fossil fuels, chemicals, non renewable seeds, which destroy ecosystems, rural communities and trap farmers in debt because of high costs. External inputs include finance and chemicals and seeds, and now “data” as a commodity.
2. **Diversity to monocultures:** Diversity is replaced with uniformity and standardisation in the mind and in management of agriculture imposing monocultures of crops, uniformity of seeds, standardisation of farming systems. Since diversity goes hand in hand with sovereignty and democracy, destruction of diversity and imposition of monocultures is associated with destruction of food sovereignty and food democracy.
3. **Circular to Extractive Economies:** The law of return that is the basis of renewable, circular economies is replaced by monocultures and extractive systems which rob the soil of fertility and farmers of their just share. Farmers are paid less than the cost of production, pushing them into a negative economy and a debt trap, ultimately displacing and uprooting farmers from farming. It extracts genes and genetic information from living organisms, and extracts “data” of limited aspects of farming for external inputs.
4. **Nature centred approaches that focus on Rights of Nature and integrity of nature to Finance and Money Centred approaches to ecological services through Financialisation:** Financialisation includes money dimensions of reduction of nature and agroecology to money. Money becomes the determinant of decision making, and it extracts one dimensional aspects of the ecological services of nature to trade them as new commodities.
5. **Ecological Knowledge to Big Data:** Big data it is said is the new Oil. But no matter how big the data,

it is still bits of information, not knowledge. It is a commodity to be sold to farmers, and a tool of control of both agriculture and the farmer’s mind. It is an external input. Knowledge and intelligence are internal to self organising sovereign living systems. Data extracted through spyware in tractors and satellites is not ecological knowledge of the soil food web, or of plant ecology, or pest predator balance. It is pushed by the mechanical mind which does not know anything about life, living processes.

6. **Commons to Commodities:** The food web is ruptured. Food is separated from agriculture, and nutrition is separated from food. Food is transformed from nourishment to a nutritionally empty toxic commodity. Seed, food, knowledge is transformed from a commons, to which all species in the food web and all humans make a contribution and have a right to, into commodities traded by corporations for profit. Biodiversity and knowledge is eroded. Food is degraded, contributing to the chronic disease epidemic.

The multiple crises we face are consequences of Industrial Globalised Agriculture and the Poison Cartel which has shaped a distorted, non-sustainable, unfair, food system based on untruths and false narratives.

But we can sow the seeds of another future ...

We can spread the seeds of hope, of care, of freedom..

We can regenerate the earth, our farms, our food democracy

The path of agroecology, with all its diversity, creates a future for humans and other species who are part of our Earth Family.

All over the world, small farmers and gardeners, and locally and regionally organised food communities are already transitioning to the ecological and democratic path: preserving and developing their soils, their seeds, practising agro-ecology. They are creating resilience in the face of deepening ecological and economic vulnerabilities. They are feeding their communities with healthy and nutritious food while rejuvenating the planet. They are thus sowing the seeds of food democracy – a food system in the hands of food communities, women, farmers and consumers free of corporate control, poisons, food miles, plastics, patents. They are reclaiming seed, food, and knowledge as a commons. A food system that nourishes the planet and all humans.

PART 2

**False Narratives,
Failed Technologies:
How the Poison Cartel
and Bill Gates are
trying to Control
our Seed and Food
Production through
False Narratives on New
GMO Technologies and
Digitalisation**

The false narrative of “feeding the world” through industrial agriculture and chemicals in the food system began with the Green Revolution.

When the Green Revolution was pushed on India, it was based on false and exaggerated claim that artificial fertilisers would increase food production and remove all ecological limits that land puts on agriculture. Today the evidence is growing that artificial fertilisers have reduced soil fertility, reduced food production and contributed to desertification, water scarcity and climate change.

Through the Green Revolution, the Poison Cartel attempted to change the seed to “dwarf” varieties which could take up more chemical fertilisers. It was falsely claimed that Green Revolution varieties were “High Yielding Varieties”. The UN clarified that they should more accurately be referred to as “High Response Varieties” since they were designed to respond to chemicals. Borlaug even called the Green Revolution

varieties “miracle seeds” (Vandana Shiva, *Violence of the Green Revolution*).

As the Green Revolution started to wane, the Poison Cartel introduced GMOs, both to sell new “miracle seeds”; and to collect royalties from seed (Vandana Shiva, *Origin, The Corporate War on Nature and Culture*). In two decades the failure of GMOs could no longer be denied. Nor could the false claim to “safety” of GMOs be sustained as increasing scientific evidence established harm to the environment and public health.

In 2018, the Poison Cartel was reduced to a cartel of three with Bayer buying up Monsanto, Dow Merging with Dupont and Syngenta merging with ChemChina.

(Vandana Shiva and Kartikey Shiva, *Oneness vs the 1%*)

(Monsanto and Bayer merge, drop the Monsanto name - Business Insider

uk.businessinsider.com/monsanto-bayer-merge-drop-monsanto-name-2018-6)

The Technology Machine of the 1%

Sumitomo Chemical Co., Ltd.

| Name | Equities | % |
|---------------------------------------|-------------|-------|
| Sumitomo Life Insurance Co. | 7,10,00,000 | 4.29% |
| Marathon Asset Management L.L.P | 6,59,74,000 | 3.99% |
| Nippon Life Insurance Co. | 4,10,31,000 | 2.48% |
| Sumitomo Mitsui Financial Group, Inc. | 3,84,53,000 | 2.32% |
| Normura Asset Management Co., Ltd. | 3,37,42,361 | 2.04% |
| Sumitomo Life Insurance Pension Fund | 2,90,00,000 | 1.75% |
| The Vanguard Group, Inc. | 2,78,00,990 | 1.68% |
| Japan Agricultural Cooperatives Group | 2,18,25,000 | 1.32% |
| BlackRock Fund Advisors | 2,10,80,000 | 1.27% |
| Norges Bank Investment Management | 2,09,09,280 | 1.26% |

Akzo Nobel N.V.

| Name | Equities | % |
|--|-------------|-------|
| Causeway Capital Management L.L.C | 1,61,38,607 | 6.52% |
| Massachusetts Financial Services Co. | 1,27,65,488 | 5.16% |
| Dodge & Cox | 72,63,401 | 2.93% |
| The Vanguard Group, Inc. | 50,12,124 | 2.02% |
| UBS Asset Management (UK) Ltd. | 47,94,611 | 1.94% |
| Templeton Global Advisors Ltd. | 42,60,470 | 1.72% |
| Norges Bank Investment Management | 39,42,002 | 1.59% |
| BlackRock Investment Management L.L.C | 33,77,093 | 1.36% |
| BlackRock Fund Advisors | 28,96,876 | 1.17% |
| Capital Research & Management Co. (Global Investors) | 28,82,000 | 1.16% |

Toxic Cartel Shareholders

E.I. du Pont de Nemours & Co.

| Name | Equities | % |
|---|-------------|-------|
| Capital Research & Management Co. (World Investors) | 8,98,38,822 | 10.3% |
| The Vanguard Group, Inc. | 5,27,55,202 | 6.05% |
| SSgA Funds Management, Inc. | 3,87,89,007 | 4.45% |
| BlackRock Fund Advisors | 3,36,22,081 | 3.86% |
| Triam Fund Management L.P | 2,02,24,075 | 2.32% |
| T. Rowe Price Associates, Inc. | 1,91,09,105 | 2.19% |
| Fidelity Management & Research Co. | 1,89,60,764 | 2.18% |
| Highfields Capital Management L.P | 1,26,20,256 | 1.45% |
| Northern Trust Investments, Inc. | 1,13,66,263 | 1.30% |
| DuPont Capital Management Corp. | 99,69,322 | 1.14% |

The Dow Chemical Co.

| Name | Equities | % |
|---|-------------|-------|
| The Vanguard Group, Inc. | 7,05,16,634 | 6.31% |
| SSgA Funds Management, Inc. | 4,40,53,093 | 3.94% |
| BlackRock Fund Advisors | 4,20,62,990 | 3.77% |
| Capital Research & Management Co. (World Investors) | 3,28,79,668 | 2.94% |
| Third Point L.L.C | 2,52,50,000 | 2.26% |
| Capital Research & Management Co. (Global Investors) | 1,63,65,000 | 1.46% |
| Wellington Management Co. L.L.P | 1,36,75,361 | 1.22% |
| Northern Trust Investments, Inc. | 1,33,13,627 | 1.19% |
| Capital Research & Management Co. (International Investors) | 1,26,24,713 | 1.13% |
| Franklin Advisers, Inc. | 1,25,95,870 | 1.13% |

Source: Vandana Shiva and Kartikey Shiva, *Oneness vs the 1%*

Poison Cartel.Toxic Capital.

The Vanguard Group, Inc.
 Norges Bank Investment Management
 Northern Cross LLC
 Jupiter Asset Management Ltd.
 Fidelity Management & Research Co.
 LEG AG (Investment Management)
 Arisan Partners LP
 Credit Suisse AG
 Capital Research & Management Co. (World Investors)
 Syngenta AG



PIONEER
 A DUPONT COMPANY
BASF
 We create chemistry

syngenta



Capital Research & Management Co. (World Investors)
 The Vanguard Group, Inc.
 SSgA Funds Management, Inc.
 BlackRock Fund Advisors
 Tain Fund Management LP
 T. Rowe Price Associates, Inc.
 Fidelity Management & Research Co.
 Highwoods Capital Management LP
 Northern Trust Investments, Inc.
 DuPont Capital Management Corp.

The Vanguard Group, Inc.
 Norges Bank Investment Management
 Northern Cross LLC
 Fidelity Management & Research Co.
 Capital Research & Management Co. (Global Investors)
 Jupiter Asset Management Ltd.
 LEG AG (Investment Management)
 Arisan Partners LP
 Credit Suisse AG
 Capital Research & Management Co. (World Investors)
 as of 31 Dec 2015

Capital Research & Management Co. (World Investors)
 The Vanguard Group, Inc.
 Lyxor International Asset Management SAS
 Norges Bank Investment Management
 State Street Global Advisors Ltd.
 BlackRock Fund Advisors
 Massachusetts Financial Services Co.
 BlackRock Asset Management Deutschland AG
 Amundi Asset Management SA (Investment Management)
 Dodge & Cox

The Vanguard Group, Inc.
 SSgA Funds Management, Inc.
 BlackRock Fund Advisors
 Capital Research & Management Co. (World Investors)
 Triad Point LLC
 Capital Research & Management Co. (Global Investors)
 Wellington Management Co. LLP
 Northern Trust Investments, Inc.
 Capital Research & Management Co. (International Investors)
 Perkin Advisors, Inc.

Capital Research & Management Co. (Global Investors)
 The Vanguard Group, Inc.
 SSgA Funds Management, Inc.
 BlackRock Fund Advisors
 Massachusetts Financial Services Co.
 Genview Capital Management LLC
 Fidelity Management & Research Co.
 Sands Capital Management LLC
 PRIMECAP Management Co.
 Davis Selected Advisors LP



MONOPOLY



Bayer AG

| Name | Equities | % |
|---|-------------|-------|
| Capital Research & Management Co. (World Investors) | 1,93,08,166 | 2.33% |
| The Vanguard Group, Inc. | 1,67,22,949 | 2.02% |
| Lyxor International Asset Management SAS | 1,58,28,584 | 1.91% |
| Norges Bank Investment Management | 1,41,00,744 | 1.71% |
| State Street Global Advisors Ltd. | 1,39,90,546 | 1.69% |
| BlackRock Fund Advisors | 1,33,99,616 | 1.62% |
| Massachusetts Financial Services Co. | 1,30,24,482 | 1.58% |
| BlackRock Asset Management Deutschland AG | 1,24,04,565 | 1.50% |
| Amundi Asset Management SA (Investment Management) | 1,00,21,629 | 1.21% |
| Dodge & Cox | 87,18,170 | 1.05% |

Monsanto Co.

| Name | Equities | % |
|--|-------------|-------|
| Capital Research & Management Co. (Global Investors) | 3,00,09,458 | 6.81% |
| The Vanguard Group, Inc. | 2,92,53,433 | 6.64% |
| SSgA Funds Management, Inc. | 1,84,49,843 | 4.19% |
| BlackRock Fund Advisors | 1,69,38,069 | 3.85% |
| Massachusetts Financial Services Co. | 1,43,19,095 | 3.25% |
| Glenview Capital Management LLC | 1,40,78,428 | 3.20% |
| Fidelity Management & Research Co. | 1,34,54,547 | 3.06% |
| Sands Capital Management LLC | 1,18,54,253 | 2.69% |
| PRIMICAP Management Co. | 1,16,30,397 | 2.64% |
| Davis Selected Advisers LP | 82,33,266 | 1.87% |

Syngenta AG

| Name | Equities | % |
|---|-----------|-------|
| The Vanguard Group, Inc. | 17,95,568 | 1.93% |
| Norges Bank Investment Management | 16,76,873 | 1.80% |
| Northern Cross LLC | 16,52,177 | 1.78% |
| Jupiter Asset Management Ltd. | 16,44,440 | 1.77% |
| Fidelity Management & Research Co. | 15,80,300 | 1.70% |
| UBS AG (Investment Management) | 14,58,502 | 1.57% |
| Artisan Partners LP | 14,23,007 | 1.53% |
| Credit Suisse AG | 12,57,852 | 1.35% |
| Capital Research & Management Co. (World Investors) | 12,19,000 | 1.31% |
| Syngenta AG | 11,57,146 | 1.25% |

Potash Corp. of Saskatchewan, Inc.

| Name | Equities | % |
|---|-------------|-------|
| RBC Global Asset Management, Inc. | 5,10,34,808 | 6.10% |
| Fiduciary Management, Inc. | 3,24,26,519 | 3.87% |
| First Eagle Investment Management LLC | 2,90,74,788 | 3.47% |
| Capital Research & Management Co. (World Investors) | 2,35,29,769 | 2.81% |
| Capital Research & Management Co. (Global Investors) | 1,57,71,000 | 1.88% |
| Capital Research & Management Co. (International Investors) | 1,53,18,560 | 1.83% |
| The Vanguard Group, Inc. | 1,30,85,152 | 1.56% |
| Fidelity Management & Research Co. | 1,29,11,995 | 1.54% |
| TD Asset Management, Inc. | 1,28,07,452 | 1.53% |
| CIBC World Markets, Inc. | 1,21,55,726 | 1.45% |

3M Co.

| Name | Equities | % |
|--|-------------|-------|
| SSgA Funds Management, Inc. | 4,52,51,374 | 7.47% |
| The Vanguard Group, Inc. | 4,06,26,344 | 6.71% |
| BlackRock Fund Advisors | 2,39,91,424 | 3.96% |
| Massachusetts Financial Services Co. | 1,72,24,573 | 2.84% |
| State Farm Investment Management Corp. | 1,11,31,700 | 1.84% |
| Northern Trust Investments, Inc. | 86,15,287 | 1.42% |
| Fidelity Management & Research Co. | 85,55,801 | 1.41% |
| First Eagle Investment Management LLC | 62,52,458 | 1.03% |
| Norges Bank Investment Management | 58,58,227 | 0.97% |
| US Bancorp Asset Management, Inc. | 55,75,819 | 0.92% |

Intrepid Potash, Inc.

| Name | Equities | % |
|---|-------------|-------|
| Bayer-AG | | |
| Capital Research & Management Co. (World Investors) | 1,93,08,166 | 2.33% |
| The Vanguard Group, Inc. | 1,67,22,949 | 2.02% |
| Lyxor International Asset Management SAS | 1,58,28,584 | 1.91% |
| Norges Bank Investment Management | 1,41,00,744 | 1.71% |
| State Street Global Advisors Ltd. | 1,39,90,546 | 1.69% |
| BlackRock Fund Advisors | 1,33,99,616 | 1.62% |
| Massachusetts Financial Services Co. | 1,30,24,482 | 1.58% |
| BlackRock Asset Management Deutschland AG | 1,24,04,565 | 1.50% |
| Amundi Asset Management SA (Investment Management) | 1,00,21,629 | 1.21% |
| Dodge & Cox | 87,18,170 | 1.05% |

Source: Vandana Shiva and Kartikey Shiva, *Oneness vs the 1%*

During the last two decades the the next miracle of GMOs was added to the false narrative of industrial food systems. There was an exaggerated claim that genetic engineering would remove all limits of the environment, grow food in deserts and toxic dumps. Today we have only two applications, herbicide resistance and Bt toxins in crops. The first was claimed to control weeds. It has created superweeds. Bt crops were supposed to control pests. They have created new pests and superpests.

And with the spread of Roundup over the past two decades we saw the spread of diseases such as cancer.

False narratives and false claims to predictability and safety create vulnerability.

The hazards of glyphosate and GMOs were denied, inspite of evidence of harm from independent scientists and even the WHO.

<https://enveurope.springeropen.com/articles/10.1186/s12302-014-0014-5>

<https://www.baumhedlundlaw.com/toxic-tort-law/monsanto-roundup-lawsuit/iarc-glyphosate-monograph/>



Retrieved from http://www.etcgroup.org/sites/www.etcgroup.org/files/files/blockingthechain_english_web.pdf

From mega mergers to market mollapse?

It took one cancer case for Bayer, who had acquired Monsanto, to start losing its market value.

By October 2018 Bayer had lost \$57 billion of its market capitalisation because of its acquisition of Monsanto and the liability of the cancer cases related to Monsanto's Roundup /Glyphosate after a US court confirmed a previous ruling on cancer damages in the case of groundskeeper Dewayne Johnson, who was diagnosed with blood cancer non-Hodgkin's lymphoma in 2014.

The jurors found that the company acted with "malice" and that Roundup and professional grade RangerPro contributed "substantially" to his terminal illness.

There are 8000 similar cancer cases in the US courts, and the financial players controlling the corporations that control our food fear that the cases related to poisoning of our daily bread will have high costs.

<https://news.abs-cbn.com/business/10/23/18/bayer-stock-slides-on-shock-monsanto-cancer-ruling>

<https://www.wsj.com/articles/judge-reduces-jury-award-against-bayers-roundup-to-78-5-million-1540258899>

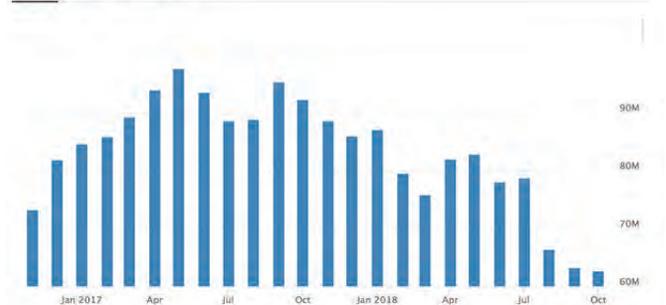
<https://www.bloomberg.com/news/articles/2018-10-22/bayer-loses-bid-to-wipe-out-first-roundup-cancer-verdict>

Analysts Estimates \$800 Billion In Future Liability

Bayer | Market Capitalization

Last Quarter: **62.7M EUR** Last Year: **95.7M EUR**

Chart Data API Alerts



Retrieved from <http://www.greenmedinfo.com/blog/bayer-stock-crashes-after-monsanto-cancer-verdict-upheld-judge-analysts-estimates>

Two decades of GMOs have caused havoc for agriculture and farmers and ordinary citizens exposed to the toxics

Now new technological tools are being introduced as new miracles to rescue the false narrative of feeding the world - new GMOs, and digital technologies. Both are described as contributing to “precision agriculture”. Both have already been exposed to not be “precise”.

Big Ag will get bigger with Big Data.

“Big Data not only invites but in fact demands greater concentration since no company at any point along the chain can risk allowing others to gain control of more information Therefore the tendency for vertical integration along the chain increases”

(<http://www.etcgroup.org/content/blocking-chain>, pg 10)

Will our daily bread be CRISPRed? Gates and the new GMOs being promoted as “natural”

Another “miracle” is now being manufactured in board rooms of the Biotech industry and by Bill Gates through his foundation to extend the technological myth of technological miracles and magic bullets

New GMOs are being introduced to cover up the failure of old GMOs - the failure of Bt cotton to control pests and the failure of Roundup Ready crops to control weeds. Instead, industrial agriculture is now faced with the unmanageable problem of superpests and superweeds

They are also aimed at creating a new narrative for genetic engineering while maintaining the genetic determinism and genetic reductionism paradigm on which genetic engineering is based. They extend the illusion of mechanistic determinism in the attempt to “engineer” complex, living, self organised systems. They are also an attempt to escape GMO regulation.

The Queensland Government and Bill Gates had tried to introduce a GMO banana with the false claim that it would end iron deficiency and childbirth death among Indian women. We responded to the false claims.

<http://www.navdanya.org/news/338-navdanya-launches-no-to-gmo-bananas-campaign>

The iron rich GMO banana for India was not heard of after our response. It suddenly became a Vit A rich banana for Uganda.

And now it is emerging as a gene edited banana.

<https://www.miragenews.com/researchers-to-save-queensland-s-banana-industry/>

Bill Gates is a big player in both promoting the old failed GMOs, including the GMO banana, Golden Rice and Bt Eggplant, as well as new GMOs based on gene editing and gene drives (Vandana Shiva and Kartikey Shiva, *Oneness vs the 1%*)

Gates has funded the new GMO technologies including gene editing and gene drives. He has made investments in Editas a company that controls patents on the new GMO technologies. With DARPA he is promoting the use of gene drives for deliberate extinction of species

In the Foreign Affairs issue of May/June 2018 an article “Gene Editing for Good: How CRISPR Could Transform Global Development”, Bill Gates argues that massive investments are necessary to support gene editing for “accelerating research that could help end extreme poverty by enabling millions of farmers in the developing world to grow crops and raise livestock that are more productive, more nutritious, and hardier”. Responding to growing criticism over promotion of commodified, patented and proprietary production of seeds, now through gene editing, the health and environmental consequences of which are yet to be appreciated, Gates says, in this essay, “New technologies are often met with skepticism. But if the world is to continue the remarkable progress of the past few decades, it is vital that scientists, subject to safety and ethics guidelines, be encouraged to continue taking advantage of such promising tools as CRISPR”.

<https://www.foreignaffairs.com/articles/2018-04-10/gene-editing-good>

The farmers of Punjab and Vidarbha, who are victims of the first and second Green Revolutions would not see the devastation of their land and lives “as remarkable progress of the past few decades”

The Gates Foundation has a major influence on control over agriculture policy and genetic resources, technologies for modifying biodiversity, as well as patents.

He has become a significant funder of the CGIAR system, as well as the Svalbard gene bank (For more details, Vandana Shiva and Kartikey Shiva, *Oneness vs the 1%*)

Gates is promoting the idea of One Agriculture for the world, indifferent to the diversities of agricultural systems and food systems across diverse ecosystems and diverse cultures. (Vandana Shiva and Kartikey Shiva, *Oneness vs the 1%*)

New GMOs based on gene editing (CRISPR (Clustered regularly-interspaced short palindromic repeats) Cas-9)

and gene drives are being rushed to the market in spite of uncertainties related to the technology.

Even while the science is uncertain, and unpredictable impacts observed, instead of using the precautionary principle, a false claim to precision is being made in the context of the the infant CRISPR technology of genetic modification.

The Spin on “Precision”

CRISPR-Cas9 is a genome editing tool that is creating a buzz in the science world. It is faster, cheaper and more accurate than previous techniques of editing DNA and has a wide range of potential applications.

<https://www.yourgenome.org/facts/what-is-crispr-cas9>

“Using “molecular scissors” to cut DNA means scientists can edit genomes more precisely and rapidly than ever before, and altered agricultural products could get to market more quickly and cheaply.”

<https://geneticliteracyproject.org/2018/03/21/monsanto-to-fund-gene-editing-company-pairwise-plants-to-develop-new-crop-varieties/>

“In agriculture, scientists say it takes far less time, and is more precise, than both traditional and genetically modified breeding techniques.

https://www.washingtonpost.com/news/wonk/wp/2017/06/13/how-one-company-plans-to-change-your-mind-about-genetically-edited-food/?utm_term=.148b44715880

The Science of Unpredictability

What the Science says about unpredictable changes in the genome

While a deterministic assumption of genetic reductionism assumes that CRISPR ‘a relatively easy way to alter any organism’s DNA, just as a computer user can edit a word in a document’ and is precise and predictable, a new study published in *Nature Methods* revealed that CRISPR introduced hundreds of unintended mutations into the genome of mice.

It found more than 1,500 single-nucleotide mutations and more than 100 larger deletions and insertions. None of these DNA mutations were predicted by the computer algorithms that are widely used by researchers to screen the genome of an organism to look for potential off-target effects.

(Vandana Shiva and Kartikey Shiva, *Oneness vs the 1%, Women Unlimited*, 2018 pg 86)

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5796662/>

“CRISPR Efficient but unpredictable

Jul 5, 2018 - Lydia Teboul, author of a new study in *BMC Biology*, explains how these ... unpredictable events arising from the use of CRISPR/Cas9 reagents

Unwanted effects are more frequent than previously thought

An increasing body of evidence is being compiled to indicate that model validation is the newest challenge for the genome editing community.

We also describe the unpredictability of the outcome of using long single-stranded donors. We illustrate that, alongside sequence-perfect, on-target integrations, the system can also produce an array of incorrect alleles. These include unintended point mutations, small or larger sequence rearrangements, some of them likely based on local micro-homology, and additional donor integrations.

These events are unpredictable by-products that must be excluded in the process of the validation of newly established mutant lines. Importantly, these unwanted events are much more frequent than the much-publicised potential off-target effects of CRISPR/Cas9 reagents.

<https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-018-0530-7>

[blogs.biomedcentral.com/on-biology/2018/07/05/efficient-unpredictable-crispr/ reagents ...](https://blogs.biomedcentral.com/on-biology/2018/07/05/efficient-unpredictable-crispr-reagents-...)

CRISPR-Cas9 Human Genome Editing: Challenges, Ethical Concerns ...

<https://www.omicsonline.org/.../crisprcas9-human-genome-editing-challenges-ethical-...>

CRISPR gene editing can cause hundreds of unintended mutations. As CRISPR-Cas9 starts to move into clinical trials, a new study has found that the gene-editing technology can introduce hundreds of unintended mutations into the genome. “We feel it’s critical that the scientific community consider the potential hazards of all off-target mutations caused by CRISPR, including single nucleotide mutations and mutations in non-coding regions of the genome,” says co-author Stephen Tsang, MD, PhD, the Laszlo T Bito Associate Professor of Ophthalmology and associate professor of pathology and cell biology at Columbia University Medical Center and in Columbia’s Institute of Genomic Medicine and the Institute of Human Nutrition.

<https://www.drugtargetreview.com/news/23510/crispr-gene-editing-mutations/>

CRISPR gene editing produces unwanted DNA deletions - Nature

<https://www.nature.com/news> by KA Schaefer - 2017 - C ited by 179 - Related articles

For example, in a recent study we used CRISPR-Cas9 for sight restoration in blind rd1 mice. The unpredictable generation of these variants is of concern.

A CRISPR Path to Engineering New Genetic Mouse Models

We address important issues related to the design and testing of crucial components of CRISPR as well as genetic mosaicism, robust genotyping, and inadvertent (off) targeting, all of which must be carefully considered for unambiguous evaluation of CRISPR-derived mice.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4882230/>

Jul 16, 2018 - Researchers have embraced CRISPR gene-editing as a method for altering genomes, but some are cautioning that unwanted DNA changes ...

CRISPR still needs microbiologists | Nature Microbiology

<https://www.nature.com/nature-microbiology> editorials

May 24, 2018 - Although the spotlight on CRISPR-Cas systems has shone on their ... Basic research efforts by microbiologists worldwide were essential not only to ... that could, in the future, also be explored for yet-unpredictable uses.

Crispr inventor worries about the unintended consequences of gene ..

Crispr inventor worries about the unintended consequences of gene editing. “Jennifer Doudna: I guess I worry about a couple of things. I think there’s sort of the potential for unintended consequences of gene editing in people for clinical use. How would you ever do the kinds of experiments that you might want to do to ensure safety? And then there’s another application of gene editing called gene drive that involves moving a genetic trait very quickly through a population. And there’s been discussion about this in the media around the use of gene drives in insects like mosquitoes to control the spread of disease. On one hand, that sounds like a desirable thing, and on the other hand, I think one, again, has to think about potential for unintended consequences of releasing a system like that into an environmental setting where you can’t predict what might happen”.

wesa.fm/post/crispr-inventor-worries-about-unintended-consequences-gene-editing

Jun 16, 2017 - Crispr has been in the news recently because a group of scientists released a much- debated study arguing that editing genes can lead to many unintended, unpredictable consequences. In the controversial case, the ... expert reaction to study looking at deletions and rearrangements due to the CRISPR/Cas9 genome editing technique

A new study, published in Nature Biotechnology, investigates the use of CRISPR/Cas9 to make simple cuts in DNA in mouse cells and subsequent on-target mutagenesis due to the inaccuracy of the type of DNA repair process employed.

Dr Helen O’Neill, Programme Director, Reproductive Science and Women’s Health, University College London, said:

“It has long been understood that certain DNA repair processes, such as the one assessed here (non-homologous end joining), can have unpredictable outcomes, whether innate (occurring naturally in cells) or induced (through genome editing). The research presented here looks more thoroughly at the expected unpredictability of this repair process following intended CRISPR/Cas9 cutting and naturally suggests that this is acknowledged in others’ analyses, especially in a future clinical setting.

www.sciencemediacentre.org/expert-reaction-to-study-looking-at-deletions-and-rearra...

Jul 16, 2018 - The research presented here looks more thoroughly at the expected unpredictability of this repair process following intended CRISPR/Cas9 ...

Greenwashing new GMOs as “non GMO” and “natural”: The false narrative of “natural”, healthy foods

There is a false claim being made that CRISPR is not a GMO. GMO means “genetically modified organism”. Modifying an organism at the genetic level is a scrambling of the self organisation and intelligence of the living organism, and has unpredictable impacts. This is what scientists are finding out.

Even as the Poison Cartel continues to spread its GMOs illegally as well as by corrupting Biosafety and Environmental Safety Agencies, it is simultaneously desperately trying to do a make over of its image as “non GMO”. Monsanto bought a company “Pairwise Plants” engaged in gene editing “a process they say can produce non-GMO farm products that do not contain foreign DNA from a different species.

Unlike traditional GMOs, in which a gene is added from another organism, gene-editing works like the find-and-replace function on a word processor. It finds a gene and then makes changes by amending or deleting it”.

<https://geneticliteracyproject.org/2018/03/21/monsanto-to-fund-gene-editing-company-pairwise-plants-to-develop-new-crop-varieties/>

<https://monsanto.com/news-releases/monsanto-and-pairwise-announce-rd-collaboration-to-accelerate-innovation-in-agriculture-with-gene-editing/>

Further, because “Some bacteria have a similar, built-in, gene editing system to the CRISPR-Cas9 system that they use to respond to invading pathogens and viruses much like an immune system” there is clear distinction between the intelligent, self organised response of a living organism to an invasion, the externally manipulated “gene editing” is not the same as “using nature’s own tools”. It is an external genetic modification.

And just as old GMOs were based on the spin of bringing miracles to farmers, given the clear rejection of GMO foods by consumers, the Biotechnology industry based on new GMOs is based on spin of bringing benefits to consumers through “natural” “healthy” foods based on CRISPR (RFSTE, *Citizens Vote for GMO Free Food*, 2003)

As the Washington Post claims Calyxt’s “healthier” soybean oil, the industry’s first true gene-edited food, could make its way into products such as chips, salad dressings and baked goods as soon as the end of this year.

Unlike older genetic modification methods, the new techniques are precise, fast and inexpensive, and companies hope they will avoid the negative reputation and regulatory hurdles that hobbled the first generation of genetically modified foods.

https://www.washingtonpost.com/news/business/wp/2018/08/11/feature/the-future-of-food-scientists-have-found-a-fast-and-cheap-way-to-edit-your-edibles-dna/?utm_term=.7c0c3aafbe67The false claim “natural” is being used to commercialise the new GMOs.

Calyxt, Inc., a consumer-centric food- and agriculture-focused company, develops healthier specialty food ingredients and food crops using gene-editing technology for plants in the United States. It engages in the development of high oleic soybeans, high fiber wheat, herbicide tolerant wheat, powdery mildew resistant wheat, improved oil composition canola, herbicide tolerant canola, improved quality alfalfa and herbicide tolerant alfalfa, late blight resistant potatoes, cold storable/reduced browning potatoes, improved protein composition soybeans, drought tolerant soybeans, herbicide tolerant soybeans, and improved yield soybeans. The Company was formerly known as Collectis Plant Sciences,...

www.calyxt.com

Calyxt claims that it is producing “soya beans with less transfats”.

“Scientists at Calyxt, a subsidiary of the French pharmaceutical firm Collectis, developed their soybean by turning “off” the genes responsible for the **trans fats in soybean oil**”.

https://www.washingtonpost.com/news/business/wp/2018/08/11/feature/the-future-of-food-scientists-have-found-a-fast-and-cheap-way-to-edit-your-edibles-dna/?utm_term=.7c0c3aafbe67

But transfats are not in the plant or the oil. They are artificial transfats produced in the process of hydrogenation of oil.

Artificial **trans fats** (or **trans fatty acids**) are created in an industrial process that adds hydrogen to liquid vegetable oils to make them more solid. The primary dietary source for trans fats in processed food is “partially hydrogenated oils.”

Trans Fats - American Heart Association
www.heart.org/en/healthy-living/healthy-eating/eat-smart/fats/trans-fat
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5062912/>
https://en.wikipedia.org/wiki/Mustard_oil

Gene Editing is a Paradigm Shift

Our Technology Allows Us to Address Both Consumer and Farmer Needs

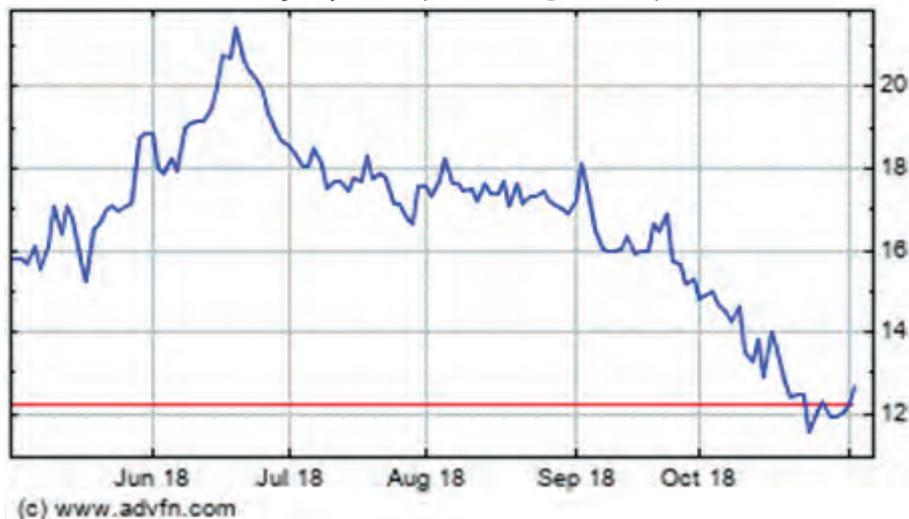


Retrieved from: https://www.calyxt.com/wp-content/uploads/2017/09/Calyxt-Investor-Presentation_September-2017.pdf

The false narratives on soya have been used to try and capture the large Indian market for edible oils. In 1998 we started the “Sarson Satyagraha to protect our biodiversity of food and our food sovereignty from the dumping of GMO soya. We have continued the Satyagraha to stop the attempt to introduce GMO mustard. Our Satyagraha will continue.

(RFSTE, Mustard via Soya)
<https://www.deccanchronicle.com/opinion/op-ed/300517/why-sarson-satyagraha-is-still-needed.html>
 Satyagraha for Gandhi’s Ghani (<http://www.navdanya.org/campaigns/559-satyagraha-for-gandhis-ghani>)
 Science is about knowledge. Not about peddling false claims. Calyxt’s stocks, like Bayer’s are falling.

Calyxt, Inc. (NASDAQ: CLXT)



Source: Calyxt, Inc. (NASDAQ:CLXT) Historical Stock Chart 6 Months : From May 2018 to Nov 2018

New GMOs are GMOs and need to be regulated

Biotechnology based on new GMOs is the corporate attempt to subvert biotechnology regulation.

There is a massive attempt to present gene editing as a non GMO technology by differentiating it from transgenic.

But as the ECJ decision recognises, gene editing is genetic modification.

The European Court of Justice on 25th July 2018 has ruled that CRISPR is a gene modification technology and needs to be regulated like all GMOs.

“In today’s judgment, the Court of Justice takes the view, first of all, that organisms obtained by mutagenesis are GMOs within the meaning of the GMO Directive, in so far as the techniques and methods of mutagenesis alter the genetic material of an organism in a way that does not occur naturally. It follows that those organisms come, in principle, within the scope of the GMO Directive and are subject to the obligations laid down by that directive”.

<https://curia.europa.eu/jcms/upload/docs/application/pdf/2018-07/cp180111en.pdf>

Gene-Edited Products Now Classified as GMOs in European Union

<https://www.ecowatch.com/gene-editing-gmos-europe-2589804007.html>

https://www.washingtonpost.com/news/business/wp/2018/08/11/feature/the-future-of-food-scientists-have-found-a-fast-and-cheap-way-to-edit-your-edibles-dna/?utm_term=.7c0c3aafbe67

<https://www.ifoam.bio/en/news/2018/07/26/european-court-justice-rules-new-genetic-engineering-techniques-must-be-regulated>

<https://corporateeurope.org/pressreleases/2018/07/ecj-ruling-gene-editing-products-victory-consumers-farmers-environment>

<https://in.reuters.com/article/us-eu-court-gmo/top-eu-court-gmo-rules-cover-plant-gene-editing-technique-idINKBN1KF15L>

<https://www.nature.com/articles/d41586-018-05814-6>
<https://www.theguardian.com/environment/2018/jul/25/gene-editing-is-gm-europes-highest-court-rules>

Following the ECJ verdict, the company [Bayer] has widened the definition of “genetically modified” accordingly to include gene editing.

The Biotech industry will thus focus on deregulation of GMOs through introduction of CRISPR foods by focussing on countries outside Europe.

Bayer, BASF to pursue plant gene editing elsewhere after EU ruling

<https://www.gmwatch.org/.../18371-bayer-basf-to-pursue-plant-gene-editing-elsewher...>

<http://www.euronews.com/2018/07/27/bayer-basf-to-pursue-plant-gene-editing-elsewhere-after-eu-ruling>

Bayer also came up with a new term of “overregulation”

Over-regulating gene editing slows down innovation, Bayer says...

<https://www.euractiv.com/.../over-regulating-gene-editing-slows-down-innovation-ba...>

The US is not regulating the new GMOs, thus opening the floodgates for GM foods based on gene editing just as it refused to be part of the International Regulatory framework for Biosafety.

Most of the world supported Art 19.3 of the Convention on Biological Diversity on the obligation of governments to assess the impact of GMOs on Biodiversity and the Cartagena Protocol on Biosafety resulting from it.

As an article in Washington Post on the new GMOs based on CRISPR states

“The Agriculture Department has indicated that it does not intend to regulate the CRISPR-edited corn because its creation does not involve any plant pests’ genetic materials.”

https://www.washingtonpost.com/news/wonk/wp/2017/06/13/how-one-company-plans-to-change-your-mind-about-genetically-edited-food/?utm_term=.148b44715880

Since 2016, it has given free passes to at least a dozen gene-edited crops, ruling that they fall outside its regulatory purview. But on Wednesday, March 28, the agency made its relationship status official; effective immediately, certain gene-edited plants can be designed, cultivated, and sold free from regulation. “With this approach, USDA seeks to allow innovation when there is no risk present,” US Secretary of Agriculture Sonny Perdue said in a statement.

Crispr’d Food, Coming Soon to a Supermarket Near You | WIRED

<https://www.wired.com/story/crisprd-food-coming-soon-to-a-supermarket-near-you/>

As an article by Emma Cowan in AgFunder news on September 19, 2016 makes clear, gene editing was an attempt to escape GMO regulation.

“There have been several reasons bandied around for why Bayer wants to acquire Monsanto. Keeping up with the broader consolidation in the industry is one thing, but there are several other strategic benefits to the tie-up, some of which have been less commented on than others like gene editing.

On the back of consumer demands and concerns, the use of genetically modified crops in food has become increasingly scrutinised by regulators across the US. The State of Vermont’s recent GMO labelling law has ushered in a new era of uncertainty as major food companies start to adopt GMO labelling, but are complaining at the cost and perception of the move. Among those complaining are General Mills, Mars, Kellogg, Campbell Soup and Monsanto that believe this state-specific law sets a dangerous precedent in Vermont that would create a patchwork of state GMO labelling policies.

A new technology, or set of technologies, are gathering momentum however, and could potentially replace GMO technology while still allowing for beneficial gene manipulation.”

How Bayer Stands to Reinvent GMO with CRISPR and Monsanto...

<https://agfundernews.com/how-bayer-stands-to-reinvent-gmo-with-crispr-and-monsan...>

Is This Tomato Engineered? Inside the Coming Battle Over Gene...

<https://www.wsj.com/.../is-this-tomato-engineered-inside-the-coming-battle-over-gene-e.....>

These Foods Aren’t Genetically Modified but They Are ‘Edited’ - The...

<https://www.nytimes.com/2017/01/09/science/genetically-edited-foods-crispr.html>

Forget GMOs. The next big battle is over genetically ‘edited’ foods...

<https://www.washingtonpost.com/.../how-one-company-plans-to-change-your-mind-abo...>

National Geographic have hailed CRISPR foods as The Next Food revolution and tried to argue it is not a GMO.

How Crispr Could Transform Our Food Supply - National Geographic

<https://www.nationalgeographic.com/.../future-of-food/food-technology-gene-editing/>

The Non-GMO Project already has barred gene-edited plants

<https://www.nongmoproject.org/blog/emerging-techniques-in-biotechnology-pose-new-risks-to-the-non-gmo-supply-chain/>

These Are Not Your Father’s GMOs - MIT Technology Review

<https://www.technologyreview.com/s/609230/these-are-not-your-fathers-gmos/>

New GMOs, like the old, are the door to patents

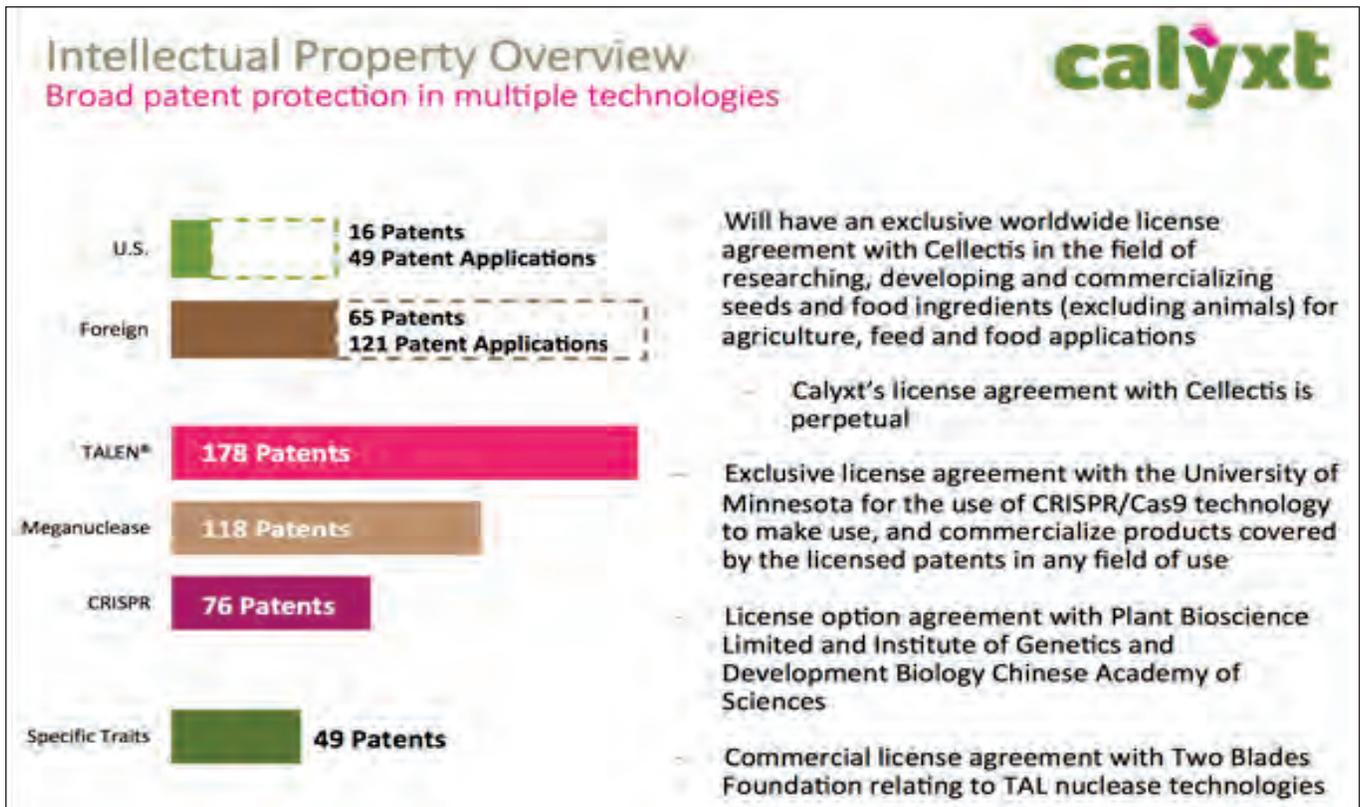
GMOs seeds were introduced in agriculture in order to take patents on seeds and collect royalties. In India we ensured through Art 3j of our Patent Act that our laws recognise that man does not create life, seed, plants and animals are not inventions, and hence not patentable (Vandana Shiva, *Origin, The Corporate War on Nature and Culture*)

Genomic patents are also aimed at escaping national biodiversity and patent laws. Intellectual property rights in genetic resources and genetic information as well as patents related to CRISPR technologies will make the agrarian crisis worse as the case of Bt Cotton farmers in India shows (Vandana Shiva, *Origin, The Corporate War on Nature and Culture*)

Patents related to gene editing reveal two facts. First, like the first generation of GMOs, royalty collections from patents is still the objective of the Biotechnology industry which is the Poison Cartel.

Gates is promoting CRISPR and a company called EDITAS for patents (Vandana Shiva, *Origin, The Corporate War on Nature and Culture*)

Calyxt founded a mere 8 years ago in 2010 which is a leader in bringing new GMO foods to the market has 421 patents, showing clearly that “nature” is green washing of greed and patent monopolies. New GMOs like old GMOs are about patents and royalties.



Retrieved from: https://www.calyxt.com/wp-content/uploads/2017/09/Calyxt-Investor-Presentation_September-2017.pdf

Bayer CropScience, LP Agrees to Settle Lawsuit Filed by Calyxt in...

<https://ih.advn.com/p.php?pid=nmona&article=77437133>

After settling lawsuit with Bayer, Calyxt launches €41M follow-on offering

<https://labiotech.eu/medical/bayer-settlement-calyxt-share-offering/>

Gene drives: A technology for deliberate extermination of species

The problem of biodiversity erosion and species extinction related to the first 2 revolutions of industrial agriculture has been:

1. Displacement of seed and crop diversity by industrial breeding and spread of industrial monocultures in diverse agroecosystems as well as the rainforests of the Amazon and Indonesia to produce GMO soya and Palm oil.
2. Extinction of species-of birds, of insects, including bees and pollinators, of biodiversity in the soil because of the impact of chemicals -fertilizers, pesticides and herbicides.

Extinction so far has been a side effect of the "Monoculture of the Mind".

(Vandana Shiva, *Monocultures of the Mind*, Zed Books Ltd, 1993.London, New Jersey)

The Militarised Mind is now undertaking a massive experiment, led by DARPA and the Gates Foundation, to deliberately drive species to extinction using "gene drives".

(Vandana Shiva and Kartikey Shiva, *Oneness vs the 1%*, Women Unlimited, New Delhi, 2018, pg 107)

Just as there is an attempt to pass off CRISPR Foods as "Natural", there is an attempt to use "gene drive" technologies in agriculture as "organic".

Organic standards do not allow GMOs. New GMOs are more an attempt to undermine the organic regulations and the Biosafety regulations than about "feeding the world".

There are two proposed uses of gene drive insects in soft fruit and citrus production for the US (both are under development). A recent paper undertakes economic behaviour studies to understand if organic and non-GMO consumers would care about GM insects being on the field as part of a production system.

More than 200 global food movement leaders and organizations, Navdanya supported the ETC call to stop the use of “gene drives” – a controversial new genetic forcing technology.

Forcing the Farm

How Gene Drive Organisms Could Entrench Industrial Agriculture and Threaten Food Sovereignty

Submitted on 16 October 2018

Gene drives are a genetic engineering tool that aim to force artificial genetic changes through entire populations of animals, insects and plants. Unlike previous genetically modified organisms (GMOs) these gene drive organisms (GDOs) are deliberately designed to spread genetic pollution as an agricultural strategy – for example, spreading ‘auto-extinction’ genes to wipe out agricultural pests.

Reports of secret meetings with a US defence committee show that agribusiness firms such as Monsanto-Bayer and Cibus Bioscience appear to be engaging with gene drive development.

Gene Drives and Agriculture: Six examples drawn from Forcing the Farm

- Gene drives are being engineered into flies, insects, worms and other pests to spread sterility as a biological alternative to pesticides.
- Researchers are proposing using gene drives as a breeding tool to increase meat production in livestock.
- “Auto-extinction” gene drives are being engineered into rats and mice as well as beetles that affect storage of grains.
- Patents have been sought to engineer gene drives into honey bees to control pollination patterns using light beams.
- Research is ongoing to engineer gene drives into common weed species to make them more susceptible to herbicides such as Roundup.
- Analysis of two key patents on gene drives show that they each reference around 500-600 agricultural uses including brand names of 186 herbicides, 46 pesticides, 310 agricultural pest insects, nematodes, mites, moths and others
<http://www.etcgroup.org/content/forcing-farm>

Their conclusion roughly speaking that is that such consumers wouldn’t care too much and would still buy ‘organic’ even if they knew there were Gene Drive insects involved.

<https://www.mdpi.com/2071-1050/9/1/59/htm>

At the IFOAM Assembly in New Delhi in Nov 2018, the Organic community unanimously passed a resolution stating that new GMO techniques were not Organic.

<https://www.nature.com/articles/d41586-018-07436-4>

Genomic patents: New tricks to own life

In real farming and food systems, food begins as seed. In the “digital” world of Big Data, seed is merely a genomic map which can be used to manipulate and own seed through patents. The latest estimates put the value of agricultural genomics at US-\$28 billion in 2017, and it is expected to reach US-\$54 billion by 2022.

Machines reading digital genomic maps of living organisms is not the same as nature’s complex self organised evolution or breeding by farmers and

scientists. There is no knowledge of the organism as a whole. But patents are being taken on digital mapping of the genome, and patents are being claimed and granted on real seeds with real traits.

Genomic patents are a new tool for biopiracy of the intelligence in the seed and in the farmer to patent climate resilient traits, it is not breeding (Navdanya, *The Biopiracy of Climate Resilient crops*; Vandana Shiva, *Origin, The Corporate War on Nature and Culture*).

There are now exaggerated claims that biotechnology combined with “artificial” intelligence, will create new seeds, and help pest control.

Evogene Ltd. (Israel) has patented a computer programme for reading the genome. Evogene’s proprietary in silico “gene discovery technology” is called the “ATHLETE.” (In silico, as opposed to in vivo or in vitro, refers to investigations performed through the use of a computer or computer simulation).

ATHLETE is the company’s proprietary computer database and analysis program for finding gene function by comparing sequences from as many different

plant species, tissues, organs, and growth conditions as possible. Evogene says its database consists of 8 million expressed sequences, 400, 000 “proprietary gene clusters,” and 30 plant species. The program clusters sequences according to a variety of criteria, and then determines which gene candidates to investigate further. It is an informed winnowing process.

Evogene’s website describes the platform it uses to identify key genes: “Athlete uses vast amounts of available genomic data (mostly public) to rapidly reach a reliable limited list of candidate key genes with high relevance to a target trait of choice. Allegorically, **the Athlete platform could be viewed as a ‘machine’ that is able to choose 50-100 lottery tickets from amongst hundreds of thousands of tickets, with the high likelihood that the winning ticket will be included among them.**”

However, all that Evogene does with its algorithms is make a guess about which existing seeds farmers have bred have climate resilience traits, and all that Monsanto’s partnership with Atomwise does is make a guess which molecules will give Monsanto the next possible pesticide. This is not the intelligence for sustainable management of pests. Just the narrow bet on the next poison.

<https://www.engadget.com/2017/06/18/monsanto-ai-crop-protection/>

The “innovation” to evolve climate resilient traits has occurred cumulatively and collectively over thousands of years. These traits and crops are a commons. However, the traits evolved by nature and farmers over centuries are now being presented as the “invention” of “scientists”, who rename the flood tolerant property in the farmer’s variety such as “Dhullaputia” from Orissa as the Sub1A or the submergence tolerant gene. “Using marker-assisted selection (not transgenics) the researchers were able to isolate the submergence tolerant gene, Sub1A, and then transfer it to a rice variety that is grown on more than 5 million hectares in India and Bangladesh, known as Swarna. Most rice can tolerate flooding for only a few days, but researchers say the new variety, Swarna-Sub1, can withstand submergence for two weeks without affecting yields”.

This is scientifically flawed description, based on genetic reductionism, because flood tolerance, like other climate resilient traits such as salt tolerance and drought tolerance, are multigenetic

traits, they cannot be identified as a “Sub1A gene”. Because it is not “a gene” it has been referred to as “Submergence tolerance 1 (Sub1) Quantitative trait locus (QTL)”

What marker assisted selection does is identify the genetic sequence that is always linked to varieties which share a trait.

<http://www.navdanya.org/site/latest-news-at-navdanya/617-seeds-of-hope-report>

Source: *Seeds of Hope, Seeds of Resilience*, Navdanya, 2017

Digital dictatorship: Farming without farmers? Data without Knowledge?

Having contributed to climate change and soil degradation, the Poison Cartel is now trying to convert the problems it has created into the next market.

Climate corporation is also involved in agriculture insurance.

Monsanto also acquired access to organisations specialising in plant microbes and screening processes and launched a joint venture with the world’s largest enzyme producer, Novozymes, as the ETC group reports in *Blocking the Chain* <http://www.etcgroup.org/content/blocking-chain>

Monsanto’s new owner, Bayer, spent US-\$425 million in 2013 acquiring a microbial pesticide company, and, two years later, bought an Argentinean company focusing on biological seed treatments. A year later, Bayer made a deal with a US company to ‘optimize’ soil microbes, and, in the same year, bought a firm using satellites to assess soil electrical conductivity and field level weather information. In 2017, Bayer invested in nitrogen fixing microbials. As is typical of a platform technology, Bayer even reached across industrial sectors to partner with Planetary Resources, a company best known for its research into asteroid mining, to use the startup’s satellites and hyperspectral sensing tech to report on soil temperature and moisture.

Microbial collaboration was also pursued by Corteva Agriscience, which first acquired two microbial producers, one British and one US, in 2015 and 2017, then started collaborations with two other companies to develop soybean and maize seed treatments, and also laid down US-\$300 million to buy a farm analytics company.

The next step of industrial agriculture is to attempt

to use software of the Big Data platform to try and identify and distinguish between crop plants and weeds. This is being done by BASF on the basis of a self teaching supercomputer and Facebook's imaging technology in a system called Maglis Mean while, ChemChina-Syngenta has acquired a high resolution satellite and drone startup that analyzes crops based on patterns of light absorption (ETC, pg 22). However as an example from Australia shows, satellites and data can get it wrong.

The Poison Cartel and Bill Gates are increasingly talking of "Digital Agriculture" and farming without farmers, with surveillance robots and drones and spyware and driverless tractors. The digitalised phase of hyper mechanisation and industrialisation of agriculture is based on machines with "artificial intelligence", sensors, satellites and "smart phones". (ETC, pg 13)

There is no reference to knowledge, but incessant reference to "Big Data".

The Gates Foundation is playing an active role in promoting digital finance which creates business opportunities for Microsoft. Instead of promoting fair trade, just prices and climate resilience based on biodiversity, ecological, regenerative farming, seed sovereignty, food sovereignty, knowledge sovereignty and economic sovereignty, Gates is promoting increasing dependence of farmers on big corporations.

Bill and Melinda Gates Foundation is working hard to ensure farmers are directly managed by insurance companies and high tech controlled by mega corporations, and that the state merely plays a facilitator role.

"Yield risk management: While effective management of price risk is essential, it is also equally important for the farmer to be able to effectively manage the risks to the yield that she is able to get from her farm. Crop insurance incentivises farm investment and increases farmers' ability to absorb shocks. However, to be effective at scale, technological tools like remote sensing and machine learning for better standardisation and quality assurance of underlying crop data are needed to streamline decision making processes between insurance providers and farmers."

<https://m-hindustantimes-com.cdn.ampproject.org/c/s/m.hindustantimes.com/analysis/risk->

[management-is-the-way-forward-for-farming/story-dyHT3L9mveGjWNMLGcTODK_amp.html](https://m-hindustantimes-com.cdn.ampproject.org/c/s/m.hindustantimes.com/analysis/risk-management-is-the-way-forward-for-farming/story-dyHT3L9mveGjWNMLGcTODK_amp.html)

The Poison Cartel and the farm machinery companies are joining hands for the digitalisation of agriculture "With its tractors logging GPS data since the turn of the century, John Deere began making deals with each of the seed and pesticide majors: starting with Syngenta in 2007 (now a subsidiary of ChemChina), and by 2015 branching out to Dow and DuPont, Bayer and Monsanto, and BASF Each venture connected John Deere's data and hardware with the seed and chemical data, as well as the software of these (then) six so-called 'Gene Giants' (ETC, pg 14)

External input industrial agriculture degrades soil and water systems.

(Vandana Shiva with Andre Leu, *Biodiversity, Agroecology and Regenerative Organic Agriculture*)

What is needed are agroecological approaches for regeneration of the soil and water. This involves a paradigm shift from industrial agriculture.

Instead, corporations are focussing on continuing on the path of the mechanistic industrial paradigm, measuring the fertiliser use, the water use, pests and weeds.

Good farming and small scale agriculture has pest and weed control built into it. Pests and weeds are symptoms of bad farming.

The industrial paradigm has no knowledge of insect ecology and plant ecology. For Monsanto pushing Roundup Ready seeds, biodiversity is "weeds", even though this rich diversity is a source of nutrition for rural families and livestock. For the Poison Cartel, all insects are pests, all biodiversity is weeds that must be exterminated with lethal chemicals like Roundup.

Care per acre and eyes per acre are more effective in managing soils, water, pests and weeds than chemicalisation and mechanisation, the very basis of industrial agriculture, including its "fourth industrial revolution" avatar. Digitalisation of chemical agriculture continues to spread the old risks of toxics in the food system while introducing new risks of the illusion of "precision" in the context of growing ignorance of the web of life.

"The industrial food chain does not know what it does not know"

(ETC, pg 29)

What is being described as “precision farming” is in fact a system of knowledge extraction from farmers to then transform the knowledge taken from them freely into Big Data which becomes the next “external input” to make farmers dependent on buying “Big Data” as the new commodity in “Digital Agriculture”, assembled from the data “mined” from them.

Just as farmers varieties were, and are being mined, for genes and genetic information, and being transformed into “Intellectual Property Rights” through Biopiracy, farmers knowledge is being mined for the creation of IPR protected Big Data.

Precision Agriculture, a company using digital technologies writes on its website that farmers contribute information in the system. This is data mining.

“Using two-way communication and information aggregation, we offer farmers useful information customized by geography, market, and farmer characteristics. As farmers realize the benefits of this service, they have incentives to contribute accurate information into the system that will improve our recommendations over time. We incorporate insights from behavioral economics and social learning theory and make use of A/B testing and machine learning techniques designed to identify what types of information and delivery mechanisms work best for farmers.”

<http://precisionag.org/what-we-do/our-model>

Monsanto too admits that “Data Science” collects data from the farmers “We’re working to create tools to help farmers collect and analyze data about their land and resources”.

<https://monsanto.com/innovations/data-science/>

Farmers have knowledge. This is the knowledge being harvested through digitalisation.

Farmers Rights to knowledge and their knowledge sovereignty are important issues that need to be addressed in the digitalisation of agriculture.

It is transforming knowledge and knowing from a participatory process of co creation with the earth, her

biodiversity, her soils to take better care of the soil and the seed, based on seed and knowledge sovereignty into “data” for increased control over farming by the Poison Cartel, a continuation of the industrial food system, and the basis of an attempt at epistemic imperialism.

There is an illusion that running faster on the chemical treadmill, now equipped with Artificial Intelligence and Robots will be more effective in pest control. Pesticides have failed to control pests. Bt crops have failed to control pests. New pesticides deployed faster through the Poison Cartel now using partnerships with “Artificial” Intelligence for algorithms for guessing which molecules can be used for new pesticides will also fail as a pest control technology. Because plants are intelligent, pests are intelligent, farmers are intelligent, pest management based on coevolution of intelligences is more reliable than illusions and false claims.

Diversity is the nature of nature and culture. Industrialism and external input systems demand uniformity and exclusion and destruction of diversity. (Vandana Shiva, *Monocultures of the Mind*)

Humanity has grown and eaten 10,000 species of crops. The industrial food system is based on just 10 globally traded commodities (Navdanya, *The Law is the Seed*; Vandana Shiva, *Who Really Feeds the World*)

Almost half of all private sector agricultural research concentrating on one single crop – maize (ETC, pg 29)

The deliberate shrinking of diversity in our food system results in ecological instability of agriculture on the one hand and destruction of nutrition and health (Vandana Shiva & Vaibhav Singh, *Health Per Acre*; Navdanya, *Annam, Food for Health*)

It also leads to depletion of the knowledge of diversity, diversity of knowledges and ways of knowing.

Living knowledge evolves from living interactions between living systems.

Digitalisation as Precision Agriculture

The Spin

“Precision agriculture (PA) is satellite farming”

Precision agriculture - Wikipedia

https://en.wikipedia.org/wiki/Precision_agriculture

“Monsanto is implementing a program this year in the Midwest to deliver IntelliScanSM field guides and IntelliSeedSM custom planting recommendations to farmers. This is the first phase of Monsanto Prescriptive Ag Solutions, a program with the vision of providing growers increased confidence in seed choice and the best placement and plant populations for their farm.”

<https://monsanto.com/news-releases/industry-leaders-collaborate-on-precision-agriculture/>

<https://monsanto.com/innovations/data-science/articles/digital-tools-sustainability/>

“Data Science: We’re working to create tools to help farmers collect and analyze data about their land and resources. This allows farmers to maximize the effectiveness of all the tools they use. We also use data analytics to drive many of our platforms, including RNAi technology, greenhouse automation, metabolomics, and automated screening.”

<https://monsanto.com/innovations/data-science/>

Digital Agriculture is precision agriculture

<http://precisionag.org>

The Reality

Data collection through machines can sometimes generate wrong data

“In 2010, Monsanto began crunching 15 years of data using algorithms to adapt its GM maize varieties to each season’s predicted diseases. Then, one year, the algorithm neglected to include the Goss’s wilt disease in its plant breeding calculations, leading to significant crop losses

John Deere’s Blue River subsidiary sent robots trundling through Australia’s cotton fields to take more than 100,000 digital photos of the crop in all its stages. But when the company went back to the cotton fields of the American South, the robots’ ‘see and spray’ technology hosed down healthy cotton plants and spared the weeds. Whether the technology misread the images because of solar and climatic conditions or of something else is not clear, but the consequences were disastrous”

http://www.etcgroup.org/sites/www.etcgroup.org/files/files/blockingthechain_english_web.pdf pg 29

Which Future of Bees: Biodiversity vs robo-bees

Honeybees, for example, pollinate 71 of the 100 most common crops that account for 90% of the world's food supply. Globally, the contribution of bees to crop production has been estimated at \$200 billion. 1 out of every 4 mouthfuls of food in the world is produced by the ecological contributions of pollinators. Insect pollinated crops in the US are valued at \$20 billion. Yet, bees and butterflies, which are essential food producers, are being killed by the arsenal of poisons that form the basis of industrial agriculture. On the Navdanya biodiversity farm in Doon Valley our research has shown that more than 30% of the food we eat is produced by pollinators. By growing biodiversity we also also produce food for the bees and pollinators. They give us food, we give them food. This is mutuality, the law of return, the real circular economy. Without pollinators, most plants would not reproduce, and without plant reproduction,

our food supply would be threatened. The cycle of seed, whether it is for trees in the forests or crops that make up the food we eat, relies on cycles of pollination.

The Law of Return, of giving back, has ensured that societies create and maintain the web of life, including bees and can be supported by biodiversity over thousands of years. The Law of Exploitation, of taking without giving back, has led to the collapse of civilizations. The law of destruction, of killing mindlessly, with the illusion that we are feeding the world, is bringing our species to the verge of extinction. Extinction is not food security. Food security depends on protecting the bees.

Our farm is swarming with pollinators which are 6 times more than in the conservation forest next door.

Pesticides are the biggest threat to pollinators, including bees.

Now the Mechanical Mind wants to bring us Robo bees and GMO bees.

Pollinators: Whats all the buzz about?



The red-tailed bumblebee (*Bombus lapidarius*) is a widespread and generalist species of bumblebee and so it is a really important pollinator of many different crops across Europe.

The majority of flowering plants are pollinated by insects and other animals. It has been estimated that the proportion of animal-pollinated wild plant species rises from an average of 78% in temperate-zone communities to 94% in tropical communities 36. Taxonomically speaking, pollinators are a diverse group, including more than 20, 000 species of bees, many other types of insects (e.g. flies, butterflies, moths, wasps and beetles) and even vertebrates such as some birds and bats. Most pollinators are wild but a few species of bees can be managed, such as honeybees (*Apis mellifera*, *Apis cerana*), some bumblebees and a few solitary bees.

Our food production depends heavily upon these pollinators – more than 75% of the leading global food crops benefit from pollination. Some of these crops – especially fruits and vegetables – are key sources of human nutrition. High yields in large-scale intensive production of crops such as apples, almonds and oilseeds depend on insect pollination 44-46 but so do the crops of smallholder farmers in the developing world, where healthy populations of wild pollinators increase yields significantly.

Economically, pollination increases the global value of crop production by US\$235-577 billion per year to growers alone and keeps prices down for consumers by ensuring stable supplies.

Changing land use due to agricultural intensification and urban expansion is one of a number of key drivers of pollinator loss, especially when natural areas, that provide foraging and nesting resources, are degraded or disappear. Improving habitat diversity within the landscape, and the inclusion of non- agricultural habitats within land management plans, have been shown to ameliorate pollinator loss, boost pollinator numbers and improve ecosystem services. Landscape-scale initiatives to improve habitat heterogeneity and connectivity have been incorporated in several national and international initiatives which focus on protecting pollinators. The abundance, diversity and health of pollinators is also threatened by a number of other drivers including a changing climate, invasive species and emerging diseases and pathogens; appropriate local, national and global actions are needed to mitigate these threats as well.

Michael Garratt, Tom Breeze, Deepa Senapathi, University of Reading
WWF Living Planet Report 2018 page 46 Chapter 2: The threats and pressures wiping out our world page 47
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GMO bees and robo-bees



Never mind the insect apocalypse, here comes the pesticide-resistant techno-fix. Report by Jonathan Matthews

“Robotic bees could pollinate plants in case of insect apocalypse”, ran a recent Guardian headline reporting how Dutch scientists “believe they will be able to create swarms of bee-like drones to pollinate plants when the real-life insects have died away”.

And that’s not the only techno-fix on offer for the mass extinction of pollinators. Also in the works are GMO bees, including ones resistant to pesticides, which are a key contributor to the crisis engulfing insects around the globe.

Are robotic bees the future?

Over 75% of the leading types of global food crops are reliant on pollinators and the FAO says their help is worth hundreds of billions of dollars a year. So it’s hardly surprising that Walmart is among those filing patents on robotic bees.

But Jeff Ollerton, a leading expert on pollination ecology, calls claims that robots are the fix for pollinator wipe-out “complete bullshit”. According to Ollerton, “No one who knows anything about pollinators thinks that this is feasible... Each year it takes at least 22 trillion pollinator visits to the flowers of coffee plants to sustain global coffee production. That’s one crop.”

Bee expert Dave Goulson is equally unimpressed. In his article, “Are robotic bees the future?”, he also points to the numbers. To take care of insect pollination, robotic bees would need to replace “countless trillions” of insects – “All to replace creatures that currently deliver pollination for free.”

It’s not just the mind-boggling scale and expense of replacing pollinators that concerns experts like Goulson and Ollerton. They also point to the environmental costs: the resources and pollution involved in producing a vast army of pollinating drones, the energy costs for running them, and the disposal/pollution costs when they stop working. In contrast, real bees, says Goulson, in addition to being biodegradable, “avoid all of these issues; they are self-replicating, self-powering, and essentially carbon neutral”.

Goulson also points out, “Bees have been around and pollinating flowers for more than 120 million years; they have evolved to become very good at it. It is remarkable hubris to think that we can improve on that.”

Send in the GMO bees

But “another controversial response to the slump in bee populations” aims to do exactly that, according to a recent article by Bernhard Warner in The Guardian. Instead of replacing pollinators, this techno-fix involves genetically engineering “more resilient” strains of the honeybee that could better survive the hazards of pesticides, as well as the bee viruses and parasites that humans have spread around the globe.

Throwing nature under the bus

There is a still more fundamental problem with projects that envisage changing or replacing bees to accommodate intensive farming practices. Jay Evans, who heads the bee research lab at the US Department of Agriculture, told Warner that designing a pesticide-proof honeybee, or a “bulletproof bee”, as Evans calls them, would “throw a lot of nature under the bus”.

Dave Goulson sees exactly the same problem with robotic bees. “If farmers no longer need to worry about harming bees they could perhaps spray more pesticides, but there are many other beneficial creatures that live in farmland that would be harmed; ladybirds, hoverflies and wasps that attack crop pests, worms, dung beetles and millipedes that help recycle nutrients and keep the soil healthy, and many more. Are we going to make robotic worms and ladybirds too? What kind of world would we end up with?”

In other words, technologists intent on propping up a form of agriculture where farmers don’t need to worry about harming bees are actually fuelling the devastating trajectory that is already causing massive insect declines. And, as a recent Guardian editorial noted, the global collapse of insect numbers is in turn a threat to almost every other species on the planet.

Even the GMO bee pioneer Martin Beye agrees that building a GMO bee is “a stupid idea”. Rather than pesticide-proof bees, he told Warner, we need to move to farming practices that don’t harm bees. “They should be working on that. Not on manipulating the bee.”

Dave Goulson puts it like this, “Do we have to always look for a technical solution to the problems that we create, when a simple, natural solution is staring us in the face? We have wonderfully efficient pollinators already, let’s look after them, not plan for their demise.”

<https://gmwatch.org/en/news/latest-news/18543>

Technological hubris?

“Ours is an age of technological hubris. There is a pervasive belief that somehow technology will find the solutions we need to resolve the multiple crises we confront without having to change our patterns of living...”

May be. But will our planet and life on earth survive long enough to see the wonders of this technological advancement?”

(Shyam Saran, Former Foreign Secretary of India, and Special Envoy on Climate Change, Keynote speech on Building An Ecological Civilization at International Biodiversity Congress, 4th October, FRI, Dehradun)

Technology is a tool, a means, that needs to be assessed in the context of higher ends, including the well being of the planet and people, democracy and participation.

In agriculture, new technologies were transformed from means that need to be assessed on the basis of their social and ecological impact into a fundamentalist religion which must be imposed on society. Tools were elevated to ends towards which society must be pushed and coerced through violence

Tools are tools. They can supplement our living intelligence which is based on interconnectedness, for narrow tasks we would choose to outsource. They cannot substitute life. Tools and technologies cannot be used to destroy people’s democratic choices based on the long term and the larger common good. As tools, they should be subject to democratic human assessment and evaluation. Do we need them? What are they used for? By whom? Who controls them? Are they used to control us ? Or do we control the tools and those who are developing them? How does the exaggeration of the tools as substitutes for complex, diverse, self organised, autopoietic systems create a new level of illusion that propels faster collapse?

These questions are important questions in every democratic society to ensure that technologies widen our interconnected freedoms and intelligences, and do not shrink and reduce them.

Lack of assessment and regulation costs lives and has destroyed entire regions and cultures, it has driven species to extinction and farmers from the land, creating the explosive migration and refugee crisis.

The industrial globalised agriculture model does not evolve from the diversities of our food and agriculture systems. It is not chosen by local communities. It is imposed on countries and communities. And the forcing into imposed centralised, uniform technological and

financial systems is misleadingly labelled “inclusion”. Real inclusion is based on spaces for diversities in nature and culture to flourish. For diversities of knowledges, technologies, and economies to coexist and coevolve in freedom. Forced “inclusion” into one monoculture of knowledge, technology, and economic organisation is the dictatorship of a particular paradigm and food system.

The First Green Revolution was imposed on India through conditionality. Punjab, the land where the Green Revolution was first introduced, was forced to adopt chemicals and dwarf varieties adapted to chemicals. Punjab has been ruined (Vandana Shiva, *Violence of the Green Revolution*)

In the Second Green Revolution based on GMOs, Monsanto introduced Bt Cotton illegally in India, which was later approved. Bt cotton has failed. Farmers lives have been ruined. Most of the 300, 000 farmers suicides in India since 1995 are in the cotton belt. Monsanto controls 99% of the Bt cotton seed according to the Competition Commission of India.

(Vandana Shiva, *Origin, The Corporate War on Nature and Culture*; Vandana Shiva, *Biopiracy, The Plunder of Nature and Knowledge*; Vandana Shiva and Kartikey Shiva, *Oneness vs the 1%*; Navdanya, *Seeds of Suicide*)

<https://seedfreedom.info/dr-vandana-shiva-submits-objection-to-bayer-monsanto-merger/>

The imposition of so called free trade agreements like WTO have spread industrial agriculture and corporate control over food and agriculture. Tax money diverted to subsidies favours industrial agriculture and punishes agroecological systems and local food economies. Knowledge and research systems are unduly influenced by the Poison Cartel and promote industrial agriculture at the cost of agroecology and indigenous knowledge systems.

Digital technologies like other technologies, are tools for faster communication and analytics. They are a means.

But digital technology is being made a human end, and a measure of our humanity. And it is being imposed.

Just as in the days of the first colonialism, imposing the colonisers religion on the “barbarians” was central to the “civilising mission”, imposing the colonisers religion of digital technology on our diverse food systems, and the diverse knowledges and technologies on which they are based, is central to the “civilising mission” in today’s digital colonisation.

When technology is no longer seen as a tool to be assessed, chosen, adopted or rejected, but

as a religion, as a civilizing mission, to be forced undemocratically on people, and when means for money making are elevated to human ends, beyond ethical, social, ecological and democratic assessment, we have Recolonisation in modern garb. But then as now, exterminating the diversity of life, of cultures, of knowledges, of economies, sovereignties, democracies through violence, for economic and political power is the objective. Piracy is still the method.

What the construction of **Terra Nullius** -Empty lands, was to the first colonisation, **Bio Nullius**, or Empty Life and **Mentis Nullius**- Empty Minds -is to the current

colonisation. What property rights to stolen land were in the first colonisation, IPRs to stolen knowledge and stolen seeds, to information and communication, are to the current recolonisation and knowledge imperialism. Property rights to every idea, to every living being, every aspect of nature's processes and social communication function as an extractive industry of theft of resources and people's commons. "Technology" and "innovation" have become the new words for the "civilizing mission". The difference is that in today's colonisation there is a risk of social and ecological collapse on a planetary scale.

The Violence of the Mechanical Mind

By Vandana Shiva and Kartikey Shiva

The mechanical mind measures, predicts, and approaches knowing, but cannot actually know because knowledge, by its very nature, is pluralistic.

Privileging one system over all others, and elevating reductionism as the only legitimate body of knowledge, leads to violence against science itself. This epistemic violence is now being combined with the violence of corporate interests to viciously attack all scientific traditions, including those that have evolved from within western science and have through epistemic evolution, transcended the limiting mechanistic worldview. Science as knowledge is being attacked so that Corporate Science, based on 'alternative facts' and 'post truth', and spun by the PR machine of Big Money and corrupted governments, can be used as a colonizing tool.

The creation of the mechanical mind is based on the construction of multiple separations. It separates soil from plants, by defining soil as an empty container for receiving chemical fertilizers, and plants as machines that run on fertilizer fuel. It separates food from health. It separates land from air, and land use from atmospheric pollution and climate change. It separates knowledge and intelligence from the processes of life and living, and reduces knowledge to information and data. It separates genes from the self-organized living organisms, and falsely assigns creative power to those who manipulate genes. It reduces life to 'intellectual property', to be owned and monopolized, even if species are pushed to extinction and farmers are driven to suicide....

The mechanical mind is also a militarized mind. It is based on violence and leads to violence. It is ontologically violent because it declares nature as dead it is epistemically violent because it destroys our capacity to think and act as part of nature, to be co-creators and nonviolent; it is ecologically violent, because through its ignorance it disrupts processes that maintain the life of organisms, ecosystems, and the earth herself; it is socially violent because it is blind to, and outlaws, the embodied knowledge of women, peasants and indigenous cultures that the world so desperately needs today to heal the planet

SOURCE: Vandana Shiva and Kartikey Shiva, *Oneness vs. The 1%: Shattering Illusions, Seeding Freedom: Women Unlimited*, New Delhi, 2018.

PART 3

Financialisation of our Food Economies: How the Money Machine is Stealing our Daily Bread and Putting Food on the Financial Casino

The money machine now drives the food system. They control major shares in the Poison Cartel. They control shares in the grain giants controlling trade, and in the retail giants Walmart and Amazon who increasingly control distribution of food. They own shares in Big IT. Big Finance and Big IT are become Fintech, Digital Finance.

The Money Machine is driving the mega mergers, it is driving the “growth” of the big corporations.

This concentration, combined with the separation of “data” from real knowledge, and financial values from real values is a recipe for instability and collapse as recent trends indicate.

The financial bubbles can burst faster than they grew.

The bigger and more centralised the food system becomes, and the more separated the value of the digital and financial technologies controlling our food



“Ron Lieber, a money-focused columnist with the New York Times whom I’ve mentioned here often, assembled a financial plan for investors who are completely fed up with the stock market. It’s a plan that, as much as possible, avoids not only investing in the stock market but working with companies that trade on the stock market. I wrote about mutual insurance companies and how they might offer a benefit to policyholders over public companies, and that same structure exists for investment companies. Even from My Journey to Millions pointed out that Vanguard is the investment equivalent of a mutual insurance company. Vanguard is not traded on the stock market, it is owned by its mutual funds, and therefore by all the investors in its mutual funds. The company’s profits are used to return dividends to its investors and to lower management fees.

When owners and investors are the same, companies can’t take advantage of one group to benefit another. That’s the benefit in theory, but whether it is true in actuality is something that would need to be studied. Regardless, it may give investors a better feeling about the company with which they are investing. For that reason, Lieber recommends investing with Vanguard, USAA, or TIAA-CREF. Vanguard and USAA also offer ordinary retail banking as well, so you can replace your for-profit, fee-raising Wells Fargo or Bank of America with these customer-owned companies for a Wall Street-free banking experience.”

| Asset Management Company | Assets Under Management |
|--------------------------|-------------------------|
| BlackRock | \$6.3 trillion |
| Vanguard Group | \$5.0 trillion |
| State Street | \$2.45 trillion |
| Capital Group | \$1.7 trillion |
| Invesco | \$907 billion |
| VanEck | \$38 billion |

Source: Jennifer Clapp, Company websites

http://www.etcgroup.org/sites/www.etcgroup.org/files/files/etc_group_blackrock_and_a_hard_place_october_2018.pdf

system become compared to the real value of our daily bread, the higher the vulnerability and risk of collapse.

The tail starts to wag the dog.

When food is put on the financial casino, collapse of the financial value of the financial giants and corporations translates into hunger for real people.

The Poison Cartel itself is controlled by the Money Machine which has become bigger than the economy of entire countries, with investment funds such as Black Rock and Vanguard increasingly deciding how we grow our food, what we eat, and whether we eat or not.

At the centre of the industrial finance driven agriculture system is profits for investors, not healthy food for people. “Its objective is to yield highest possible returns for invested capital”

http://institut-fuer-welternahrung.org/wp-content/uploads/2018/10/Agriculture-at-a-tipping-point_EN.pdf

Playing with money, the rich are trying to take control of our daily bread. They can destroy the lives of millions farmers and deepen the hunger crisis.

The 2008 Wall Street crisis led to both the food crises the as well as the emergence of the financial giants.

Hunger for Profits: Food on the Global Casino

Food is our nourishment. It is the source of life. Growing food, processing and transforming it, distributing it, involve 70% of humanity. Eating food involves all of us. Yet it is not culture or human rights that are shaping today’s dominant food economy. It is speculation and profits designing food production and distribution. Putting food on the subprime crisis and the Wall Street crash, investors rushed to commodity markets, especially oil and agricultural commodities. While real production did not increase between 2005-2007, commodity speculation in food increased 160%. Speculation pushed up prices, and high prices pushed an additional 100 million to hunger.

A 2008 advertisement of Deutsche Bank stated –

“Do you enjoy rising prices? Everybody talks about commodities – with the Agriculture Euro Fund you can benefit from the increase in the value of the seven most important agricultural commodities” (Quoted in Peter Wahl, WEED, Speculation Undermines the Right to Food, Eurodad, Britton Woods Project and WEED, 2008)

When speculation drives up prices, the rich investors get richer, and the poor starve. The financial deregulation that destabilized the worlds financial system is now destabilizing the world food system. The price rise is not just a result of supply and demand. It is predominantly a result of speculation. Between 2003 to 2008, commodity index speculation increased by 1900 percent from \$ 13 billion to \$ 260 billion. 30% of these index funds are invested in food commodities. As the Agribusiness Accountability Initiative states – “we live in a brave new world of 24 hour electronic trading, triggered by algorithms of composite price indices, fits of investor “lack of confidence” and of unregulated “dark pools” of more than US\$ 7 trillion in over the counter commodities derivatives trades” (Agribusiness Accountability Initiative, Time to Act on Food Price Speculation, April 20, 2008, <http://www.agribusinessaccountability.org>).

The world trade commodity trading has no relationship to food, to its diversity, to its growers or eaters, to the seasons, to sowing or harvesting. Food diversity is reduced to eight commodities and bundled into “composite price index”. Seasons are replaced by 24 hour trading. Food production driven by sunshine and photosynthesis is displaced by “dark pools of investment”. The tragedy is that this unreal world is creating hunger for real people in the real world.

In a cover story for Harpers's Fredrick Kaufman wrote about the Food Bubble "How Wall Street starved millions and got away with it." The history of food took an ominous turn in 1991, at a time when no one was paying much attention. That was the year Goldman Sachs decided our daily bread might make an excellent investment".

And the entry of investors like Goldman Sachs, AIG Commodity Index, Bear Sterns, Oppenheiner Puneo, Barclays allowed agribusiness to increase its profits. In the first quarter of 2008, Cargill attributed its 86% jump in profits to commodity trading. Conagra sold its trading arm to a hedge fund for \$2.8 billion.

Gambling on the price of wheat for profits took food away from 250 million people. Speculation had separated the price of food from the value of food. As Austin Damani told Fred Kaufman "we're trading wheat, but its wheat we're never going to see its a cerebral experience". Food is an ecological experience, a sensory experience, a biological experience. With speculation it has been removed from its own reality. Grain markets have been transformed, with futures trading by the grain giants in Chicago, Kansas city and Minneapolis combined with speculation by investors. And as Kaufman says, "imaginary wheat bought anywhere affects real wheat bought everywhere". And if we do not decommodify food more and more people will be denied food, as more and more money is poured into global casino for profits (Harpers's Magazine, Fred Kaufman, the Food Bubble, July, 2010)

The artificial processes of speculation are driving up prices of food, and taking it beyond the reach of millions. The rules of WTO, the structural adjustment programmes of the World Bank and IMF, and bilateral free trade agreements have forced the integration of local and national food economies into the global market. And now the global financial system is speculating on food commodities, influencing prices and the right to food of the poorest person in the remotest corner of the world.

The spike in the world food prices started to reappear in 2011. According to the FAO, in January 2011, the food price index was up 3.4% from December 2010. Cereal price index was 3% above December, and at the highest level since July 2008, though still 11% below its peak in April 2008. The oils and fats index rose by 5.6%, nearing the June 2008 record level. The dairy price index shot up 6.2% and the sugar price index by 5.4%. Wheat prices were up by 25% compared to six months ago. Prices of soybean and palmoil doubled over the second half of 2010.

In India, the prices of onion jumped from Rs. 11/kg in June 2010 to Rs. 75/kg in January 2011. While production of onion had gone up from 4.8 million tones in 2001-2001, to 12 million tones in 2009-10, prices also went up, showing that in a speculation driven market there is no correlation between production and prices. The price difference between wholesale and retail was 135%.

Tomato prices shot up by more than 100% between October 2010 and December 2010, going from Rs. 15/kg to Rs. 40-50/kg. Prices of cabbage went up by 159%, garlic 140%, potato 86%, brinjal 72%, green peas 66% between March 2010 and December 2010.

While traders gained, farmers were losing. Farmers got only Rs. 8/kg for tomatoes selling at Rs. 50/-.

Price of staples has also been systematically going up. Between December 2006 and December 2010, rice went from Rs. 14.50/kg to Rs. 24/kg, sugar from Rs. 21/kg to Rs. 34/kg, Arhar Dal from Rs. 32/kg to Rs. 65/kg, Moong from Rs. 46.50/kg to Rs. 64/kg. (Data from Navdanya / RFSTE field study "Skyrocketing Prices", January 2011)

Food has been put on a global casino. This is serving speculative investors and agribusiness well. But it is not serving people. We need to get food off the global casino and back on people's plates.

Food democracy and food sovereignty can only be achieved by putting an end to financial speculation.

Josette Sherian, the Executive Director of the World Food Programme, related the Egyptian Revolution of 2010 to the rise of food rise of food prices.

"In many protests, demonstrators have brandished loaves of bread or displayed banners expressive anger about the rising cost of food staples such as lentils". She added "when it comes to food, the margins between stability and chaos are perilously thin. Volatility on the markets can translate quickly to volatility on the streets and we all should remain vigilant." (Nicole Winfield, The Canadian Press, "France Makes Food Prices Priority for G - 20, Seeks Transparency to Case Price Swings, Crisis, February 14, 2011)

(From Vandana Shiva, *Making Peace with the Earth*)

The sudden growth and equally fast collapse of the financial bubble puts the food security of the vulnerable at an even deeper risk than the 2008 finance driven food crises which led to the Arab Spring, because now it is not just food commodities that have been put on the global financial casino, but the entire food system-from the seeds farmers use, to information they are given through Big Data, how food is produced,

how it is processed, and how it is distributed.

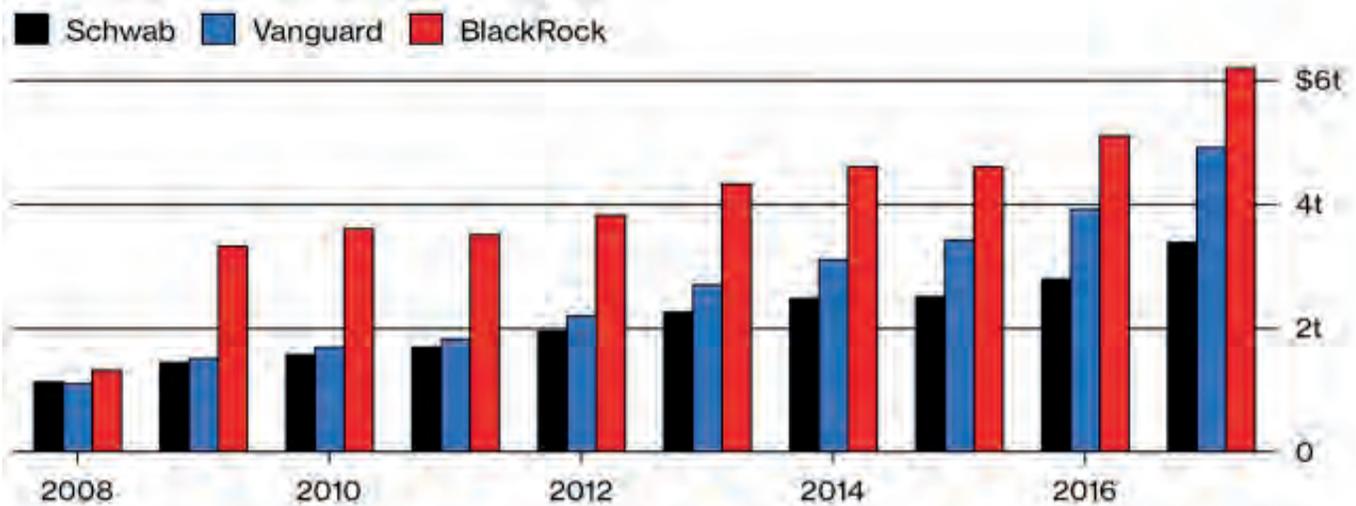
BlackRock and Vanguard became the giants they are after the 2008 Wall Street Collapse.

They are now collapsing as fast as they grew.

In October 2018, BlackRock, the world's biggest investment fund which had shot up to \$ 6.3 trillion, lost 30% of its value (Robin Wigglesworth, "A Vast Money Machine Sputters" Financial Times 21st October, 2018)

BlackRock Outpaces Its Peers

Assets under management



Data: Company reports; compiled by Bloomberg

Retrieved from <https://www.bloomberg.com/news/articles/2018-08-30/blackrock-s-decade-how-the-crash-forged-a-6-3-trillion-giant>

BlackRock Inc

BLK.N NEW YORK STOCK EX...

387.49

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Retrieved from <https://www.reuters.com/article/us-blackrock-results/blackrock-reports-weaker-demand-for-index-funds-shares-dip-idUSKBN1K617B>

PART 4

Globalisation and Commodification of Food: How Big Trade and Big Retail are Hijacking our Food, and Stealing Farmers Incomes, Creating Vulnerabilities

Food is the very basis of life.

The web of life is a food web. Food and nutrition is the currency of life connecting us to soil organisms, plant biodiversity, pollinators, and the trillions of microbes in our gut.

Since food connects all life, it is a commons. The commodification of food is an enclosure of the food commons.

The commodification of food and corporatisation of food go hand in hand.

The commodification of food is taking place through control over how food is distributed -through trade, through retail, and now through e commerce. 80% of international trade is controlled by Big Ag, and 80% retail is controlled by Big Retail.

How Cargill and the ABCD corporations hijacked food through “Free trade rules” they wrote

Large corporations define freedom as “free trade”, which is corporate globalisation. The freedom of corporations and their masked owners is misused to destroy the Earth’s ecological fabric — the fabric of people’s economies and societies. “Free trade” rules are written by corporations to enlarge their freedom to commodify and privatise the last inch of land, the last drop of water, the last seed, the last serving of food, the last byte of information, the last bit of data, knowledge and imagination. In the process, they must destroy the freedom of the earth and the earth family, the freedom of people, their cultures and democracies, by enclosing the commons, commodifying and privatising every aspect of life.

Free trade is doublespeak. It is about an end to truly free trade between independent producers exchanging and selling goods at fair and just prices.

“Free Trade” is Freedom for Corporations, not Nature and People

Food is now a commodity, traded by Merchants of Grain like Cargill

As a trade-able commodity 90% of the corn and soya grown in the world goes to biofuel and animal feed. 50% of food is wasted.

Globalisation is not feeding the world. It is feeding profits of the giant corporations.

Commodification contributes to vulnerability by undermining food sovereignty and food security.

(Vandana Shiva, *Who Really Feeds the World*)

4 giant grain traders, the ABCD companies -ADM, Bunge, Cargill, Dreyfus -control the international trade in food. Cargill wrote the Agreement on Agriculture of the the General Agreement on Tariffs and Trade that led to the creation of WTO in 1995 when governments signed the Agreement in Marrakesh, Morocco in 1994.

New Free Trade Agreements such as TPP and TTIP, are structuring the absolute rights of corporations through the “*Investor State Dispute Settlement Systems*”. By changing the rules of trade in their favour, they control agriculture.

(Navdanya, *Cargill*; Navdanya, *Yoked to Death*; Vandana Shiva, Andre Leu *Biodiversity, Agroecology, Regenerative Organic Farming*; Vandana Shiva, *Stolen Harvest*)

They establish a market monopoly, selling costly inputs and buying cheap commodities, driving down farmers incomes, driving farmers off the land.

“Meet the Behemoths of Modern Grain Trading”

(Murphy, Sophia, Ms, David Burch, Dr, and Jennifer Clapp, Dr. “Cereal Secrets.” Oxfam. *Oxfam Research Reports*, Aug. 2012. Web. Jan. 2016.

<https://medium.com/www-bins-ai/meet-the-behemoths-of-modern-grain-trading-f78957f9f723>)

Big retail and e-commerce: Retail dictatorship of the big giants vs food sovereignty and retail democracy

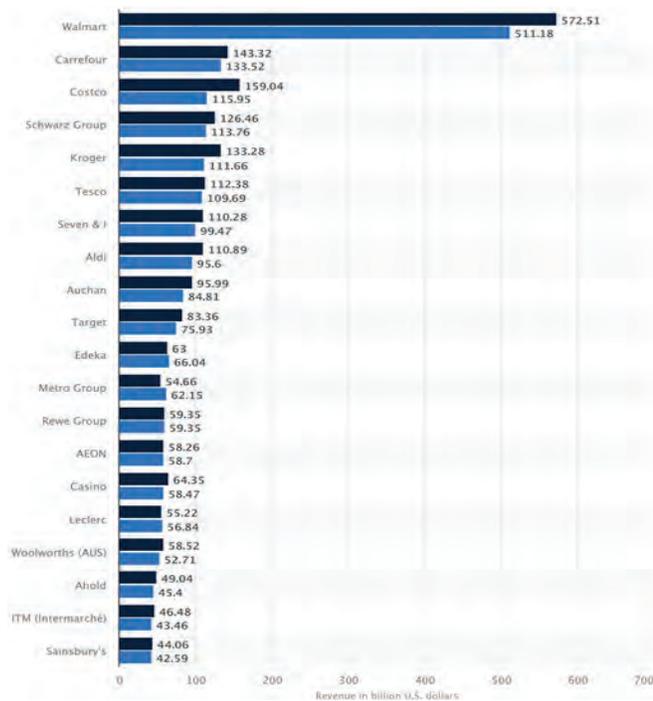
Retail until recently was local and diverse. In the last few decades of globalisation, as trade and distribution has been deregulated, big retail and big super markets have exploded, accounting for nearly 80% of the grocery sales. Walmart is by far the biggest in the supermarket chains and retail giants. Walmart and other supermarket chains started to control how our bread is distributed, and with their buying power, they decide what is grown, what price it is sold at, depriving producers of their fair share of the price, and destroying farmers livelihoods.

Walmart has emerged as one of the largest corporations in the world, and definitely the largest in retail. It started only fifteen years ago. In 1990, Walmart had only nine supercentres. By the end of 2000, it had 888 supercentres in USA, and had become the number one retailer in the country. Today it has become the biggest grocery seller in the world. In the U.S. it controls 16% of the grocery market. In some cities its share is 30%. Walmart now has 3,811 stores in the USA. It has become the largest retailer in Mexico and Canada, the second largest grocery seller in U.K – all in a few years.

Walmart is the largest retailer in the world and was formerly the largest corporation in the world based on revenue for 2004. It operates retail department stores selling a wide range of products, and now the main emphasis is focused on the “supercenters” which sell, everything from and between, grocery items to clothing to electronic goods. It also operates Sam’s Club, a “warehouse club” that sells merchandise, often in large numbers or quantities, to customers who pay an annual fee for shopping there.

A typical Walmart store sells 60,000 different items, a supercentre sells 120,000 items.

Leading food retailers worldwide in 2014 and 2019, based on sales (in billion U.S. dollars)



Source: <https://www.statista.com/statistics/240464/global-leading-food-retailers-based-on-food-retail-revenues/>

These retailers are changing markets to “hypermarkets”. Explosive growth of these giant food retailers is predicted for Asia and Latin America. Asia is predicted to account for 41% share of the global retail market in 2020. According to IGD, A U.K based market research firm, India will become the 4th largest grocery retail market by 2020. Walmart has already announced that it is looking for a swift entry into India.

Multinational food retailers like Walmart wield extraordinary economic and trade power. According

to ETC, “these companies decide where and by whom a staggering share of the world’s food is produced, processed and procured. Thus Walmart sources most of its products from factories in China, where 80% of the 6000 factories that supply Walmart are located.

Walmart is one of the best beneficiaries of corporate led globalization, and has made communities dependent on supplies from thousands of miles away for everyday items – including the food we eat and the clothes we wear. The Food and Agriculture organization has warned that the dominance of global supermarkets “has led to consolidated supply chains in which a handful of giant food processors and retailer wield increasing power to set standards, prices and delivery schedules”.

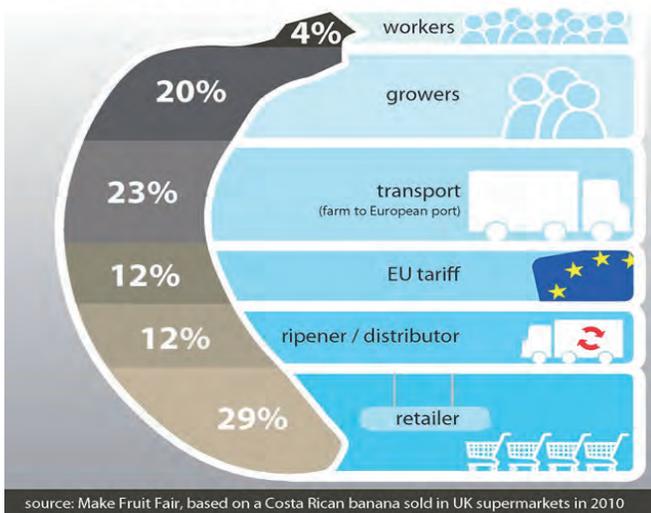
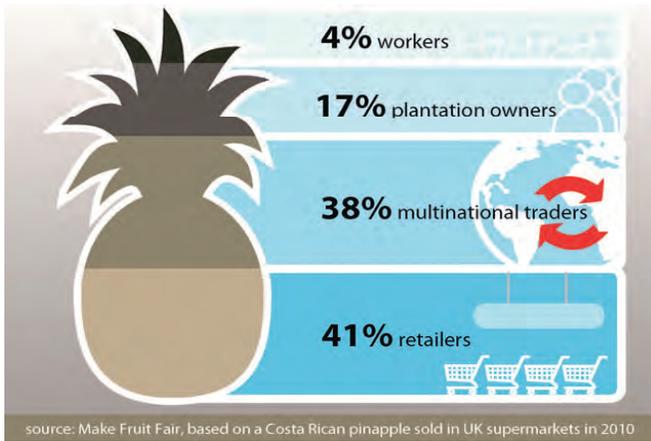
Hyper markets displace diversity, quality and taste and replace it with uniformity, quantity and appearance. As Tobias Reichart reports “to ensure timely delivery to numerous retail outlets, companies like Walmart prefer to buy large amounts of products meeting uniform standards from a limited number of supplies. The contracts are often designed in a way that allows retailers to place orders on very short notice, refuse products for quality reasons and pay only several months after delivery, thereby capturing value while passing business risks to suppliers and farms”. In Kenya as retail chains started to influence food production and food distribution, the share of small farmers in horticultural exports decreased from 70% to only 18% in the 1990’s, while large commercial farms and export companies with their own production make up more than 80%.

Over at least 30 years, supermarkets in the rich countries have acquired an increasing share of grocery markets, increasing their influence over what food is grown and how it is processed and packaged – with impacts reaching deep into the lives and livelihoods of farmers and workers worldwide.

Supermarkets and the power of Big Retail allows them “to determine what will – and will not – be stocked, and on what terms: sources, quantity, quality, delivery schedules, packaging, returns policy, and above all, price and payment conditions.”

<https://www.researchgate.net/...for.../consumer+detriment+briefing+paper+sept2012.p>

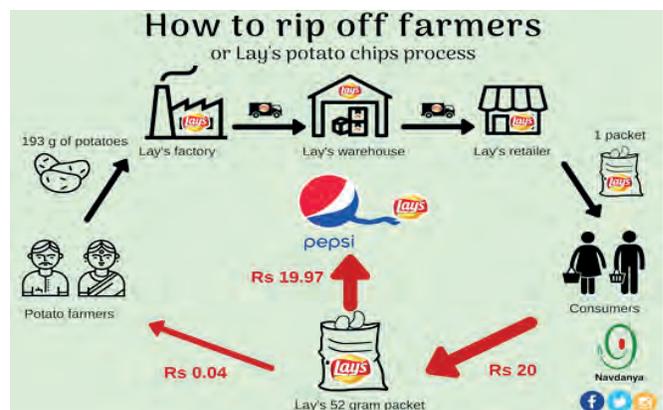
The examples of pineapple and banana illustrate how the bigger the retail, the smaller is the producers share.



4th of July Farmer's Share

| CONSUMER PRICE | FARMERS SHARE |
|---------------------------|---------------|
| \$5.49 1-lb ground beef | \$1.20 |
| \$8.99 6-pack beer | \$0.04 |
| \$2.19 2-liter soda | \$0.05 |
| \$3.99 16-oz strawberries | \$0.55 |
| \$2.00 4 ears corn | \$0.20 |
| \$3.29 8-oz potato chips | \$0.06 |

Farmer's share derived from USDA, NASS "Agricultural Prices," 2018. | Prices based on May 2018 data. Retail prices based on Washington, D.C., Safeway. |



Food, Inc. Corporate concentration from farm to consumer, Bill Vorley UK Food Group 2003.

Banana Link website: <http://www.bananalink.org.uk/the-problem-with-bananas>

Organisations such as the Ecologist and the International Labour Rights Forum amongst others have documented examples of unacceptable working conditions in food supply chains in Europe, the USA and worldwide.

http://www.theecologist.org/News/news_analysis/1033179/scandal_of_the_tomato_slaves_harvesting_crop_exported_to_uk.html;
<http://www.laborrights.org/>

In the short run the concentration of power in the hands of Big Retail creates vulnerabilities for the small producers, first leading to decline in their incomes and erosion of their livelihoods, and finally leading to their disappearance. In the long run by undermining producers it undermines food production, which translates into vulnerability for the entire society.

<https://www.researchgate.net/...for.../consumer+detriment+briefing+paper+sept2012.p...>

India's retail democracy

India is a bazaar – every street, every village, square, bursts into life as farmers setup their weekly “haats” in villages and vendors set up their wares on city streets. And the vegetable vendor comes to your doorstep early morning with vegetables picked up fresh at the Mandi.

Since 2005, Walmart has tried every trick in the trade to enter India and hijack the Indian retail sector, which is diversified and decentralized. I call it retail democracy. Our retail democracy is a source of livelihoods of 400 million people. For 1000 people there are 11 shops and

India's 12 million shops has created the highest density of retail. In addition, 40 million hawkers bring retail to people's doorstep. 80% of vegetables in India are sold by hawkers.

Walmart tried to enter directly by pressuring the government to allow FDI in retail. However, protests in parliament and among people forced the government to restrict FDI to single brands. This did not stop Walmart, which is also on the Board of the US-India Knowledge Initiative in Agriculture. Walmart is all set to destroy the uniquely Indian retail democracy – our “*bazaars*” and “*haats*”, our street markets and “*kirana*” stores.

India is a land of retail democracy – hundreds of thousands of weekly “*haats*” and *bazaars* are created across the length and breadth of the country by people's own self-organisational capacities. Our streets are *bazaars* – lively, vibrant, safe and the source of livelihoods for millions. This does not include the village *haats*.

Our retail democracy is characterized by –

1. High levels of livelihoods in retail with nearly 40 million employed which accounts for 8% of employment and 4% of the entire population.
2. High levels of self organization
3. Low capital input
4. High levels of decentralization

In a country with large numbers of people, and high levels of poverty, this model and retail democracy is the most appropriate in terms of ecological sustainability, and economic viability.

However, our diversified and decentralized retail economy is under a severe assault from giant corporations like Reliance and Walmart who are trying to establish a retail dictatorship, where they control the entire supply chain, from production to retail.

This assault has both cultural and economic components. A well-crafted cultural assault is being made to project India's retail democracy as inferior and Walmart or Reliance monopolies as culturally superior.

Language and semantics has an important role in this cultural assault.

Thus the self – organised sector of retail democracy is now defined as “unorganized”. And the corporate monopoly sector is defined as “organised”. The subtle implications to project the transition from retail democracy to retail dictatorship as a transition from an unorganized to an organised state.

Self organised, high employment generating retail is defined as under developed by using lean employment and high automation as criteria of development (FDI in India's retail; more bad and good? Mohan Guruswamy, Center for Policy Alternatives, New Delhi).

Similarly, indigenous trading arrangements are defined as “middleman”, and the destruction of the livelihoods of 40 million people is projected as destruction of middleman. The imposition of giant middleman like Reliance and Walmart goes unquestioned. They present themselves as liberators of farmers while in fact they exploit the farmers by buying cheap. And extracting the farmers fair share. In the short run, to capture markets, through predatory pricing they will, of course “buy dear and sell cheap” to destroy alternative markets for the producer and the consumer. Once the alternatives are destroyed, they will drive down the price of produce, and thus drive down farmers incomes. The logic of corporate trade monopolies is to “buy cheap, sell dear”.

The three arguments used to justify the Walmart model of retail are employment generation, efficiency and low cost. Each claim is false. Walmart will rob 400 million people involved in tiny retail of livelihoods. It will create unemployment and destitution.

In India the destruction of local economies will be more far reaching because of India's retail density and the number of livelihoods involved, and the fact that the indigenous retail is low cost.

Walmart can displace the low cost options available through corner shops, street vendors and hawkers only by a cultural and legal assault. The pull towards Walmart's mega stores will come by promoting shopping in super stores as fashionable among the middle classes. The push towards Walmart and giant retail chains will come by legally banning street vendors and local retail as is being done in city after city in India in the name of “cleaning up” the city. Many observers interpret the force behind the current “sealing” drive in Delhi through which commercial establishments and retail is being shut down under new zoning criteria as being the giant retail chains and super markets coming up on the outskirts of cities. Why would people drive 20 km, if vegetables and groceries are available at your doorsteps? And what happens to 96% of India, which does not own a car?

Low prices at Walmart will also be achieved by creating monopoly markets. The volumes Walmart buys makes suppliers dependent on selling to Walmart – and lowering prices is always possible when there is a monopoly buyer. Giant retail is driving down prices of agricultural produce, increasing the agrarian crisis. What we have seen in terms of farmers suicides in cotton growing regions of India could well spread to regions where Walmart will procure its vegetables and groceries. And with Walmart’s monopolies, monocultures pushing out India’s rich agro-diversity will grow and with it the cultural diversity of our agriculture and food systems.

The Walmart hijack of India’s retail sector can only be successful in the context of fascist policies.

We need to defend our retail democracy, which offers a different model from Walmart’s retail dictatorship. We cannot allow our livelihoods, ecological sustainability and the cultural vitality of our streets and localities to be destroyed. Retail democracy in India is a survival imperative for millions of Indians. It is also a survival imperative for the planet.

The Indian movement for retail democracy has prevented the entry of Walmart in retail though they have been allowed a few wholesale “cash and carry stores”.

Big retail meets big IT

Walmart is now digitalising its retail. In India it has acquired Flipkart, an E-commerce platform for \$16 million

<https://economictimes.indiatimes.com/small-biz/startups/newsbuzz/walmart-acquires-flipkart-for-16-bn-worlds-largest-ecommerce-deal/articleshow/64095145.cms>

Walmart completes its \$16 billion acquisition of Flipkart | TechCrunch

<https://techcrunch.com/2018/08/20/walmart-flipkart-deal-done/>

It sees Walmart take a 77 percent share in the company, buying out Flipkart

Walmart completes Flipkart buy - The Hindu
<https://www.thehindu.com Business Industry>

Walmart completes deal to buy Flipkart for \$16 billion - Livemint

<https://www.livemint.com Companies>

Walmart buys Flipkart for \$16 billion, shifts battle with Amazon to India...

<https://www.livemint.com Companies>

Why did Walmart buy India’s Flipkart? - BBC News
<https://www.bbc.com/news/world-asia-india-44064337>

Why Walmart bought India’s Flipkart, explained in five charts

<https://www.recode.net/2018/5/11/.../walmart-flipkart-india-ecommerce-charts>

Microsoft has partnerships with all mega players in retail, seeking to take control of our daily bread through digital platforms.

On July 17, 2018 Walmart announced it is establishing a five year strategic partnership with Microsoft Corp., to further accelerate Walmart’s digital transformation in retail.

The five-year agreement will leverage a broad base of cloud, AI and IoT solutions for enterprise-wide use.

<https://news.walmart.com/2018/07/17/walmart-establishes-strategic-partnership-with-microsoft-to-further-accelerate-digital-innovation-in-retail>

<https://www.theverge.com/2018/8/15/17691920/microsoft-amazon-alexa-cortana-integration-preview-features>

Both Walmart and Amazon are using digital platforms and e-commerce to undermine real retail and the community that local retail sustains.

E-commerce sales of Walmart increased by 60 percent in the most recent quarter. Walmart.com is now the second-largest online retailer, behind Amazon.com, following its \$3.3 billion acquisition of Jet.com last year.

https://www.washingtonpost.com/news/business/wp/2017/08/17/americans-are-buying-more-food-at-walmart/?utm_term=.e75705f59028

Amazon

Amazon has now joined Walmart in bring you your vegetables and daily bread.

There are new grocery wars brewing between Walmart and Amazon.

Amazon, a new entrant in the distribution of our daily bread, has now become a big player in distribution with Jeff Bezos emerging as the richest man on the Forbes list with a net worth of \$160 billion, putting Bill Gates at second place. In 1998 he was 102nd-richest American with a net worth of \$1.6 billion.

In 2017, he doubled his net worth with a 104% surge in the price of Amazon stocks, and a 41% increase in e-commerce. In the first six months of 2018, it recorded more than \$100 billion in net sales in the first six months of 2018.

<https://www.forbes.com/sites/angelaueung/2018/10/03/how-jeff-bezos-became-the-richest-person-in-the-world-2018-forbes-400/#1bd411721bee>

<https://www.usatoday.com/story/tech/nation-now/2018/07/16/amazon-jeff-bezos-richest-person/790289002/>

He is the ultimate online seller of everything and also a provider of services from cloud computing to grocery delivery. In the second quarter of 2018, its grocery sales grew to \$650 million, a 40% increase over a year.

Amazon bulks up its online grocery market share | Supermarket News

<https://www.supermarketnews.com/.../amazon-bulks-its-online-grocery-market-share>

Amazon is not just selling online. It bought whole Foods, the world's biggest Organic chain for \$13.1 billion on May 23rd, 2017

<https://www.businessinsider.in/7-potential-bidders-a-call-to-Amazon-and-an-ultimatum-How-the-Whole-Foods-deal-went-down/articleshow/62301137.cms>

<https://www.nytimes.com/2017/06/16/business/dealbook/amazon-whole-foods.html>

<https://www.nytimes.com/2017/06/16/business/dealbook/amazon-whole-foods.html>

While Jeff Bezos gets richer every day, his workers get poorer.

And his company is losing.

As Patrick Clinton reports, "Amazon doesn't report its sales or profits on specific categories of merchandise. But, overall, the picture is clear: The company you're familiar with loses money. In 2017, Amazon sold \$106 billion dollars worth of merchandise in the United States, for an operating income (that is,

basically, before-tax profits) of \$2.8 billion, or about 2.7 percent. In its international operations, the company lost \$3 billion on sales of \$54 billion and change. That's a net loss of roughly \$200 million. By comparison, back in 2016, when everyone was hysterical about Whole Foods going down the tubes, it had an operating income of 2.9 percent, down substantially from the 5.5 and 5.6 percent it posted the two preceding years, but in the typical range for the industry.

This isn't to say that Amazon makes no profits. Its Amazon Web Services division, which provides a huge range of cloud-based services for companies and even governments, has been enormously profitable. Its sales are only a small percentage of what Amazon takes in over a year: just \$17.5 billion last year. But its operating margins are terrific, almost 25 percent—which means that the tail earned the dog more than \$4.3 billion in 2017."

<https://newfoodeconomy.org/amazon-a-whole-foods-growth-profit/>

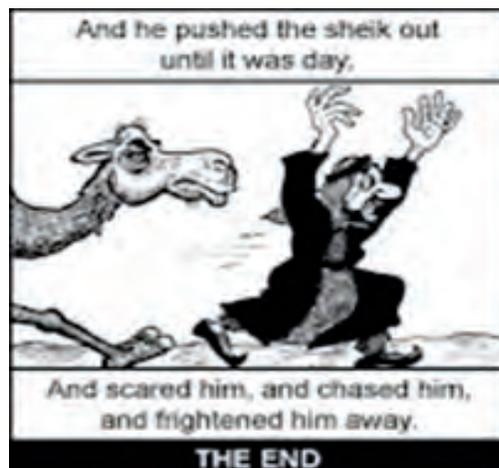
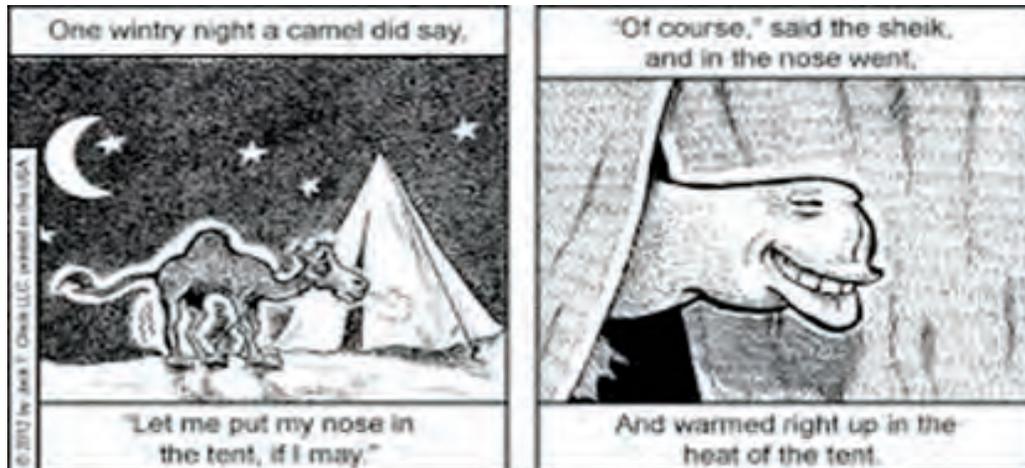
The fate of our bread is in the cloud. Not the cloud that brings us rain. Not the angry cloud of climate change that pours intense rain causing floods. It is in the digital cloud. While we think of Amazon as delivering everything under the sun at your doorstep, it is in fact an IT company.

"What is Amazon? A retailer? Web service provider? Search provider? Ad company? All of the above? Or are the distinctions truly obsolete?"

<https://newfoodeconomy.org/amazon-a-whole-foods-growth-profit/>

PART 5

The Corporate Camel's Nose in the Andhra Pradesh Tent



The hyper industrialisation and totalitarian control of agriculture that corporations are seeking through financialisation and digitalisation is being introduced rapidly in the industrialised world, specially the USA. In India, which is a small farmer centred agrarian economy, the next stage of industrialisation of the food system is being introduced through green washing and doublespeak. We are getting glimpses of Big corporations like Walmart, the Money Machine, and Bill Gates entering the Andhra Pradesh food tent behind the banner of “natural farming”.

The corporate camels have their nose in the AP tent.

As an old Arabian proverb cautions us : “If the camel once gets his nose in the tent, his body will soon follow.”

(For details of the AP agriculture Policy, see, <http://www.esgindia.org/sites/default/files/education/community-outreach/press/crzbnf-review-saldanha-esg-oct-2018.pdf>)

Gates, control of seed, and “DNA technologies”: New bondage of farmers to the poison cartel

In a speech on *Smallholder-led Agricultural Transformation summit*, delivered on 17th November 2017 at the AP AgTech Summit, Bill Gates advocated a “shift – from agriculture based merely on subsistence – to agriculture that is run like a business to be efficient, and profitable, and that (which) meets the needs of producers and consumers”.

What Gates refers to as subsistence agriculture is the agriculture of permanence based on agroecology which has evolved over and lasted 10,000 years. On the other hand, the first and second Green Revolutions which Gates promotes based on monocultures and uniformity have each collapsed in two short decades, destroying ecosystems, farmers lives, our food, our health.

In Andhra Pradesh Gates said, “many smallholder farmers in India still use seed varieties that are decades-old, so they are not realizing the benefits of newer, higher-yielding and more resilient seeds”. He highlighted how “modern plant breeding techniques, including DNA analysis, can double or even triple the annual increase in crop yields and lead to hardier varieties”.

He then asked the audience to “imagine what could happen if every farmer in AP was growing the latest varieties bred for today’s environment and production system”.

(AP AgTech Summit details are accessible here: <http://www.apagtechsummit2017.in/>)

The text of Bill Gates speech on Smallholder-led Agricultural Transformation summit, delivered on 17th November 2017 at the AP AgTech Summit is accessible here:

<https://www.gatesfoundation.org/Media-Center/Speeches/2017/11/Bill-Gates-Smallholderled-Agricultural-Transformation-Summit>

Gates, through his mechanical mind sees seeds as a technological product with built in obsolescence. Seeds are living. Seeds evolve, seeds adapt. Seeds embody past and future evolution.

At Navdanya we save seeds that are decades and centuries old. And the participatory and evolutionary breeding we promote is the most effective path to evolve varieties adapted to unpredictable climate change. We save and exchange seeds through 120 community seed banks we have helped set up.

(Vandana Shiva, Andre Leu, *Biodiversity, Agroecology, Regenerative Organic Agriculture*)

Over the past 31 years, Navdanya has created community seed banks across the country, and changed the paradigm from breeding for chemicals, monocultures and uniformity to farmers participatory breeding for diversity, nutrition, quality, taste, resilience and sovereignty. **These are the seeds that respond to today’s problems of malnutrition, chronic diseases and climate change - problems to which the industrial food system has contributed. Indigenous seeds bred by farmers have more nutrition than nutritionally empty industrial varieties (Navdanya International, *Manifesto on Food for Health*)**

<https://www.gatesfoundation.org/>)

Gates on the other hand wants to have centralised, commercialised seed supply. Just as he imposed commercialised Seed Systems on Africa through AGRA, the alliance for the Green Revolution in Africa, he envisions seed dependence for Andhra Farmers.

The Green Revolution varieties were imposed on Farmers as Improved varieties. The Bt Cotton illegally introduced by Monsanto was supposed to be a miracle variety.

Gates has stated clearly that farmers need finance to “buy seeds and chemicals”. His paradigm of farming is Industrial Agriculture, including the Green Revolution now wedded to what is called the 4th Industrial Revolution based on centralised control

on seed.

This is not agroecology or “natural farming” by any stretch of imagination. It is based on the continued dependence on chemicals. And it does not exclude GMOs which the organic system of Agroecology clearly does.

When Gates talks about Modern plant breeding for new varieties he means GMOs, including the new CRISPR technology of gene drives. No where in the AP model is it stated that GMOs are excluded,

When the Poison Cartel is expanding its toxic empire through GMO seeds, whether GMO’s are excluded or included is the test of whether an agriculture system works with nature or against Nature’s ecological principles of evolution and diversity

The AP initiative being imposed from the top has no basis in the science of Agroecology.

Bill Gates referred to the Mega Seed Park being developed in Andhra Pradesh and said it will “drive innovation – not only for higher-yielding hybrids, but also for varieties of regional importance, including more nutritious and resilient non-cereal crops like pulses”. The seed research center and Mega Seed Park located in the Kurnool district of Andhra Pradesh is being developed by Iowa State University in partnership with the Andhra Pradesh State Government, Acharya N. G. Ranga Agricultural University, and other state agencies. Iowa State University is a hub of the Biotech industry and Agribusiness.

<https://www.seeds.iastate.edu/news/gates-says-mega-seed-park-will-drive-innovation>.

Gates has also become a major funder of the CGIAR Institute ICRISAT based in Hyderabad which has all the collections of dryland crops such as millets and pulses from across India and the world.

With access to the worlds seeds, Gates can claim “innovation” through Biopiracy of farmers varieties as it has done with the flood tolerant rice.

(Vandana Shiva, *Origin, The Corporate War on Nature and Culture*; Vandana Shiva, *Biopiracy, The Plunder of Nature and Knowledge*; Vandana Shiva and Kartikey Shiva, *Oneness vs the 1%*; Navdanya, *Seeds of Hope, Seeds of Resilience*)

The use of information and digital technologies in Andhra Pradesh Agriculture is a priority for Gates. In his speech at the Ag tech Summit he stated

“A data feedback loop could help AP bridge the gap between innovation happening in its public breeding

programs and the products”

He called upon Andhra Pradesh to “leverage local expertise in GIS and its world-class IT sector – along with low-cost commercial software and DNA testing services – to develop better varieties more quickly”.

DNA testing does not create new varieties, it does genetic mapping of existing varieties. New varieties through what Gates refers to as DNA testing services are either based on transgenics, or on gene editing.

Gates Foundation is going out of its way to say that it is not promoting transgenics in India, but its constant reference to DNA analysis could be the CRISPR nose in the AP tent.

(Remarks by Gates Foundation representative at the Food Systems Dialogue, IIC, 25th October, 2018)

Commodification and the retail giant walmart: New bondage of farmers to global markets and industrial retail

Movements for retail democracy in India have prevented Walmart from entering retail. But it has been allowed to enter the wholesale business, and the largest number of cash and carry stores have been set up in Andhra Pradesh.

Walmart to open 15 more stores in Andhra Pradesh
<https://economictimes.indiatimes.com>

Walmart has bought Flipcart, an e-commerce platform. And through Andhra Pradesh, the retail giant has put its nose in the tent of Indian Agriculture. Walmart and Microsoft have a strategic partnership for digitalising retail.

Committing his Foundation’s support to the ongoing transformation in Andhra Pradesh’s agriculture, Gates said the focus would have to be on “increasing the productivity of smallholder farms and farmers and connecting them to markets so that they can prosper from their hard work”.

Neither Gates nor Walmart are talking of local and regional markets and food sovereignty. They are thinking of globalised, linear, extractive markets. While the rhetoric is about doubling farmers income, once the camel is fully in the tent and an oligopoly has been established, the retail giants will drop producer’s share as they have done world wide.

Walmart Foundation invests nearly US \$2M in ‘Farmer Market news.walmart.com/.../walmart-foundation-invests-nearly-us-2m-in-farmer-market-rea...

Over the next two years, ICRISAT will work in Andhra



Executive Office



Reference: Asia/Pacific/Executive/2018

23 August 2018

Dear Chief Minister,

It is widely recognized that public funding will not be enough to tackle some of the most defining challenges our planet is facing: produce more food, stimulate economic growth and jobs, and reduce deforestation and tackle climate change. We need a different paradigm for land use, especially for agricultural commodity production and the role that private finance institutions can.

UN Environment, UN Women, BNP Paribas SA, World Agroforestry Center and several other international organizations and financial institutions have come together to host an event entitled "Financing Sustainable Agriculture: Global Challenges and Opportunities" on the sidelines of the annual UN General Assembly from 15:00-17:30 hrs on 24 September 2018. The event will highlight how blended finance models can support countries in achieving inclusive growth and emissions reductions goals. It will share lessons learned from ongoing partnerships and innovative finance approaches in sustainable landscapes management emerging from developing countries.

The Government of Andhra Pradesh under your leadership is delivering transformative environmental, social and economic impact through its pioneering Zero Budget Natural Farming Programme. UN Environment is privileged to support your ambitious efforts to scale-out zero chemical farming to 6 million farmers across the state by 2024. Global stakeholders should hear from you and learn from your experience in the spirit of south-south collaboration. I am therefore writing to invite you to deliver a keynote speech at this event. I sincerely hope that you will be able spare your invaluable time to join us in New York next month.

Please accept, Minister, the assurances of my highest consideration.

Best wishes,

Erik Solheim
Executive Director

H.E. Mr. N. Chandrababu Naidu
Chief Minister of Andhra Pradesh
Amaravati, India

Pradesh's ... CGIAR is a global agriculture research partnership for a food secure future.

Walmart Foundation grants \$2 mn to agri project in Andhra Pradesh <https://www.dnaindia.com/.../report-walmart-foundation-grants-2-mn-to-agri-project-i...>

Walmart Foundation today said it has granted USD 2 million fund to a two-year agriculture project that would help over 6,000 farmers in Andhra ...

Walmart Foundation grants USD 2 mn to agri project in Andhra <https://retail.economicstimes.indiatimes.com> > ... >

Food & Entertainment > Grocery

The Andhra Pradesh Model is pumping in huge credit to force farmers into purchased seed, purchased chemicals, and dependence on corporations like Walmart as buyers. Where ever Walmart has entered, it has destroyed small farmers and left only 1% of the consumer price in the hands of producers.

The agrarian crisis in India is worst where farmers depend on purchased seeds and grow commodities they cannot distribute through diverse channels. Bt

cotton farmers, potato farmers, tomato farmers are in crisis because of rising costs of production and falling prices when farmers grow one commodity. Walmart's entry in AP will deepen the crisis for farmers.

Farmers need local markets through public investment, combined with government procurement. The government has announced a huge subsidy for procurement by private players.

So farmers borrow, get into debt, and corporations get a captive market for chemicals and seeds, and a captive supply of cheap commodities.

Commodification, not food sovereignty is the objective of the corporate entry into Andhra Pradesh. As Eric Solheim clearly stated in his letter to Chandra Babu Naidu, the C M of Andhra Pradesh on 23rd August 2018

“We need a different paradigm for agricultural commodity production and the role of private finance”
<http://www.esgindia.org/education/community-outreach/press/review-andhra-pradesh-climate-resilient.html>

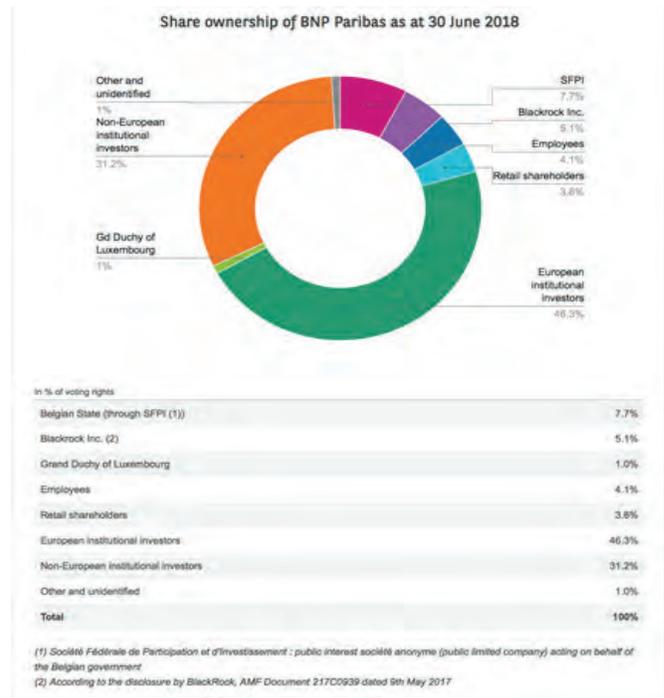
Big finance and financialisation of agriculture: A new bondage & debt trap for the indian farmers

The emerging agriculture model of agriculture in AP is a finance driven system as many players in shaping APs agriculture future have admitted. As Leo Saldanha reports in A Review of AP CRZBNF, Leo F. Saldanha, Environment Support Group, (ESG), October 2018.

“Besides the Rs 100 crore from APPI a philanthropic foundation, “the Andhra Pradesh Cabinet has approved a Rs 1,000 crore mega loan to be raised by a parastatal RySS (Rythu Sadhikara Samstha (RySS - Farmer's Empowerment Corporation) from Vijaya Bank, “with a monthly interest rate of 7.9 % for creating infrastructure facilities in agricultural sector”. And with facilitation by the Sustainable India Finance Facility (SIFF) Rs. 16,500 (\$2.3 billion) is being raised from BNP Paribas and other creditors to extend loans to all farmers of Andhra Pradesh. The Rs. 16,500 crores investment portfolio extending credit to farmers of Andhra Pradesh on commercial lending terms over the next five years. This would be done through SIFF, routed via RySS and on commercial lending terms.”

As the world's 8th largest bank, BNP Paribas also has investments from the world's biggest investment bank, BlackRock.

As Leo Fernandes points out in his review of the



Andhra Pradesh Agriculture transition:

“When Rs. 16,500 crores sourced from foreign banks is the investment in a programme promoted by extremely wealthy and powerful institutions such as APPI, UNEP, BNP Paribas, Bill and Melinda Gates Foundation, OLAM International, SIFF, etc., and the entire scaling up is based on extending credit to farmers with the State as the guarantor, the shift that is being engineered is towards financialization of all relationships linked to the farm, farmer, food production, food aggregation, agricultural processing, marketing and consumption.

It is categorically stated that “repayment will not be done by individual farmers but by the state government of Andhra Pradesh” (emphasis in original). Who then is the direct beneficiary of this financing? This question remains unanswered, and it may be safe to assume that the funds procured will be disbursed to FPOs, who will also be responsible for ensuring repayment. The mechanistic of this financial arrangement is not clarified. This is worrying because with the exception of Rs. 100 crores grant extended by APPI, the rest of the funding for the programme is to be raised on commercial terms as loans and through climate bonds in the market. Due diligence in raising foreign direct investment for farming via volatile global markets, appears to not have been undertaken yet”. (A Review of AP CRZBNF, Leo F. Saldanha, Environment Support Group, (ESG), October 2018 pg 21).

The agroecological transition from corporate industrial agriculture is an imperative for the planet and people

The FAO has synthesised the 10 Elements of Agroecology which communities and scientists have evolved across the world and which are the basis of Agroecological transitions from the industrial food system model to ecological systems.

1. Diversity
2. Co-creation of knowledge and transdisciplinary approaches for innovation
3. Synergies
4. Efficiency
5. Recycling
6. Resilience
7. Human and social value
8. Culture and food traditions
9. Responsible governance
10. Circular and solidarity economy.

All initial observations of the AP corporate driven model violates the above elements.

1. Diversity

Diversity of Agroecological approaches already tried and tested in AP such as Permaculture started by Dr Venkat, and the widespread adoption of organic have been ignored.

2. Co-creation of knowledge and transdisciplinary approaches for innovation

Farmers knowledge has been given a go by, with Bill Gates and other powerful players determining what the future of farming in AP should be.

3. Synergies

There is no synergy with existing democratic institutions in the country and the state.

4. Efficiency

Efficiency continues to be defined in industrial terms.

5. Recycling

A focus on commodities implies monocultures and long distance trade which increases uniformity and food waste, and makes recycling more difficult.

6. Resilience

Resilience has been changed from its ecological meaning of resilience through biodiversity, repairing the carbon, nitrogen and hydrological cycles to financialisation and financial speculation.

7. Human and social value

A finance driven system is driven by values of Big Money making bigger money, not by human and social values.

8. Culture and food traditions

There is no priority given to local cultures and food traditions.

9. Responsible governance

Bypassing institutions of democratic governance is not responsible governance. India has important laws on local governance -the 73rd Amendment (Panchayat Raj) Act, 1992 and Panchayat (Extension to Scheduled Areas) Act, 1996 and Forest Rights Act, 2006, Biological Diversity Act, 2002.

The risk of side-stepping Panchayat Raj institutions and other statutory bodies is likely to adversely affect overall effort to decentralise administration and devolve power to local bodies, which was the objective of the Constitutional 73rd Amendment (Panchayat Raj) Act, 1992. While it could be argued that these parastatals are an attempt in themselves to decentralise, it is imperative to remember that neither its membership or its leadership is democratically elected from the general population- a crucial criterion for any democratic institution. (A Review of AP CRZBNF, Leo F. Saldanha, Environment Support Group, (ESG), October 2018, pg 24).

10. Circular and solidarity economy

The model being put in place is a corporate extractive commodity economy, not a circular and solidarity economy. It is based on extracting finances from society to pay the 6.8% on the loan from BNP Paribas. It is based on extracting genetic information and other data to create the Big Data sold as a commodity to farmers. With Walmart's entry it has the risk of deepening the hunger and malnutrition crisis by extraction of food from local economies and communities and trading it as a commodity globally, with no attention being paid to local economies and food sovereignty.

Before the project goes further it needs to be democratically discussed and evaluated, not just in AP, but in India and the world, since claims have been made that it will be spread nation wide and world wide.

PART 6

Reclaiming our Daily Bread: From Corporate Control to Food Democracy, From Vulnerability to Resilience

We do not need to go faster and further down the road that has destroyed the planet, our biodiversity, our farmers and rural economies, and is threatening to close our future. There are other paths which farmers of India and across the world have walked for 10,000 years, which has been rejuvenated through diverse agroecological systems, and show the direction to the future.

For the earth, for farmers, for all humans, a transition from an industrial, corporate driven food and agriculture system to an ecologically sustainable, socially and economically just, politically participative, healthy food and agriculture system has become an imperative. A scientifically and ecologically robust paradigm of agriculture is emerging in the form of biodiversity based Agroecology and regenerative organic farming which addresses the triple crises, and instead of degrading the planet, our health, and rural livelihoods it rejuvenates and regenerates them. The scientific paradigm is Agroecology, the science of Ecology applied in agriculture. Instead of chemical inputs which cause harm to the environment and public health, the ecological agriculture paradigm is based on biodiversity –the diversity of fauna and flora, of plants, animals and microbes, and their diverse ecological functions. The ecological practice based on Biodiversity and Agroecology is Regenerative Organic farming which regenerates the soil, water, biodiversity, climate systems, public health and farmer’s livelihoods

Such a transition is being shaped by thousands of food communities across the world, in the north and the south. They are taking the road to the future, and abandoning the dead end road.

The transition to the future includes reversing the degrading and destructive trends and assumptions on which industrial agriculture rests, including the hyper industrialisation of the current corporate drive to enclose every aspect of our food and farming systems.

The transition involves a shift from

1. External Input systems to Internal input self organised renewable regenerative systems.
2. Monocultures and uniformity to diversity and multi functionality.
3. Extractive to circular, cyclical local economies.
4. Unfree “Free Trade Rules” written by corporations to fair trade rules shaped by people’s participation.
5. Rights of the Money Machine to Rights of Nature. From Money making as an end to money as a means,

assessed on the basis of Rights of the Earth, Human Rights to Livelihoods, the Right to Food and Health. Awareness of diverse forms of wealth and diverse forms of investment. Redefining “inclusion” from the dominant meaning of including the last farmer and last eater in corporate totalitarianism to inclusion in decision making and choice through democratic participation.

6. Technology as end to technology as means, assessed in terms of need, social and ecological impacts and democratically chosen and controlled by society.
7. Food as Commodity to Food as a commons, Good Food for all a fundamental right.

The way forward to regenerate the planet, our rural economies, our democracies and our food systems

Diverse paths of agroecology and regenerative organic farming

Ekam Sad Vipra Bahudha Vadanti

The Real is one, the learned speak of it variously

(The Rig Veda)

Agroecology includes diverse paths of farming with nature, and without chemicals. The road that is being walked by local, diverse food communities across the world, north and south. It is based on principles of Agroecology which includes diverse approaches such as organic, farming, permaculture, biodynamic, natural, with Matsunooba Fukukua and his *One Straw Revolution* as the most well known, as well as hundreds of thousands of local farming traditions that have evolved over millennia. Even the well established schools of Agroecology are based on learning from traditional agriculture, and articulating the principles and practises in contemporary scientific discourse.

There is no conflict and contest between these systems. They are different articulations of the same agroecological ecological principles of production and distribution of food which respect the rights of nature and the human right to food. Diversity, care for people and the land, and food sovereignty are central to the food systems that people have evolved and are evolving.

It puts food and farmers first and is based on ecological principles of nature’s nutrition and hydrological cycles. Mimicking nature, it creates local circular, cyclical biodiverse, healthy and sustainable food economies. 80% of the food we eat is produced by small farmers. From the perspective of people’s

livelihoods, food security and sovereignty, and care for the earth, the small scale is the appropriate scale for food systems. Rejuvenation of small farms and small farmers has become an ecological and food security imperative. Agroecological systems are rejuvenating the planet by rejuvenating biodiversity, soil, water, and contributing to mitigation and adaptation to climate change and climate resilience. They are rejuvenating local economies based on diverse, healthy, fresh, ecological good food for all. They are reclaiming food as a commons from the commodification which is degrading the quality of food and contributing to hunger and malnutrition food democracy and food sovereignty as the basis of all choices and decisions made by food communities.

Ecological Agriculture is too complex and diverse to be one man's invention. It is based on time tested traditions and their evolution for contemporary conditions.

"Organic Farming" is the name given to ancient Indian farming systems based on principles of diversity, gratitude and giving.

It evolved a century ago from India's 10,000 year indigenous Agroecological sciences when Albert Howard, who was sent by the British in 1905 to "improve" Indian agriculture, found the soils fertile and no pests in the field. He decided to make the Indian peasant his Professor. He then wrote his classic *The Agriculture Testament*. What is called organic today is the distillation of centuries of peasant knowledge of India. Organic is indigenous agriculture, it is "swadeshi"-of the land, of the people.

Howard talks about how Indian peasants learnt to farm in "Nature's ways" and made farming as permanent as the forest by applying Nature's principles of diversity and law of return in agriculture. It is therefore scientifically inappropriate to present organic farming as "imported" and to posit natural vs organic as is becoming fashionable in some circles.

Organic means chemical free

Etymological Roots of Organic

Sense of "from organized living beings" is first recorded 1778 (earlier this sense was in organical, mid-15c.). Meaning "free from pesticides and fertilizers" first attested 1942.

Organic is based on organised living beings, which in today's language we call biodiversity and ecosystems

services. The equivalent of life in Hindi is Jiva and living is "Jaivik". That is why ecological agriculture in India is referred to as "Jaivik Kheti".

Organic is a chemical free system which evolved as an alternative to chemical industrial agriculture.

It is inaccurate to present organic as if is only certified organic, and it is only the "organic industry"

Organic is not a product. Organic is not a mere technique.

It is a world view and a set of principles .

The organic world view is based on of non separation and awareness of humans being part of a living world, in contrast to the mechanistic, industrial world view which sees humans as masters and manipulators of nature.

IFOAM – Organic International, the global movement has evolved the Principles of Organic Agriculture for the worldwide adoption of ecologically, socially and economically sound agriculture and food systems:

1. Principle of Health
2. Principle of Ecology
3. Principle of Fairness
4. Principle of Care.

Organic principles also exclude GMOs.

A ten thousand year old civilisation's time tested Agroecological systems and knowledge, and their distillation into organic principles and Agroecological science over the past century should not be ignored in this vital discussion about the future of our food and farming. Organic has been the scientific and economic challenge to the rule of the Poison Cartel. It has a vital role as a system in shaping the future. The Poison Cartel would like nothing better than marginalise and erode the scientific systems that have evolved as part of the organic movement.

And corporations would like nothing better than attack the diversity of agroecological approaches that have evolved over time, and impose one monoculture of the mind and one money making system. This violates the principle of diversity, pluralism, "bahudha" on which nature is based and which India's ecological civilisation is founded.

Agroecology includes Organic

Organic=Natural

GMOs, Old and New are excluded in Organic Systems

As Shri B P Singh said in his closing remarks at the International Biodiversity Congress 2018 on 6th October at FRI, Dehradun

“Pluralism is the closest equivalent of Bahudha in English. But Bahudha denotes much more than pluralism as dharma conveys more than religion. ... The culture of Bahudha is deeply rooted in the inculcation of a special attitude from an early age. Dialogue requires a state of mind where one can strongly believe in one’s own way of looking at issues while simultaneously accommodating another’s point of view. It is this mental discipline that makes one willing to consider the validity of other person’s view point. In short, the Bahudha approach is both a celebration of diversity and an attitude of mind that respects another person’s point of view. Democracy and dialogue are central to this approach.”

A transition to Agroecology offers solution to every dimension of the social, economic and ecological crisis created by industrial agriculture.

Organic farming takes excess carbon dioxide from the atmosphere, where it doesn’t belong, and through photosynthesis puts it back in the soil, where it does belong. It also increases the water holding capacity of soil, contributing to resilience in times of droughts, floods and other climate extremes.

We cannot address climate change, and its very real consequences, without recognizing the central role of the industrial and globalised food system, which contributes more than 50% to green house gas emissions through deforestation, animals in concentrated animal feeding operations (CAFOs), plastics and aluminium packaging, long distance transport and food waste. We cannot solve climate change without small scale, ecological agriculture, based on biodiversity – living seeds and living soils and local food systems. We can solve it without minimal food miles and an absence of plastic packaging.

Over the last thirty years Navdanya has promoted and practiced Biodiverse Organic Farming and Agroecology and addressed the problems of hunger, poverty, soil degradation and climate change as synthesised in *“Biodiversity, Agroecology, and Regenerative Organic Agriculture”*. Every problem industrial agriculture is creating for nature and society is being addressed by Agroecology.

A scientifically and ecologically robust paradigm of agriculture is emerging in the form of biodiversity based Agroecology and regenerative organic farming which addresses the triple crises, and instead of

degrading the planet, our health, and rural livelihoods it rejuvenates and regenerates them. The scientific paradigm is Agroecology, the science of Ecology applied in agriculture. Instead of chemical inputs which cause harm to the environment and public health, the ecological agriculture paradigm is based on biodiversity –the diversity of fauna and flora, of plants, animals and microbes, and their diverse ecological functions. The ecological practice based on Biodiversity and Agroecology is Regenerative Organic farming which regenerates the soil, water, biodiversity, climate systems, public health and farmer’s livelihoods.

The emerging scientific paradigm of Agroecology puts biodiversity at the heart of food production. It changes the measure of productivity from yields of monoculture commodities produced with intensive fossil fuels and chemical inputs to the biodiversity based productivity and total output of biodiverse systems, including the internal input ecological functions provided by biodiversity, which are alternatives to chemical inputs.

Biodiversity produces more food and higher incomes for farmers

The Navdanya model for ecological/organic farming focuses on biodiversity. Navdanya means nine seeds as well as new gift. The most significant contribution by Navdanya has been the promotion of Biodiversity Based Productivity for small farmers, which combines ecological conservation with economic production.

At a time when GMO seeds are being offered as a miracle, just as the HYV seeds were introduced as a miracle, during the Green Revolution, Navdanya has conserved the open pollinated farmers varieties, re-introduced them in production systems, and enhanced both productivity and rural incomes.

(Vandana Shiva, Andre leu, *Biodiversity, Agroecology, Regenerative Organic Farming*)

Navdanya’s practice and research of 3 decades has shown that we can regenerate biodiversity, soil, water and mitigate climate change, increase nutrition and health double food production and farmers incomes through the emerging paradigm of biodiverse regenerative ecological agriculture.

Since the 1980’s I have been practising and promoting non-violent biodiverse agriculture. I realised that what I have called “The Monoculture of the Mind” has focused on “yield” of a part of a part of a part of biodiverse ecosystems and presents that increase of a fragment at

very high cost of external inputs as increase in overall production and therefore an answer to food security.

I started to look at biodiversity based productivity and found total output to be much higher than the monoculture yields of chemical farming. (Navdanya, *Biodiversity Based Productivity*). We started to measure “Health per Acre” and nutrition per acre instead of yield per acre. Biodiverse intensive organic farming can feed two India’s while conserving our natural resource base. (Navdanya, *Health Per Acre*)

Biodiverse organic farming also contributes to health as highlighted in the Navdanya Book *Annam: Food as Health (2017)* and the *Manifesto on Food for Health*

The FAO has also reiterated the link between biodiversity and diets stated in its press release on World Biodiversity Day, 2018. It is now recognized that biodiversity in our fields is connected to biodiversity in our diets. Chemical monocultures in the field are contributing to degraded diets and a disease epidemic.

As Navdanya’s research on biodiverse organic systems has shown, ecological systems produce higher biodiverse outputs and higher incomes for rural families. Our report *Health per Acre* shows that when measured in terms of nutrition per acre, ecological systems produce more food. We can double food production ecologically.

Using the multifunctional contributions of biodiversity and the ecological principles of Agroecology biodiversity based organic agriculture also reduces farmers costs and increases farmers income. Our book on true cost accounting *Wealth Per Acre* shows how biodiversity and Agroecology are an answer to rural poverty, declining farmers incomes, and the agrarian crisis.

Ecological systems of agriculture are based on care, compassion, and co-operation, and enhance ecological resilience and diversity, sustainable livelihoods and health.

The new paradigm of agriculture creates living economies and living cultures which increase the well being of all people and all beings. At the heart of the new agriculture is biodiversity and Agroecology, both as a paradigm and as a means of production. And as our work in Navdanya in India and by other farmers and organisations across the world shows, we can produce more nutrition and higher incomes for farmers through

biodiversity based organic and regenerative farming which regenerates the planet’s soil, biodiversity, water, climate systems, people’s health, farmers economy and food democracy.

From extractive economies to circular economies

The linear, extractive logic of greed and exploitation without limits is threatening ecological and social collapse.

Linear extractive systems are at the root of both the ecological crisis, and the crisis of poverty and inequality.

The ecological crises grows through extraction from nature.

Poverty, misery, unemployment, displacement, exploitation, exclusion grows through extraction from those who work in the forests, fields and factories.

Small farmers are getting poorer everywhere and being uprooted from the land because vertically integrated corporations are stealing 99% of the value they produce. They are getting poorer because “free trade” as freedom for corporations, promotes dumping, destruction of livelihoods and depression of farm prices.

The linear extractive economy is based on extraction, commodification, profits. It has no place for the care of nature and community. It leaves nature and society impoverished, be it extraction of minerals, or extraction of knowledge through Biopiracy, or extraction of ‘genes’ through genetic mining, or extraction of data through ‘data mining’, or extraction of rents and royalties for seed, water, communication, privatised education and health care. It creates poverty, debt, and displacement. It creates waste - waste as pollution, wasted resources, wasted people, wasted lives.

Real wealth is our capacity to create, produce and make what we and our communities need to ensure our well being. Well being is the original meaning of wealth, not money. Work creates wealth. As co-creators and co producers with nature we protect the earth’s wealth creating capacities and enhance our own. We create real wealth when we live as Earth Citizens.

(Vandana Shiva, *Biodiversity, Agroecology, Regenerative Organic Farming*)

The extractive economy gives nothing back to nature and society who create the real wealth. Planetary boundaries are broken, ecological limits are transgressed.

The law of return, of giving back, is nature's law of permanence. This is the basis of circular economies.

The ecological Law of Return maintains the cycles of nutrients and water, and hence the basis of sustainability. For society, the Law of Return is the basis of ensuring justice, equality, democracy and peace.

Regenerative, renewable, sustainable economies that enhance nature's well being and ours are based on the law of return-of-giving back in gratitude and deep awareness that we are part of the web of life.

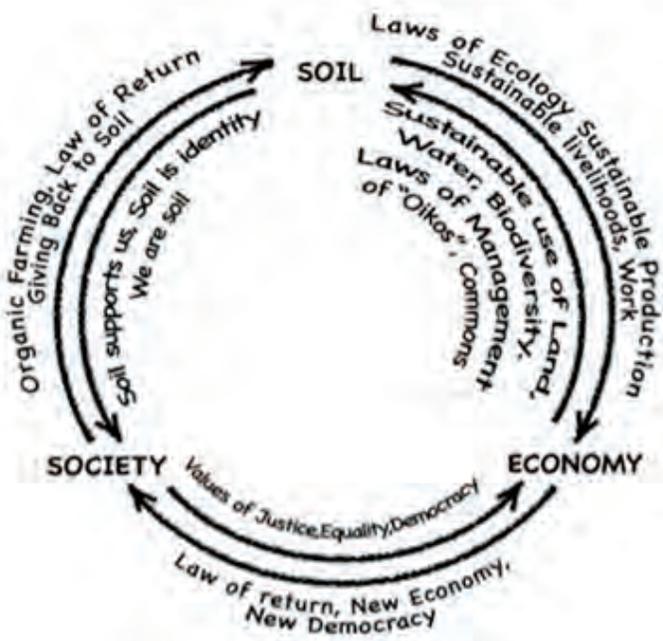
Biodiversity is the organising principle which guides Navdanya's work, from biodiversity of seeds and crops, biodiversity of agricultural systems and knowledge systems, to biodiversity of distribution systems and markets.

Biodiversity based organic farming and biodiversity of markets and economies is Navdanya's approach to rejuvenate soil, water and biodiversity, rural economies and the health of all through cooperation, circular economies and local food systems.

(Vandana Shiva, *Biodiversity, Agroecology, Regenerative Organic Farming*)

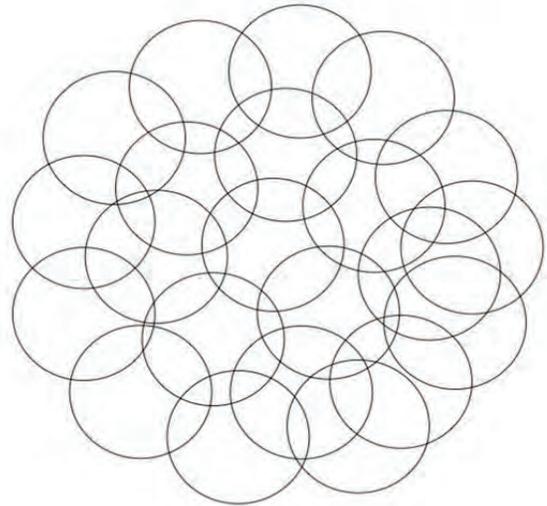
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Circular Economy



"If fresh food is necessary to health in man and beast, then that food must be provided not only from our own soil but as near as possible to the sources of consumption."
Lady Eve Balfour

Biodiversity, Agroecology,
Local- Regional Circular Food Economies
The Ecological Food System Revolution



Ever Expanding Never Ascending Circles of Food Sovereign, Knowledge Sovereign, Economic Sovereign Food Communities

During Gandhi's 150th birth anniversary let us build on his vision of "everexpanding, never ascending oceanic circle" of one humanity, one planet, rich in diversity and self organisation.

"In this structure composed of innumerable villages, there will be ever widening, never ascending circles. Life will not be a pyramid with the apex sustained by the bottom... till at last the whole becomes one life composed of individuals, never aggressive in their arrogance but ever humble, sharing the majesty of the oceanic circle of which they are integral units.

Therefore, the outermost circumference will not wield power to crush the inner circle but will give strength to all within and derive its own strength from it" Gandhi, Harijan, 28-7-46, p. 236

The Dominant paradigm of the industrialisation and commodification of our food system has degraded the planet, rural economies, and the quality and safety of our food. It has created vulnerability at the ecological, social, economic and political levels.

The vicious cycle of interconnected degeneration is unravelling the earth's vital life supporting processes and the fragile fabric of our societies. Collapse is inevitable if we continue on the dead end path.

But we have a living, growing alternative of regeneration based on diversity and Agroecology.

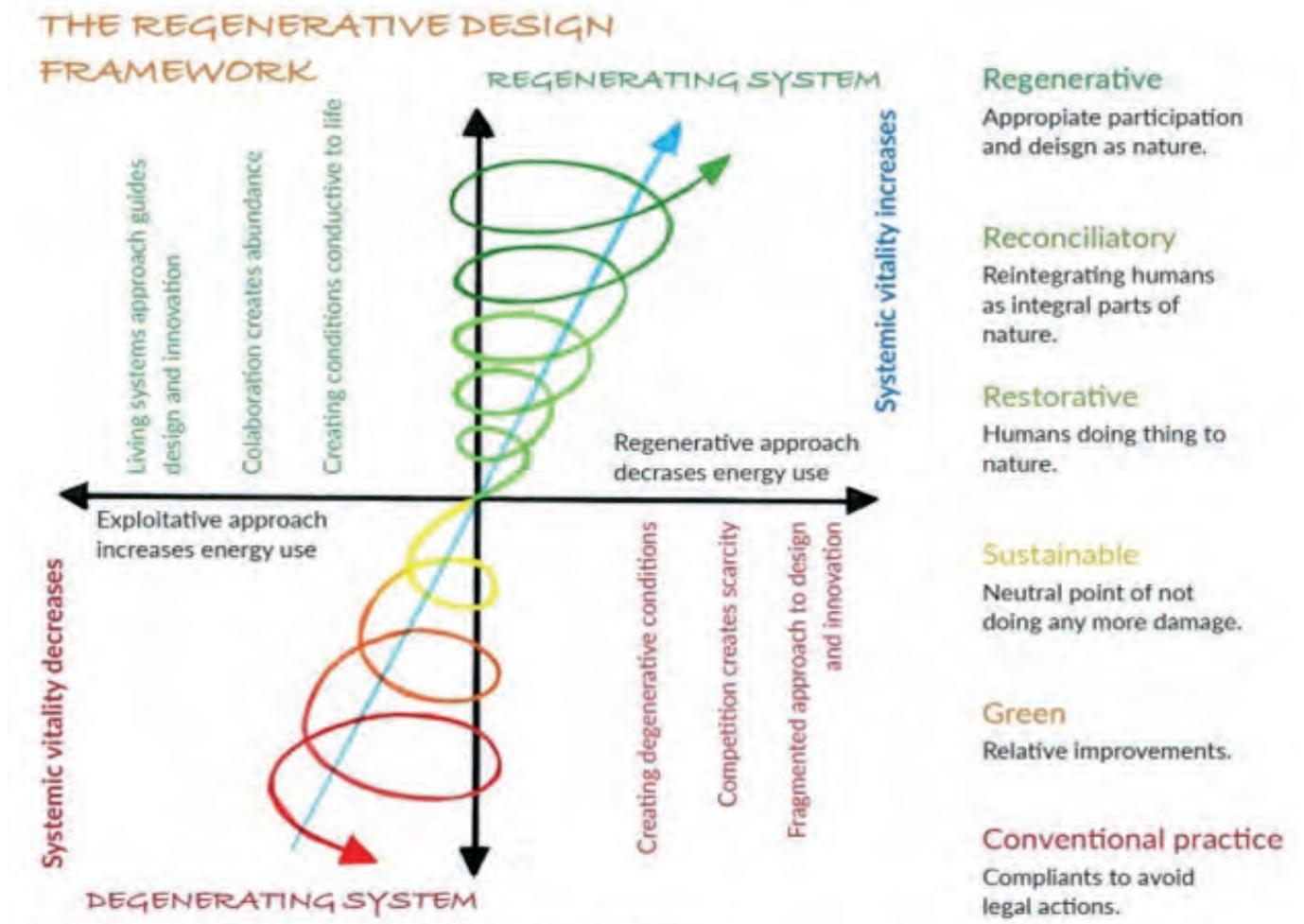
The transition from Corporate Control to Food Democracy, from Vulnerability to Resilience, is not just a possibility. It has become a necessity if we have to avoid collapse.

The Agroecology transition we are making includes both stopping the race on the dead end road and

spreading the principles, paradigms and practices that protect the planet, protect people's sovereignties grow good food for all.

Navdanya's 9 Principles based on Biodiversity for a transition to a food and agriculture system which can regenerate nature's economy and people's economy and help meet the SDG goals.

The Choice is Ours: The road to regeneration or the dead end road to collapse



<https://www.resilience.org/stories/2018-05-23/sustainability-is-not-enough-we-need-regenerative-cultures/>

Biodiversity of plants and animals, of microbes in the soil and our gut, biodiversity of knowledges and economies is the organizing principle of a transition from an agriculture model that is destroying the planet, farmers livelihoods and people's health.

These three challenges we face are the first three SDGs

- GOAL 1: No Poverty.
- GOAL 2: Zero Hunger.
- GOAL 3: Good Health and Well-being.

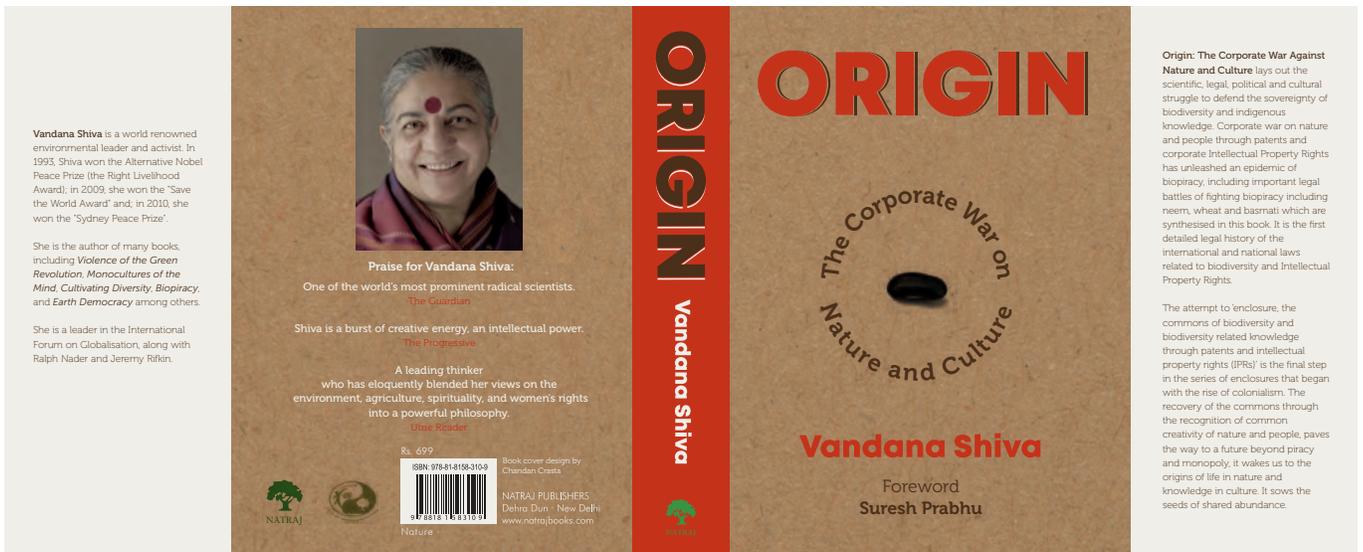
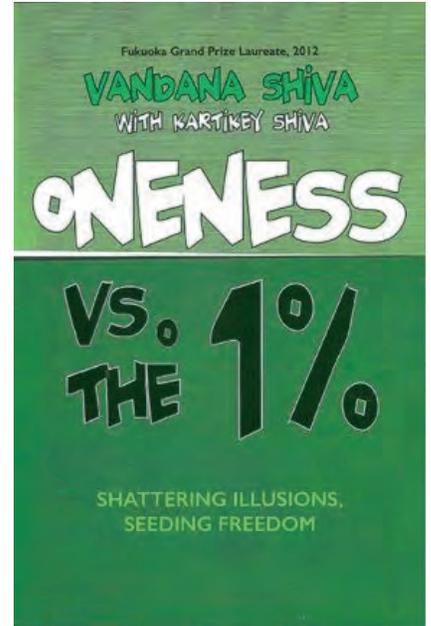
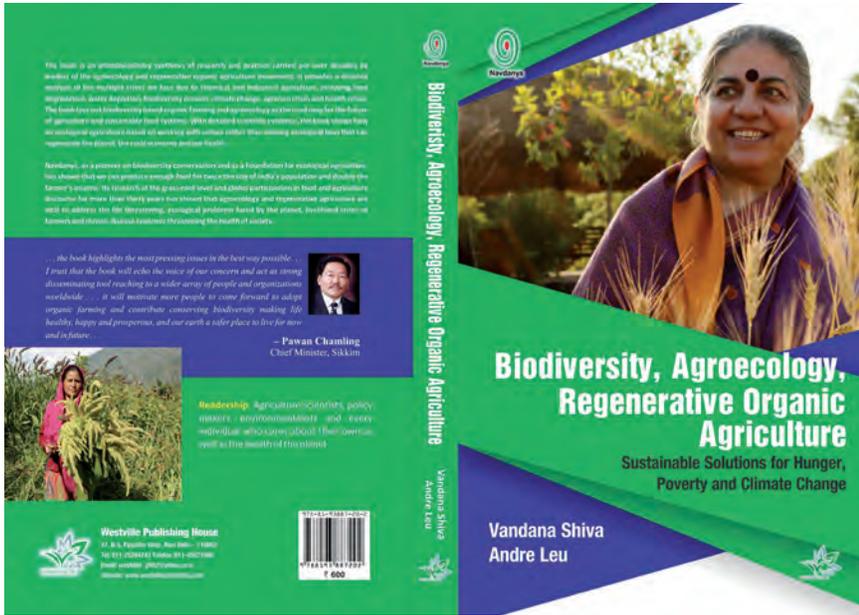
In this book we have provided evidence from the past 3 decades of practice and scientific research how we can meet the SDG goals through Biodiversity Conservation, Agroecology and Regenerative organic agriculture which regenerate nature's economy and people's economy, creating health and well being for diverse species, for farmers, for consumers.

Navdanya has evolved the following 9 principles for a transition to ecologically and socially sustainable food and agriculture systems for meeting the SDG goals.

1. Regeneration of nature's economy is based on regeneration of biodiversity, soil and water through poison free biodiverse organic farming and regenerative agriculture.
2. Biodiversity is an organizing principle of the planet's health and people's health, from the soil, to plants, to insects and birds, to our food and our gut microbiome.
3. Biodiversity and Regenerative Organic Farming contributes to Mitigation of and resilience to Climate Change by repairing the broken carbon and nitrogen cycles that have been ruptured by Green House Gas emissions from industrial agriculture.
4. Biodiversity is an organizing principle of people's economy, both as a means of production and through diversity of economies and markets.
5. Biodiversity based organic production and biodiversity of market s can reduce costs of production, increase the value of what farmers grow, and double farm incomes sustainably.
6. Biodiverse organic farming increases the food and nutrition security of the farming household which is a priority in people's economy given that half the 1 billion hungry people in the world are now farmers.
7. Local, circular and solidarity economies based on biodiversity of production and distribution is necessary to protect the livelihood of farmers, and the health and nutrition of society, specially in the context of the epidemic of chronic diseases related to food.
8. The transition to sustainability needs a transition from unfair corporate "free trade" which spreads degraded food through deregulation and externalizes social, ecological and health costs to a fair trade system based on true cost accounting and real food.
9. The web of life is a food web, and cultivating Earth Democracy begins with the growing and sharing of poison free food.

(Vandana Shiva, Andre Leu, *Biodiversity, Agroecology, Regenerative Organic Farming*, Westville Publication)

Related Publications





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