

A Harvest of Heat: Agribusiness and Climate Change

**How Six Food Industry Giants
Are Warming the Planet**



**Agribusiness Action Initiatives – North America
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Contents

Introduction

Overview

Industrial Agriculture's Role in Causing Climate Change

Cargill

Biofueling Climate Change

Archer Daniels Midland

Grains and Climate – Ethanol vs. Food

Tyson

Livestock and Climate Change

Dean Foods

Dairy Cows and Climate

Dow AgroSciences

Pesticides and Climate Change

Monsanto

The False Promise of “Climate-Ready” GMOs

Solutions

Farming to Save the Earth

Bibliography

Agribusiness Action Initiatives

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Caterpillar



Peggy Greb / USDA



Doug Wilson / USDA

INTRODUCTION

Agriculture's critical dependence on fossil fuels and the clearing of forests, grasslands and prairies for farming are the top two factors responsible for today's massive global increases in CO₂.

Factory smokestacks, once seen as icons of industrial progress, are now viewed with the same concern as a smoking tailpipe. Climate change has fueled an onslaught of droughts, floods and fires that have buffeted the world, killing tens of thousands and causing billions of dollars in damage. Some island nations like the Maldives are fated to see their countries swallowed by the sea. The Global Humanitarian Forum holds climate change directly responsible for 300,000 deaths a year — a figure that may need to be ratcheted upwards now that scientists have linked climate change to the increasing frequency of deadly volcanoes, earthquakes and landslides.

While an increase of 2 degrees Celsius could cause the extinction of millions of species, climate change is already threatening food yields and the livelihoods of peasant farmers around the globe. The Food and Agriculture Organization (FAO) warns that a global temperature increase of two-to-four degrees Celsius over pre-industrial levels could reduce crops yields 15-35 percent in Africa and Asia and 25-35 percent across the Middle East.

When most of us think about the root causes of global warming, we think of companies like Ford, GM, Toyota, Honda, Chevron and ExxonMobil. But the problem isn't just one of cars and smokestacks; it's also a problem of cows and cornstalks. While governments, the media and even the some climate activists tend to focus on industry and automobiles to rein in pollution, the largest single factor stoking global warming may be the industrial food system.

Powerful corporations like Archer Daniels Midland, Cargill, Dean Foods, Dow AgroSciences, Monsanto and Tyson share a major — though largely overlooked — role in fueling climate change. These giant multinationals have seized control over much of the planet's food resources, dominating the growing, processing and sales of meat, grains and oils. ADM and Cargill now control 65% of the world's trade in grain. Monsanto and Syngenta control 20% of the \$60-billion market in bio-engineered seeds. The corporate campaign to “patent nature” and control the world's food supply has been so successful that today, 85% of US corn is genetically engineered.

Agriculture — at least the high-input, chemical-dependent, fossil-fueled system favored by the Agribusiness giants — has become a major part of the climate crisis. In addition to producing food and fiber, agriculture produces a harvest

of three major greenhouse gasses (GHGs) — carbon dioxide (CO₂), nitrous oxide (N₂O), and methane (CH₄). Carbon dioxide is produced when fossil fuels are burned for energy and transportation and in the production of chemical pesticides and artificial fertilizers. Fertilizer manufacturing emits around 41 million metric tons of CO₂ a year. Up to 60 percent of human-caused nitrous oxide (which has 296 times the Global Warming Potential of CO₂) is released largely by the use of chemical fertilizers. Fifty percent of methane (with 25 times the GWP of CO₂) is produced by industrial livestock operations. The impact is compounded by a global trade structure that was created to turn farming from a local enterprise into a planet-sized business.

Soils contain vast stockpiles of carbon in the form of organic matter. Industrial agriculture's practice of plowing the land for immediate gain rather than long-term sustainability releases land-stored carbon into the atmosphere, exacerbating climate change. According to varying estimates, oil-dependent farming, livestock operations, destruction of carbon-storing fields and forests to accommodate farming, the use of chemical fertilizers and the combustion of fuel to process and distribute food all add up to between one-fifth and one-half of the human-caused pollution that is driving climate change.

The Intergovernmental Panel on Climate Change (IPCC) has warned that, in order to avoid a climate calamity, the world's industrialized nations must cut GHG emissions 25-40% below 1990 levels by 2050. The G-77 countries and the People's Climate Declaration have called for cutting emissions by at least 40% below 1990 levels by 2020 but neither pending US legislation nor the non-binding Accord signed at the end of the Copenhagen Climate Summit comes anywhere close to meeting this goal.

The industrialized nations are responsible for 7 of every 10 tons of CO₂ emitted since the dawn of the Industrial Era — with much of that stemming from the conversion of land to large-scale commercial farming and the growth of energy- and chemical-intensive industrial agriculture. So far, the response of most of the industrialized world has been to insist that the solutions to world hunger and climate change lie in “more of the same” — agrofuels, genetically engineered “climate-ready” seeds, nuclear power, the Global Marketplace and “cap-and-trade” pollution-trading schemes. At the same time, the World Bank continues to increase its lending to fossil fuel projects around the world (up 165% in FY2008).

Fortunately, evidence is mounting that much of the damage done by industrial farming can be undone by small, local, organic farming. “If we can change the way we farm and the way we produce and distribute food,” a report from GRAIN concludes, “then we have a powerful solution for combating the climate crisis.”

OVERVIEW: Agriculture's Role in Causing Climate Change

When it comes to combating climate change, most environmental “to-do” lists include familiar goals like driving cleaner cars, investing in green jobs and clean energy, and reducing CO₂ emissions. Agriculture has usually been missing from the list — but that is beginning to change.

Cows, Corn and Climate

In 2004, the United Nation's Intergovernmental Panel on Climate Change estimated that agriculture contributes 13.5 percent of global greenhouse gases (GHGs). A 2006 UN report concluded livestock were responsible for 18% of global GHGs and a recent Greenpeace investigation (that included both direct and indirect emissions from farming, land use impacts, transportation, packaging and processing) placed agriculture's GHG contribution as high as 32 percent. (On March 24, UN scientists acknowledged the 2006 percentage was “flawed” and promised a revised report by year's end.) Producing red meat, dairy products, chickens, fish and eggs accounts for 58% of these food-related GHG emissions. Beef and sheep have the greatest global warming impact at 13 and 17 CO₂-equivalents per kilogram of meat, respectively. Chickens have the lowest carbon footprint. The average meat-eating American devours 200 pounds of meat each year and contributes 2,520 grams of CO₂ to the atmosphere every day.

Some US agronomists have challenged the UN's finding that a herd of cattle is more polluting than a commute-time traffic jam, claiming that raising cattle and pigs produces only 3% of US GHGs while transportation generates 26%. The EPA (without considering agriculture's “externalities”) has pegged agriculture's GHG contribution at 6%. But comparing percentages to tons can be misleading. Even if agriculture only accounted for 6% of the country's GHGs, the US produces so much pollution that it would still be one of the world's top sources of agricultural GHGs. (China is a close contender in overall CO₂ emissions but, if the pollution generated to produce Chinese goods for the US market were included, the US would remain the undisputed GHG champ.) Robert Goodland and Jeff Anhang, writing in the March/April 2010 issue of *World Watch* magazine, estimate that livestock (and livestock by-products) account for at least 32.6 billion tons of CO₂ per year — 51 percent of annual global GHG emissions.

Although CO₂ gets star billing on the climate debate stage, the global warming potential of methane is 25 times greater (factored over 100 years), nitrous oxide is 296 times more potent and the fumigant pesticide sulfur hexafluoride is 4,780 times more powerful. Agriculture generates 40-60% of N₂O emissions (mainly from nitrogen fertilizers) and 50% of CH₄ emissions (from the belches of ruminant animals and decomposition of their manure). As much as 70% of US

agricultural GHGs arise from the production of livestock, fruits, vegetables and grains. Another 10% is attributable to food processing, with 5-15% generated by transportation and an additional percentage tagged to shopping, cooking, refrigeration and waste. In 2008, the EPA's Climate Change Science Program estimated that as much as 50% of the world's food goes uneaten. Worse, most of this “lost, wasted or discarded” bounty winds up in landfills where it releases global-warming methane.

Manufacturing synthetic fertilizers and pesticides is estimated to consume almost 40 percent of all the energy used by US agriculture. It can take as much as 33,000 cubic feet of natural gas (or five tons of carbon) to make one ton of nitrogen fertilizer. In addition to generating GHGs, chemical fertilizers and pesticides disrupt key ecosystem functions of soil biota, decreasing the land's ability to sequester carbon, cycle nutrients, break down greenhouse gases and retain water.

The Fall of the Green Revolution

The Green Revolution, featuring “miracle seeds” fueled by an elixir of chemical fertilizers and pesticides, was supposed to end world hunger. Initially, this approach produced amazing bounties but this increase in yield came at a price. It turned out that injecting artificial accelerants into the ground was slowly destroying soil fertility (and spilling CO₂ into the air). Soils pumped full of artificial stimulants eventually began to wear out and required ever-increasing doses of expensive oil-based chemicals to offset declining productivity. In addition, the nitrogen fertilizers poured into the land steadily filled the air with nitrous oxide.

Today, with more than one billion hungry people (15% of the global population), many of the same multinationals behind the failed “Green Revolution” are again promising salvation — this time under the banner of “biotechnology.” These profit-driven firms are promising a new miracle cure — a “Gene Revolution” powered by a mix of costly imported agrochemicals, patented seeds and genetically modified crops.

Global trade rules and international financial institution loan requirements compound the problem by pressuring poor countries to pay debts by converting forests, grasslands and other natural resources into commodities to be sold in the global market. In Latin America, deforestation is driven by the pressure to raise and export beef, soybeans and agrofuels. In Southeast Asia, large landowners are turning forests into palm oil plantations for cheap consumer products and agrofuel export. This market-driven devastation unleashes CO₂, destroys self-sustaining rural communities and undercuts local food security.

Inefficiency on the Farm

US industrial agriculture may be the least efficient farming system in the world. It typically requires 10 calories of fuel to produce each calorie of food. Producing 2.2 kilograms of beef can generate more GHG and other pollutants than leaving all the lights on in your home and taking a 3-hour spin in your car. In the US, meat, grains and produce travel an average of 1,500 miles before reaching the dinner table. This means that only 20% of the energy burned by US agriculture is used to produce food while 80% is used for transport, processing, packaging, retailing, restaurants, refrigeration and preparation. Thanks to the rise of large multinational food companies, processed foods now comprise 75% of world food sales.

Although agriculture occupies hundreds of thousands of acres across the US, it employs fewer than 2 percent of the population. Large farms represent only 8.6% of US farms but they control 80% of sales. Economies of scale can fail when a few large corporations dominate national and international trade. Consolidating production and distribution in a few huge corporations can increase overall costs of transportation, refrigeration and packaging, especially as declining oil supplies inflate shipping costs. Industrial farming has become so inefficient that it can be cheaper to fly organic milk from New Zealand to the UK and sustainably raised flowers from Africa to Europe.

The Agrofuel “Solution”

In 2005, the Global Forest Resources Assessment reported that tropical rainforests were vanishing at the rate of 100,000 acres every day. The destruction of these ancient ecosystems is believed responsible for producing 15% of the world's GHGs. One of the greatest threats to the world's great forests — in the Amazon, Indonesia, Malaysia and Papua New Guinea — is the expansion of soy and palm oil plantations to produce cheap consumer goods (from body lotions to lipstick), animal feed and agrofuels. In the Amazon, 60% of soy plantation expansion is funded by just three multinationals — ADM, Bunge and Cargill.

The agrofuel boom triggered by the 2007 Energy Independence and Security Act has fueled the expansion of large grain, biotech and oil companies. But “solving” the climate crisis by sacrificing the forests of the Global South is self-defeating since these intact woodlands provide one of our greatest natural buffers against excess atmospheric carbon. Indonesia's old-growth rainforests are believed to hold nearly 750 million tons of CO₂. Clear-cutting these forests releases vast stores of carbon into the air. The growth of the agrofuel “solution” largely accounts for the fact that Indonesia and Brazil have now become the world's third and fourth largest emitters of GHGs. Three-fourths of Brazil's GHG emissions are attributable to deforestation. In addition to global impacts, the loss of forest cover can trigger massive regional climate changes. Logging the vast forests of West Africa led to the disappearance of Lake Chad and ushered in a new era of punishing drought.



Applying herbicide to sorghum.

Jack Dykinga / USDA

The Biotech “Solution”

When world leaders met in Rome in 2008 to discuss the food crisis, a host of giant biotech companies were on hand to promote biotechnology as the answer to world hunger. Monsanto announced a commitment to increase food production by developing crops that need less water. Monsanto's critics, however, warn that the company is less interested in rendering humanitarian service than in achieving control of the world's food system.

Giant biotech companies have been quietly filing hundreds of patents on drought-resistant seeds and genes that may help crops resist climate change. Monsanto, BASF, Bayer, Syngenta, Dow and four other firms have filed at least 532 patents on about 55 different genes that promise protection against heat, drought and flood. These patents would grant the companies monopoly power over the natural raw material needed to control future food supplies in an increasingly hungry world.

In 2007, Monsanto and BASF announced a \$1.5 billion collaboration to develop genetically engineered (GE) crops that are “more tolerant to adverse environmental conditions.” The two companies also filed patents for 27 “climate-ready” genes. One patent application would cover more than 30 major food crops from oil plants to oats, tea to triticale, and potatoes to perennial grasses. This “corporate gene-grab” will give a few transnational companies the power to decide who will have access to key genetic traits and how much farmers will have to pay to use them. Small farmers in developing countries would be particularly hard hit by “climate-change profiteering” since, under the ruthless economic model pioneered by Monsanto, they

would be prohibited from saving patented seeds and forced to buy new “climate-ready” seeds every year. Many farmers who have attempted to continue growing traditional seed crops have been driven into bankruptcy by Monsanto’s harassment and well-financed legal assaults.

While conventional breeding techniques are making remarkable progress in developing crops that can tolerate heat, floods and drought, the corporate promotion of biotech solutions is concentrating corporate power, driving up costs, and stealing resources that could be supporting affordable, farmer-based strategies for survival.

The Cop-out at Copenhagen

Despite its leading role in fueling climate change, agriculture was not on the agenda at the December 2009 UN Climate Change Summit in Copenhagen. Nonetheless, Big Agriculture cast a long shadow over the UN Summit. The largest nongovernmental organization in attendance was not an environmental group, it was the International Emissions Trading Association, an ag-industry lobbying group representing 170 companies that favor carbon-trading and genetic engineering as the best response to climate change. In apparent lockstep, US Agriculture Secretary Tom Vilsack offered the Summit delegates only business-friendly biotech and agrofuel solutions — and didn’t even mention organic farming. (Back home, the USDA’s crop insurance program continues to provide subsidies to biotech crops but not to organic growers.) As Family Farm Defenders Executive Director John Peck noted after returning from the Summit: “The simple fact that pollution prevention remains the best cure for global climate change was lost in the official debate in Copenhagen.”

The American Farm Bureau, the Grocery Manufacturers Association, Cargill, Tyson Foods and other multinational food and agro-tech giants have joined forces to oppose any climate change legislation that could chip away at their profits — or (as they prefer to express it to the public) “severely hike food prices.” The American Farm Bureau (AFB) continues to deny evidence of climate change and invited a representative of the Competitive Enterprise Institute to address its January 2010 meeting on the topic, “Global Warming: A Red Hot Lie?” (CEI, an industry-funded think tank, has received millions of dollars from ExxonMobil and other oil and auto companies to challenge the scientific evidence of climate change.)

The AFB is abetted by farm state politicians like House Agriculture Committee Chair Collin Peterson (D-MN) and Earl Pomeroy (D-ND) who have proposed bills to overturn the EPA’s December 7, 2009 “endangerment finding” that classified CO₂ and methane as dangerous pollutants that need to be regulated to protect public health.

To counter the analysis that “agribusiness as usual” is no longer sustainable, Monsanto, ADM, John Deere and DuPont founded the Global Harvest Initiative, which promises (once again) to end world hunger with a new

Green Revolution based on biotechnology. But the US Working Group on the Food Crisis notes that it is precisely these “chemical-intensive... unproved biotechnologies and ‘free’ trade solutions” that have contributed to the current food, climate and environmental crisis. The Green Revolution forces point to the fact that, between 1970 and 1990, food production rose 11% while the number of hungry humans fell 16%. But this statistic contains an anomaly — China. During this period, hunger actually continued to rise in most of the world, outstripping production gains. But in China, the number of hungry fell from 406 million to 189 million — not because of increased use of chemicals and “miracle seeds” but because of a massive reallocation of land and resources to the poor. As Food First notes, this begs the question: “Which has been more effective at reducing hunger — the Green Revolution or the Chinese Revolution, where broad-based changes in access to land paved the way for rising living standards?”

Organic Farming to the Rescue

Fortunately, low-tech, low-cost solutions to climate change are readily available. As decades of work by the Rodale Institute demonstrate, organic farming offers the best path to secure yields while countering the impacts of climate change. Carbon dioxide emissions from organic farms can be 48-60 percent less than emissions from industrial farms. Organic growing is also better at sequestering nitrogen and other potent GHGs. Ecological management of soils to sequester carbon has the highest proven potential to reduce agriculture’s GHG emissions, contributing an estimated 89% toward that potential. Greenpeace has determined that organic farming outperforms industrial farming for wheat, canola and potatoes.

The Agribusiness industry has done an effective job of convincing people that only large-scale farming can feed the planet’s ever-growing population but it is now clear that organic farms are not only competitive with industrial farms, they can also produce greater yields, especially in developing countries. As a bonus, organic produce is tastier, fresher, chemical-free and contains more nutrients.

As the Cool Foods Campaign notes, “agriculture is the only human activity based on photosynthesis that has the potential to be fully renewable.” With the world’s finite oil supplies in decline, industrial agriculture clearly has no long-term future — but it will leave a long-term legacy in the form of dirty skies, melting glaciers, rising seas and polluted waterways. In the absence of oil (a one-time Energy Drink that allowed humanity to briefly transcend the limits of the natural world), the only sustainable form of agriculture will be one that is localized, biodiverse and regenerative.

A transition to a sustainable economy is imperative but it will not come easily given the entrenched power and global reach of Agribusiness. It will be necessary to hunker down and get our hands dirty. But first, let’s meet six of the corporate culprits that are most responsible for promoting — and profiting from — climate change.

CARGILL

Agrofueling Climate Change

At Cargill, corporate responsibility is a process of continually improving our standards, our actions and our processes. Our commitments on business conduct, the environment, people and communities guide our overall approach.

** We will conduct our business with high levels of integrity, accountability and responsibility.*

** We will develop ways of reducing our environmental impact and help conserve natural resources.*

** We will treat people with dignity and respect.*

** We will invest in and engage with communities where we live and work. — Cargill*

Cargill, Incorporated is a privately held multinational based in Minnesota. Since its founding in 1865, Cargill has grown to become the country’s largest privately held company (in terms of revenue) and the second largest in the world. Despite its size, the corporation is still a family owned business: descendants of the founding Cargill and MacMillan families own more than 85% of the company. Cargill purchases, processes and distributes grains and farm commodities and manufactures livestock feed, processed foods and pharmaceuticals and is responsible for 25 percent of all US grain exports. In 2009, Cargill posted \$3.3 billion in earnings on revenues of \$116 billion. Cargill’s profits from commodity trading for the first quarter of 2008 were 86% higher than for the same period the year before (credited to global food shortages triggered by the expanding biofuels industry). With more than 160,000 employees at 1,100 locations in 67 countries, Cargill supplies approximately 22 percent of the US domestic meat market. Cargill’s plants supply all of the eggs used in McDonald’s US restaurants.

BACKGROUND

Cargill dominates the world grain and food system — from growing animal feed, to raising, processing and delivering meat products directly to supermarkets and fast-food chains. As a private company, Cargill is not required to release the same amount of information as a publicly traded company. Were it publicly held, Cargill would rank among the top 10 Fortune 500 companies. Cargill owns two-thirds of the shares of the Mosaic Company, one of the world’s leading producers and marketers of concentrated phosphate and potash fertilizers. Cargill has been a major force in the push to power America on farm-grown industrial biofuels — also known as “agrofuels.”



University of South Australia

Agrofuel: A Natural Disaster

It is ironic that Big Oil and Big Ag are trumpeting biofuels as a solution to global warming. When Rudolf Diesel debuted his first auto engine in 1898, it ran on peanut oil. Henry Ford’s Model T was originally built to run on ethanol derived from hemp. The promise of a farm-based fuel economy was intentionally derailed by Big Oil, which managed to undercut farm alcohol programs. General Motors helped by buying out (and then destroying) public trolley systems across the country to force more Americans into cars. Similarly, many of the farmers who pioneered the rebirth of the US ethanol industry in the 1990s were forced to watch helplessly as their struggling enterprises were taken over by ADM and Cargill. In 2003, well over half of US ethanol plants were farmer-owned; today, nearly 90% are controlled by Cargill and a few other powerful agribusiness firms.

The corporations pushing the agrofuel bandwagon are familiar names: ADM, Bunge, Cargill, ConAgra, DuPont, Monsanto, Syngenta; British Petroleum, Royal Dutch Shell, Chevron, Petrobras, Total, Barclays, Goldman Sachs, Morgan Stanley and the Carlyle Group.

Ethanol: A Bogus Biogas

In 2007, a Cargill subsidiary announced plans to triple its ethanol production by building four Midwest plants, each with the capacity to turn 40 million bushels of corn into 100 million gallons of agrofuel. But agrofuels — and agrofuel refineries — are far from a practical or clean solution.

Agrofuels can be derived from cassava, wheat, barley and from cellulosic ethanol derived from switchgrass,

crop residue, biotech trees and algae. (While hailed as a “greener” feedstock, University of Virginia researchers report that algal biofuels require more energy and water and produce more GHGs “than any other biofuel source.”)

Corn, the main ethanol feedstock, requires massive infusions of pesticides, herbicides and chemical fertilizers (made from natural gas). The US currently burns around 142 billion gallons of gasoline a year. Producing 17 billion gallons of corn ethanol by 2022 (as mandated by the Energy Independence and Security Act of 2007), would require 52,000 tons of insecticides, 735,000 tons of herbicides and 93 million tons of fertilizer.

Shifting to agrofuels would only delay, not solve, our energy problems because a gallon of ethanol costs 3.5 times as much to produce and has only two-thirds the energy of a gallon of gas. The 2006 US International Energy Outlook predicted a 71% rise in energy demand by 2030, with renewables filling only 9% of the need. Meeting the US Renewable Fuels Standard of 15 billion gallons-per-year of corn ethanol would consume half of America’s entire corn crop. There simply is not enough corn in the US to fill the tank of every SUV, schoolbus, 747 jetliner and B-2 bomber.

Because it can take six gallons of water to produce a gallon of ethanol, expanding corn acreage to supply the ethanol market could require 120 billion gallons of water per year. With 132 US ethanol plants in operation and 79 more being built (mostly in the Midwest), plant expansion could threaten the 800-mile-long Ogallala aquifer, an underground sea that helps irrigate one-fifth of all US cropland. For each gallon of ethanol produced, biorefineries discharge 12 gallons of sewage contaminated with toxins, including chloride, copper and other wastes. The pollution continues once the ethanol reaches a car’s gas tank where the fuel evaporates, releasing volatile organic compounds, hydrocarbons and global-warming nitrous oxides.

Most agrofuels are made in “biorefineries” that burn as much fossil fuel as any petroleum refinery. Until it was shut down in 2004, the Gopher State Ethanol Plant in St. Paul, Minnesota, was emitting 230 tons of volatile organic compounds a year — seven times over the legal limit. Between 2002 and 2005, the EPA forced ADM and Cargill to pay \$458 million for operating ethanol plants that were gross air polluters — emitting illegal levels of carbon monoxide, methanol, toluene, and cancer-causing formaldehyde and acetaldehyde.

The US spends \$7 billion tax-dollars a year to subsidize Cargill and other large agrofuel companies. In an attempt to extort even more support from the federal coffers, ADM and Cargill have threatened to import cheaper sugarcane ethanol from Brazil if taxpayer incentives for domestic corn-based ethanol are not sufficiently “competitive.”

The *Journal of Atmospheric Chemistry and Physics* argues that burning agrofuels may cause more global warming

than burning petroleum. Agrofuels generate nitrous oxide (a GHG that is nearly 300 times more damaging than CO₂). Burning corn-based ethanol or canola-based biodiesel generates 50% and 70% more greenhouse gas emissions, respectively, than fossil fuels. If corn-based ethanol output climbs as predicted, GHG emissions from the US transport sector alone could rise 6% by 2022. Meanwhile, Cargill plans to “profit from pollution” by entering the cap-and-trade business. Cargill’s Green Hercules subsidiary will offer “carbon offsets” to polluting industries as part of an “emissions trading” scheme that allows Wall Street speculators to become players in the climate crisis.

As Family Farm Defenders head John Peck observes: “The agrofuel industry is built around patented biotech varieties, chemical intensive monocultures, massive toxic refineries, and global commodity trading.” It was the issue of “global commodity trading” that prompted Jean Ziegler, the UN’s expert on the right to food, to declare agrofuels a crime against humanity. As Ziegler explained: “The effect of transforming hundreds and hundreds of thousands of tons of maize, of wheat, of beans, of palm oil, into agricultural fuel is absolutely catastrophic for hungry people.”

Cargill and Amazon Deforestation

Tropical rainforests are vanishing at the rate of 100,000 acres a day and the Amazon rainforest — home to nearly 10 percent of the world’s mammals and 15 percent of the world’s known land-based plant species — now has 6 million hectares devoted to agrofuels. Brazil plans to increase its sugarcane acreage to 30 million hectares to meet agrofuel export demands, which means as much as one-third of the country’s pasture could soon be converted to sugarcane. Some 200 million hectares of dry tropical forests, grasslands and marshes in the Cerrado, the Mata Atlantica and the Pantanal have been opened to agrofuel production. NASA reports that soybean cultivation for biodiesel was responsible for destroying 325,000 hectares of Amazon rainforest in 2007. Colombia (with USAID assistance) aims to increase palm oil plantations to more than 1 million hectares by expropriating traditional land occupied by the country’s Afro-Colombian communities.

In its pursuit of agrofuel profits, Cargill has defied international environmental standards and local laws. In Brazil, Cargill continues to operate a soy processing plant in the Amazon port of Santarém despite the port being ruled illegal by the Brazilian Supreme Court. Prior to construction, Cargill failed to comply with a federal law requiring the preparation of an Environmental Impact Statement. While the facility was initially supported by local residents who hoped to find work at the port, opinion quickly turned against the plant when the promised jobs failed to appear. Since the port opened in 2003, regional deforestation has doubled. Cargill claims it no longer buys soy from recently cleared land but local observers in Santarém disagree. Cargill now plans to expand its port and open other agrofuel plants in Brazil.

Cargill’s Palm Oil in Asia

Palm oil is used in 50% of all consumer goods, from lipstick to packaged foods to lotions to biofuels. Palm oil can produce five times as much biodiesel as canola oil. Approximately 85% of palm oil is grown on industrial plantations in Indonesia, Malaysia and Papua New Guinea (PNG). Cargill’s directly owned palm plantations in the region were carved out of lowland rainforests. In 2009, Cargill’s PT Harapan Sawit Lestari plantation began clearing forests in Borneo without the legally required environmental assessment.

With Cargill’s help, Indonesia hopes to surpass Malaysia as the world’s top palm oil producer. Indonesia has announced plans to convert up to 18 million hectares into palm oil plantations by 2020. These plans pose a direct threat to the survival of endangered orangutans, Sumatran tigers, elephants and more than 20 million Indigenous people whose lives depend on the forests.

Palm oil plantations are driving the destruction of the world’s tropical rainforests. Indonesia, with the world’s highest rate of rainforest deforestation (averaging 20 square miles destroyed each day), produces nearly 45 percent of the world’s palm oil. According to Wetlands International, Indonesia now ranks as the world’s third largest GHG emitter — right behind China and the US. Producing a ton of palm oil generates 33 tons of global-warming CO₂ emissions.

Cargill is the fourth-largest exporter of palm oil from Malaysia and holds more than 247,000 acres of plantations (on former rainforest land) in Indonesia. Cargill recently sold its PNG plantations to Britain Palm Oil. Clearing forests to grow industrial biofuels increases climate-changing emissions. With 2.5 million acres of tropical forests being cut each year to accommodate palm oil plantations in Indonesia, Malaysia and PNG, the agrofuels industry has become a major source of CO₂ emissions. Plans to drain peat lands for agrofuel palm oil plantations would also release vast stores of global warming gases.

Cargill’s CTP Holdings, which owns two palm oil plantations in Indonesia, is both the largest exporter of palm oil to the US and the largest US importer of palm oil, buying roughly 11% of Indonesia’s total output. Cargill also purchases palm oil from some of the “worst-of-the-worst” rainforest destroyers — Wilmar, Sinar Mas and Duta Palma.

At Cargill’s former palm oil plantations in PNG, farmers lured by (unfulfilled) promises of new roads, schools and hospitals, have been reduced to *de facto* bonded laborers through Cargill’s use of complex debt schemes. While tropical lands managed by family farms can create 35 jobs per 100 hectares, palm plantations average just 10. Indonesia’s National Human Rights Court has recorded hundreds of cases of social conflict at Cargill’s plantations and Cargill has admitted its failure to prevent the use of child labor on its former PNG plantations.



Agrofuel fields being burned.

REMEDIES

- Stop buying meat and crops raised on rainforest land.
- Require tracking to ensure that imported foods and ingredients were not grown on deforested lands.
- Create protected areas in the world’s ancient forests.
- Demand that Cargill implement a Global Forest Policy.
- Pressure General Mills and other customers to cancel supply contracts until Cargill reforms its palm oil policies.
- Insist that Cargill expand its Amazon “soy moratorium” to include a palm oil moratorium in all at-risk ecosystems.
- Demand that all imported soy is GE-free.
- Ensure that the World Bank and US foreign aid does not contribute to deforestation or land conversion.
- Develop food and agricultural policies that eliminate pressure on the world’s remaining forests.

CAMPAIGNS

Greenpeace has campaigned to close Cargill’s Santarém facility by releasing a report that identified Cargill as the firm most responsible for Amazon deforestation. Greenpeace won agreements from McDonalds and British retailers to stop buying meat raised on rainforest soy. These retailers, in turn, pressed Cargill and Archer Daniels Midland to prove their soy was not grown on Amazon soil, which led to the creation of the soy moratorium.

Rainforest Action Network (RAN) is pushing Cargill and other agribusinesses to stop clearing rainforests to plant palm oil crops. RAN has launched a campaign to convince General Mills to stop using Cargill’s palm oil in more than 100 products including Cheerios, Lucky Charms, Pillsbury and Betty Crocker brands. For more information: www.TheProblemWithPalmOil.org

RAN, Family Farm Defenders and **Food First** have asked the UN General Assembly’s Human Rights Committee to support an agrofuel moratorium. More than 100 groups have demanded a European Union moratorium as well. **Family Farm Defenders** and other organizations have called for a similar moratorium in the US. For more info: www.familyfarmdefenders.org

ARCHER DANIELS MIDLAND

Grain Processing & Climate: Ethanol vs. Food

ADM's Mission: To unlock the potential of nature to improve the quality of life. We create products that help satisfy global nutrition needs, such as low-cost quality protein isolates. ADM ethanol production reduces emissions as well as reliance on petroleum-based fuels. ADM also makes the food we all enjoy more available and affordable, enhancing the quality of life. What We Believe: Agriculture is the key to sustainable global growth.... In profound respect for our environment. In integrity and responsiveness in all our interactions.

— Archer Daniels Midland

Archer Daniels Midland, a Decatur, Illinois-based conglomerate with 270 plants and nearly 28,000 employees worldwide, is a global leader in the processing of cocoa, corn, oilseeds and wheat. ADM's products include sweeteners, food products, drinks and animal feed. ADM has recently begun investing heavily in ethanol and other bioenergy projects. Founded in 1902, ADM reported sales of \$69.2 billion in 2009. In 2007, ADM's profits soared 65% to a record \$2.2 billion. ADM also owns fish farms and a railroad.

BACKGROUND

ADM, the world's leading processor of soybeans, corn, wheat and cocoa, was ranked as the 27th largest US company on the 2009 Fortune 500 list. ADM is one of the leading producers of the genetically engineered corn most responsible for causing the "genetic pollution" of organic corn crops. ADM used to characterize itself as the "Supermarket to the World," but its new foray into the profitable world of agrofuel has given rise to a new slogan: "Resourceful by Nature." The shift recognizes the fiscal reality that, in the last two decades of the 20th century, the US government handed out \$11 billion in ethanol subsidies. The 2005 Energy Policy Act calls for the US to produce 7.5 billion gallons of ethanol by 2012 and ADM is expanding its facilities to meet that goal.

In 2009, 107 million tons of grain — more than a quarter of all US grain — was diverted to feed US ethanol plants. That amount of grain could have fed 330 million people for a year. The Earth Policy Institute concludes that, even if the US converted its entire grain crop from food to fuel — i.e., no grain for bread and no animal feed to produce meat, milk or eggs — ethanol could only replace 18% of the country's current demand for fossil fuel.

Beginning in late 2006, the diversion of crops from food-to-fuel caused world grain prices to hit record highs. The resulting hike in food costs triggered food riots around the world. In 2009, for the first time, the number of hungry people in the world topped the 1 billion mark. Washington's plan to spend \$6 billion a year to subsidize ethanol production seems misguided, given that the 450 pounds of corn consumed to fill the fuel tank of an SUV would be sufficient to feed a hungry individual for an entire year. Diverting food to fuel the 940 million automobiles on the planet when there are more than a billion starving people would constitute an immoral misappropriation of resources.

ADM praises ethanol as a "clean" alternative to gasoline but the company has a dirty secret — the power used to turn corn into ethanol will, in most cases, come from burning coal. (In 2006, the Bush Administration's Department of Energy presented ADM with \$150 million to build three new biorefineries to produce ethanol. Because the DoE didn't specify that the new plants should themselves be "green," ADM was free to build coal-burning biorefineries.) ADM operates four coal-powered ethanol plants — one in Illinois, two in Iowa and its newest plant in Columbus, Nebraska.

Studies suggest that ethanol's reputation as a climate-friendly fuel may be overblown since ethanol is 15-20% less efficient than gasoline and producing ethanol takes 70% more energy than the fuel actually delivers. Burning corn to make electricity produces 81% more energy than turning corn into ethanol. Burning ethanol reduces CO₂ but generates nitrous oxide — a powerful GHG. The US Energy Information Agency notes that ethanol fuels produce "considerably more water vapor" — another powerful GHG. A *Science* magazine report concluded that corn-based ethanol would only cut GHGs by 13 percent. (Making ethanol from cellulosic materials like switchgrass doesn't require corn's intensive inputs of climate-damaging herbicides, pesticides and nitrogen fertilizers.)

The EPA identifies ethanol plants as a "major source" of carbon monoxide, methanol, toluene and carcinogenic compounds and has actually been forced to crack down on polluting ethanol plants in the Midwest. ADM's corn processing plant in Clinton, Iowa, was closed in 2004 after spewing nearly 20,000 tons of volatile organic compounds, sulfur dioxide and nitrous oxide.

The Political Economy Research Institute ranks ADM second on its 2008 "Toxic 100" list of corporate air polluters. The EPA and Department of Justice have filed hundreds of complaints against 52 ADM processing plants in 16 states. In 2001, the Department of Justice and the State of Illinois fined ADM a combined \$2.6 million for violating state and



Giuseppe Bizzarri / FAO

Harvesting crops for agrofuel.

federal air pollution laws. In 2003, the company paid \$10.5 million in penalties (as part of a \$351 million settlement) and promised to cut 60,000 tons of air pollutants released by 42 ADM plants in 17 states.

But the occasional penalties exacted by Washington are more than offset by lavish federal subsidies. Between 2003-2005, Washington gave corn growers \$17.6 billion in subsidies. (Soybean growers got \$2 billion.) Thanks to federal dollars, ADM has become the largest US producer of ethanol. The libertarian Cato Institute estimates that ADM's subsidies have "cost the American economy billions of dollars since 1980" with at least 43% of the company's profits directly attributable to products that are "heavily subsidized or protected by the American government."

Ethanol subsidies have been particularly rewarding. According to Cato, "every \$1 earned by [ADM's] ethanol operation costs taxpayers \$30." The *New York Times* was equally blunt when it characterized the Clinton Administration's support for ethanol as "little more than a politically inspired gift" to ADM. In October 2009, ADM received 1.5 million tax dollars from the Department of Energy to test the feasibility of storing a million tons of CO₂ 6,000 feet underground. The sequestered CO₂ represents the yearly pollution from just one of ADM's ethanol plants — equal to the emissions of 220,000 automobiles.

Oil Palm Plantations in Asia

ADM's decision to become a major player in ethanol production suffered a setback when the cost of corn soared and the demand for biofuels faltered. Faced with potentially massive losses on its investments in corn- and soy-based biofuels, ADM lobbied Washington for a Federal mandate that requires adding ethanol to gasoline blends. ADM also has diversified its agrofuel portfolio by investing in massive soy and palm oil expansion in Southeast Asia and South America. But, palm oil, like ethanol, also has an environmental downside: palm-based agrofuels can emit up to ten times more CO₂ per gallon than gasoline.

Huge areas of tropical rainforest must be cleared to make room for sprawling monocrop soy and palm oil plantations. Each acre of Indonesia's vast forests stores nearly 750 tons of carbon. Releasing just one acre of that stored carbon would be the equivalent of flying 620 passenger jets from New York to London.

Clearing forests to make fuel creates a nightmare for the climate and a nightmare for Indigenous and local communities forced off their land by soy and palm oil expansion. In one Indonesian province, the UN predicts that up to 5 million people could be displaced by palm oil plantation growth. With a controlling interest in Wilmar (a Singapore-based firm with major palm oil operations in Indonesia), ADM is directly accountable for this damage.

A History of Lawbreaking

In 1997, ADM was hit with the highest anti-trust fine in US history — \$100 million. In 1999, three top ADM officials were sentenced to federal prison for price-fixing. In 2005, ADM reported paying \$400 million to settle a class-action anti-trust suit. ADM also was part of a suit brought against several companies by the International Labor Rights Fund, which accused the firms of involvement in the trafficking, torture and forced labor of children who harvest cocoa beans that the companies imported from Africa.

In 2006, the Center for Responsive Politics reported that ADM had handed out more than \$3 million in political contributions since the 2000 election cycle (\$1.2 million to Democrats and \$1.85 million to Republicans). This may explain why ADM continues to receive a host of federal favors ranging from ethanol tax credits, billions of dollars in corn and ethanol subsidies, a national requirement to add ethanol to gasoline, and tariffs designed to protect ADM from foreign competitors offering cheaper ethanol. (Brazil's sugar-based ethanol is much cheaper than ADM's corn-based alternative.) This favoritism prompted the Cato Institute to tag ADM as the country's leading recipient of "corporate welfare."

CAMPAIGNS

The Rainforest Action Network's Rainforest Agribusiness Campaign is challenging US firms, including ADM, to stop destroying rainforests, abusing human rights and exacerbating climate change. In March 2008, three RAN activists publicly invited ADM's CEO (and former Chevron Executive-Vice President) Patricia A. Woertz to sign a pledge to stop destroying rainforests for agrofuels. Woertz refused to sign but she did acknowledge the problem at ADM's 2009 shareholder meeting. www.theproblemwithpalmoil.org
<http://action.ran.org/index.php/Cargill>

Family Farm Defenders and other organizations have issued a call for a moratorium on agrofuel development in the US. www.familyfarmdefenders.org/index.php/Agrofuels

Union Voice wants ADM and Cargill to assure consumers that their products are harvested without forced labor or child slavery. www.unionvoice.org/campaign/CargilADM08

The Organic Consumers Association is running a Campaign Against GE Corn. ADM and Cargill are the primary targets of the campaign. www.organicconsumers.org/corn/index.cfm

DEAN FOODS

Dairy Cows & Climate Change

Healthy Foods, Healthy Families, Healthy Business. Our thousands of customer-focused employees take great pride in delivering fresh, nourishing and quality products to American families — pure and simple. With a solid vision for the future, strong commitment to sustainable business practices and healthy approach to growing our business, we are poised to continue to deliver reliable, consistent growth.

— Dean Foods

Dean Foods (aka “the Microsoft of the dairy industry”) maintains plants and distribution networks across the US and the United Kingdom. Founded in 1925, the Dallas-based firm is a major food and beverage force with two operating divisions — Fresh Dairy Direct and White Wave-Morningstar. Dean’s 29,000 employees staff 100 facilities in 35 US states (plus plants in Spain, Portugal and the UK) where they produce a range of foods including milk, ice cream, canned and frozen vegetables, salad dressings and processed pickles. Dean controls about 35% of all milk, 60-65% of organic milk, and 90% of soy milk in the US. Dean’s vertically integrated “organic” dairy operations in Colorado, Idaho, Maryland, Texas and elsewhere, maintain tens of thousands of milking cows. In 2009, Dean recorded net earnings of \$240 million on sales of more than \$11 billion.

BACKGROUND

Dairy production, while less polluting than the meat industry, generates significant amounts of GHGs. The planet’s livestock consume around 80% of the world’s soybeans and more than 50% of all corn. Burning fossil fuels to manufacture fertilizers to grow feed crop generates 42 million metric tons of CO₂ per year. Cutting woodlands and forests to create pastures for livestock and cropland for feed production releases an estimated 2.4 billion metric tons of CO₂ each year.

Dean, a major player in the GHG League, controls 50 different brands of dairy products, including: Land o’ Lakes, Horizon, Borden, Country Fresh, Organic Cow, Meadow Gold, Garelick, Oak Farms, Silk soy milk, Stroh’s ice cream and Hershey’s chocolate milk. (The Dean Food name does not appear on any Horizon or Silk brand organic products.)

Consumer demand for healthy, environmentally sound and humane livestock practices has helped turn organic farming into a \$24 billion industry. Unfortunately, many of the pioneering companies that helped build the industry have been acquired by major agribusinesses like Dean Foods, General Mills and Kraft. The result is that most processed organic food today is produced by the same companies

that flood our stores with Baco Bits, coffee creamer, Cocoa Puffs, Lucky Charms and Oreos.

With the goal of maximizing profits, some of these companies have resorted to relabeling organic brands as “natural,” while using cheaper conventional ingredients. Dean Foods recently was forced to change the packaging for its Silk-brand soymilk after the Cornucopia Institute revealed the company had replaced organic soybeans with cheaper, conventional soybeans (without materially changing the traditional packaging or even the barcodes).

Most suppliers of organic label dairy products deal directly with legitimate small family farmers. Dean Foods is a major exception. While Dean promotes a “family farm” image for its brands, it sources much of its “organic” milk from crowded Concentrated Animal Feeding Operations (CAFOs), including one California operation that (until it was shut down) confined 10,000 milking cows to a single crowded feedlot. Two corporate dairies that supplied Dean’s “organic” Horizon milk were shut down following complaints to the USDA. Meanwhile, the government has refused to inspect Dean’s two huge CAFOs in Idaho, each crowded with 8,000 head of cattle. The USDA did investigate a Dean corporate dairy in Maryland — but only after warning the company in advance of the inspector’s visit.

The Cornucopia Institute notes that a loophole in USDA regulations allows companies to label factory-farmed dairy products as “USDA organic,” even if the company imports conventional calves that “have been weaned on cow blood, injected or medicated with antibiotics, and fed genetically engineered corn, soybeans and cotton seeds, laced with slaughterhouse waste and tainted animal fats.” Allowing such unhealthy and unsustainable practices helps the bottom line for big corporations but it puts true organic practitioners at a severe disadvantage.

The USDA’s lack of enforcement may have something to do with the money Dean Foods spends on lobbyists and campaign contributions. Sourcewatch reports that, in 2006, Dean spent \$1,063,000 on lobbying and gave \$350 million to federal candidates (31% to Democrats; 69% to Republicans).

In January 2010, the US Justice Department filed an antitrust suit against Dean Foods, charging the company had eliminated a competitor in a bid to dominate the market and drive up milk prices. In April 2009, Dean had purchased Foremost Farms, a member-owned dairy collective in Wisconsin. With the take-over, the small farmers went from being owners to contract suppliers and Dean wound up controlling 57% of milk sales in Michigan,

Illinois and Wisconsin. Between 1996 and 2009, Dean Foods acquired more than 100 competitors without any outcry from Washington. Finally, President Obama’s anti-trust chief, Christine Varney, appears to have taken note of complaints from small farmers who are being slammed by low milk prices at the same time that big processors like Dean are selling milk at record prices.

A Solution that’s Hard to Digest

The UN predicts the environmental impact of livestock will double by 2050 unless drastic action is taken. In the US, livestock currently generate 130 times more sewage than humans — 500 million tons of solid and liquid wastes, according to a 2003 EPA estimate. Beef and dairy cattle are the greatest emitters of methane, a greenhouse gas that is 25 times more powerful than CO₂. The fossil fuel required to heat, cool, ventilate and feed animals crowded into CAFOs and other large confinement operations releases 90 million metric tons of CO₂ each year.

Simple changes in livestock diet (to alfalfa, flax and hemp fortified with tannins and garlic-based additives) could cut methane emissions 18-25%. But instead of getting cattle off processed corn and soy, US Agriculture Secretary Tom Vilsack has announced a costly techno-fix that aims to reduce dairy industry GHG emissions 25% by 2020. The USDA and Dairy Management Inc. — an organization representing 56,000 dairy producers — have hatched a plan to use taxpayer funds to provide methane digesters to large livestock operators. The digesters will make it possible to use methane captured from “manure lagoons” to produce heating fuel and electricity.

In 2008, Dean Foods received a \$500,000 USDA grant to build an anaerobic digester for its Big Sky Dairy in Idaho. With taxpayer support, Dean Foods turned the methane from 4,700 dairy cows into 1.2 megawatts of electricity. In addition to profiting from the sale of the electricity, Dean also receives valuable “renewable energy credits.”

By 2008, the USDA, the EPA and Department of Energy had funded around 150 waste-to-energy digesters that produced approximately 341,400 MWh of electricity. But these digesters raise environmental concerns because they tend to release nitrogen oxide. These federal incentives also serve to increase the economic viability of massive cattle and hog operations that contribute to water pollution and air pollution.

Meanwhile, the country’s sustainable, small-scale dairy farms (which graze cattle in open fields and don’t have a problem of excess manure) receive no such federal support. Adding insult to injury, the 2008 Farm Bill continues to provide subsidies for commodity crops — wheat, corn and other mainstays of the fast-food industry that have contributed to soaring rates of obesity, diabetes and heart disease — while denying similar assistance to growers of fruits and vegetables.



Peggy Greb / USDA

RESOURCES

The Cornucopia Institute has compiled a scorecard that ranks organic dairy products based on their ethical approach to milk production. It is available at: http://cornucopia.org/index.php/dairy_brand_ratings

Cornucopia also maintains a *Who Owns Organics* chart (created by Michigan State University Professor Philip Howard) that shows consumers whether their favorite organic brands are made by Agribusiness or family farms: www.cornucopia.org/who-owns-organics

CAMPAIGNS

Organic Consumers Association has petitioned the USDA to stop Dean Foods and other factory farm dairy feedlot operators from falsely labeling their products as “USDA Organic.” www.organicconsumers.org/sos.cfm

Livestock and Climate Change

Tyson cares about important issues, such as families, the environment, communities, food safety, and education.... Our Team Members across the country ... work to make their world a better place.

— Tyson Foods, Inc.

Tyson is the world's largest beef producer (and the second-biggest processor of pork and chickens) with \$27 billion of sales in 2009. Founded in 1935, this Arkansas-based multinational is the largest processor of chicken, beef and pork in the US. The company's 300 facilities worldwide (including 123 food plants in the US) employ around 107,000 employees. Tyson is the major source of chicken, pork and beef for restaurants and the fast-food industry. Tyson's "vertical integration" strategy has established control over the entire food process — from breeding, to slaughter, to processing, to distribution. With more than 7,200 poultry farms under contract, Tyson's 54 chicken plants process 43.5 million birds every week. Thirteen beef plants and six pork plants process nearly 171,000 cattle and 348,000 pigs per week. Since 2001, Tyson has swallowed nearly 20 competitors, including Iowa Beef Processors, previously the top US beef packer.

BACKGROUND

Meat and dairy animals now account for about 20 percent of all living land animals. Livestock now occupy 30 percent of Earth's land surface, with some 33 percent of the planet's arable land now devoted to producing feed for livestock rather than food for people. Each year, around 56 billion land animals are raised and slaughtered to feed global markets. Cattle, pigs and poultry produce 40% of the world's agricultural gross product. Global meat production is projected to more than double from 229 million to 465 million tons by 2050, with milk output set to soar from 580 to 1,043 million tons.

The UN Food and Agriculture Organization (FAO) has estimated that (when emissions from land use are included), the livestock sector generates more GHGs (measured in CO₂ equivalent) than the direct CO₂ emissions from buses, trains and cars. By this measure, cows and cattle would account for 18% of global GHGs including 9% of human-caused CO₂, 65 percent of anthropogenic nitrous oxide and 37 percent of all human-induced methane. The FAO has called livestock production "a major threat to the environment." (Note: the FAO's estimates are being revised. An updated report is due out later this year.)

Livestock in the US account for 55% of land erosion, 37% of pesticide use, 70% of antibiotic consumption, 64% of the ammonia that winds up in rivers and in acid rain, and 33%



Stephen Ausmus / USDA

of the nitrogen and phosphorous run-off that has turned large stretches of ocean into "dead-zones."

In Latin America, where 70 percent of the Amazon's forests have been cleared for cattle pastures, overgrazing disturbs water cycles and contributes to biodiversity loss. According to the UN report, "Livestock's Long Shadow," deforestation for animal agriculture releases an estimated 2.4 billion metric tons of CO₂ annually. Plowing intact grassland to grow crops (mainly to feed livestock) releases as much as 28 million tons of CO₂ per year. Grazing cattle on these cleared lands releases another 100 million tons of CO₂ per year. Finally, the slaughter of livestock releases "several tens of millions" of tons of CO₂ a year.

On the plus side, livestock husbandry provides livelihoods to about 1.3 billion people. For many poor farmers, livestock provide renewable energy for pulling plows, a source of organic fertilizer for their crops and an essential supply of protein for their diets.

The impacts of industrial agriculture are not so beneficial. On average, producing a pound of Big Ag meat requires 16 pounds of grain. A Cornell study estimates that livestock consume more than five times as much grain as the entire US population. In addition to debating the practice of diverting food-for-fuel, it may be time to consider the long-term sustainability of diverting food-for-feed.

Tyson came to dominate the US meat industry by taking over smaller competitors and pursuing a strategy of "vertical integration," wresting control of the entire food chain from field to mill to slaughterhouse to distribution. Tyson has also forged tight supplier relationships with major fast-food giants like McDonalds and the mega-retailer Walmart, which buys 13% of its products.

The agrofuel boom was bad news for Tyson, which saw corn and soy prices skyrocket as supplies of cheap animal feed were diverted from cattle to Cadillacs. In response, Tyson has shifted a significant share of its production from

the Midwest to the Global South, staking its future growth on expanded meat production in Brazil, China and India.

The strategy of "off-shoring" livestock operations allows Tyson to enjoy the cost-savings that come with tapping cheap labor and lax environmental laws. In its quest to turn Brazil into its new base of operations for supplying meat to the global market, Tyson has contracted with large landowners to install huge industrial barns on 1,000-acre plantations. So far, President Lula da Silva has failed to put the brakes on foreign food giants that seek to build new empires of profit on the ashes of the Amazon.

CAFOs – Factory Farms for Livestock

One of the worst expressions of industrial agriculture is the Concentrated Animal Feeding Operation (CAFO). In the US, there are around 9,900 CAFOs housing millions of cattle, pigs and poultry. These factory farms consume vast quantities of petroleum for heating, cooling and ventilation and release an estimated 90 million tons of CO₂. Tyson's apparent goal is to turn Brazil into its "CAFO to the world." Some CAFOs confine tens of thousands of steers, dairy cows and hogs and hundreds of thousands of chickens in massive sheds and feed-yards, where they are fattened on soybeans, genetically engineered corn and recycled animal by-products, treated with antibiotics and forced to stand ankle-deep in their own excrement. The FAO estimates that 56 billion animals are killed each year to feed the wealthiest of Earth's 6.6 billion human inhabitants. While comprising only about 5 percent of US animal operations, CAFOs produce more than half of the country's food animals. Because they generate about 65 percent of the country's animal manure — more than 500 million tons per year of liquid and solid waste — CAFOs are major sources of ammonia, hydrogen sulfide, methane and nitrogen gases.

Despite overwhelming evidence that CAFOs produce GHGs, volatile organic compounds and particulates, the EPA does not require these facilities to meet the Clean Air Act's testing, performance or emissions standards. Although smaller operations can be more efficient and less



Regis Lefebvre / USDA

Hogs crowded into a CAFO

harmful to the environment, CAFOs have flourished due, in part, to generous (mostly indirect) federal subsidies. Solutions to addressing the environmental impact of these animal concentration camps range from placing tarps over lagoons of wastes to changing animal feed, inventing "anti-methane" injections and genetically engineering "cleaner" cows. Meanwhile, Tyson has found another way to cut costs — it is burning animal wastes and animal fat for fuel.

REMEDIES

While Washington has offered taxpayer subsidies to help some of the largest and worst GHG offenders build anaerobic digesters to turn wastes into energy, the better course would be to stop subsidizing pollution by requiring CAFOs to abide by the Clean Air Act and reduce their emissions. Properly managed open pastures require less upkeep and energy, capture more heat-trapping CO₂, do a better job of absorbing soil nutrients and produce less air and water pollution. The manure of cattle grazed in open pastures produces about 50% fewer GHGs.

A February 2010 FAO report proposed instituting a "carbon-tax on livestock" — essentially, a levy on the GHG flatulence of cattle, pigs and sheep. The FAO report criticized the livestock sector for "consuming a large share of the world's resources and... contributing a significant portion of global greenhouse gases." The proposal would hit Cargill and Tyson squarely in the bottom line.

The Livestock, Environment and Development Initiative has proposed a number remedies, including: soil conservation; excluding livestock from sensitive areas; grazing livestock on pasture grass (rather than processed corn and soy feed) to reduce methane; introducing full-cost pricing for water and taxes to discourage large-scale livestock operations. Other remedies include ending subsidies for commodity corn and soy crops, enforcing anti-competition laws, and requiring CAFOs to report GHG emissions. (Federal subsidies for biogas plants to recycle manure is a mainly a gift to CAFO sites that confine large numbers of animals.)

CAMPAIGNS

Friends of the Earth, The Center on Race, Poverty and the Environment, The Humane Society of the United States and others have sued to force the EPA to crack down on CAFOs by requiring them to reduce land, water and air pollution while curtailing emissions of GHGs.

Humane Society of the US and Farm Sanctuary convinced Michigan to start phasing out veal cages, battery cages for poultry and gestation cages for pigs. Arizona, California, Colorado, Florida, Maine and Oregon have passed similar laws. Wendy's, Safeway, Burger King and Carl's Jr. are moving to "cage-free" products.

The Coalition for Justice and Sustainability in the Meat Industry is pressing big meat companies like Tyson, Hormel and Smithfield to become more sustainable. For more information see: www.iccr.org/issues/place/index.php or contact William Kramer at wkramer@access4less.net

Dow AgroSciences Pesticides and Climate Change

The products we make find their way into products that provide people the world over with improved lifestyles. All of us at Dow understand and take pride in this contribution.... We put our science and technology to work to create solutions for our customers and for society.... What We Seek to Become: To be the largest, most profitable, most respected chemical company in the world.

— Dow Chemical Company

The Dow Chemical Company, an American firm founded in 1897 and headquartered in Midland, Michigan, is the second largest chemical manufacturer in the world (after BASF). With 214 company sites in 37 countries and customers in 160 countries, Dow's 52,000 employees staff seven major operating segments that produce plastics, chemicals and agricultural products. The company's 2009 sales totaled \$45 billion. While Dow sometimes sells directly to customers, most of the company's products are sold to other manufacturers. **Dow AgroSciences**, a wholly owned subsidiary of Dow Chemical based in Indianapolis, Indiana, manufactures pesticides, cultivates seeds and promotes biotechnology as a "solution" to world hunger.

BACKGROUND

The Agricultural Revolution, like the Industrial Revolution, was fueled by technological innovation and cheap oil. As smoke-belching tractors began to plow the earth, they drove millions of oxen, horses and small farmers from the land. The success of corporate agriculture (like most capital growth) required the exploitation of natural resources and the poor. Explaining America's expropriation of the 420 million acres once occupied by Native Americans, US Senator Henry Dawes memorably remarked: "Common property and civilization cannot coexist."



Industrial farming requires toxic chemicals.

With the end of the era of cheap oil, the advent of agrofuels promises to prolong the entrenched carbon-based "Combustion Economy." Even if the world does manage a transition to a renewable energy economy, the landscape may already be transformed by the power of the multinationals. As Food First Executive Director Eric Holt-Giménez observes: "the present Agro-fuels Transition will 'enclose the commons' by industrializing the remaining forests and prairies of the world. It will drive the planet's remaining smallholders, family farmers and Indigenous peoples to the cities." As oil becomes less available, the price of agrofuels will soar. As a result, Holt-Giménez notes: "The planet's energy crisis is potentially an \$80-\$100 trillion dollar bonanza for food and fuel corporations."

Having seized the land from the native inhabitants (in the process transforming 93% of the continent's prairie grasslands into croplands and cities), the captains of capital moved on to seize the country's croplands from America's small farmers. Between 1940 and 1970, as corporations began to consolidate their control over the world's food supply, the number of US workers employed on the farm fell from 18 percent to less than 5 percent.

As Anuradha Mittal of the Oakland Institute observes: "In the 1930s, 25 percent of the US population lived on the nation's 6 million farms. Today, America's 2 million farms are home to less than 2 percent of the population. There are more people behind bars than behind the wheel of a tractor." Small family-owned farms have been plowed under by vast, industrialized farming operations. In modern America, both land and wealth now concentrate at the top with 8% of US farming operations controlling 72% of food sales. This degree of corporate growth would not have been possible without the profligate application of billions of tons of climate-altering chemicals.

According to a Cranfield University study commissioned by the Crop Protection Association (a pesticide-manufacturers' group), pesticide manufacturing represents about 9% of the energy use expended on arable crops and represents about 3% of the 100-year Global Warming Potential (GWP) from crops. Drawing on research compiled by Duke University and the National Institute of Environmental Health Sciences, a coalition of environmental groups including the Sierra Club, Beyond Pesticides and the Pesticide Action Network has asked the EPA to review the relationship between pesticides and climate change. While it is known that manufacturing pesticides and fertilizers generates greenhouse gases and that industrial agriculture depletes carbon locked in the soil, there are other important pesticide-related climate-change effects that EPA regulators need to consider. These include:

- Changes in global transport patterns of wind- and water-borne chemicals.
- Increased spread of pests creating pressure to intensify the use of pesticides.
- Increased pesticide risk for people and ecosystems exposed to "exceptional" weather events such as flooding.
- The release of previously deposited persistent pesticides from polar ice as the climate warms.

Just as "cocktails" of pesticides are often more toxic than their individual toxicities would suggest, so too can the combined effect of pesticides and climate change prove to be greater than the sum of the individual effects.

After an August 2009 meeting with the environmental coalition, EPA staff agreed that the pesticide-climate connection needs to be investigated. The Senate Agriculture Committee has taken an interest as well. The next steps will most likely involve convening an EPA Scientific Advisory Panel. Ultimately, this could result in across-the-board improvements in the way EPA conducts pesticide risk-assessments. EPA scientists already have concluded that the effects of climate change "include sickness and death" and that global warming threatens "virtually every facet of the living world around us."

Dow's Greenhouse Gas

The only currently known example of a pesticide that contributes directly to climate change is the Dow fumigant sulfuryl fluoride (brand-name Vikane®). The insecticide is mainly used to kill termites by pumping the gas into an infested structure once it has been covered by a tent. Unfortunately, researchers have discovered that Vikane is a greenhouse gas that is 4,780 times more potent than CO₂.

It was previously believed that sulfuryl fluoride's active atmospheric lifetime was as short as five years but researchers at the University of California at Irvine now report that sulfuryl fluoride may remain in the atmosphere for up to 100 years. This raises serious concerns as Vikane use has nearly doubled in the last six years. About 60 percent of the world's sulfuryl fluoride use occurs in California, where Vikane's annual impact equals the amount of CO₂ emitted by about one million vehicles.

Sulfuryl fluoride blocks a wavelength of heat that otherwise would easily escape the Earth. Carbon dioxide blocks a different wavelength, trapping heat near the surface. "The only place where the planet is able to emit heat that escapes the atmosphere is in the region that sulfuryl fluoride blocks," says UC Irvine Chemistry Professor Donald Blake. "If we put something with this blocking effect in that area, then we're in trouble."

Chemists worry that sulfuryl fluoride emissions will increase — especially given the ban on methyl bromide, an ozone-depleting fumigant regulated under the Montreal Protocol. (Although recognized as a toxic chemical, sulfuryl fluoride emissions are not regulated under the Montreal Protocol.)



Ken Hammond / USDA

Simply breathing sulfuryl fluoride can put workers and nearby residents at risk for neurotoxic harm. Studies on laboratory rats have found that sulfuryl fluoride can damage the nervous system, lungs and brain and cause developmental and reproductive harm. Since sulfuryl fluoride was only registered for use for "existing" infestations, EPA waived the environmental requirements and did not consider ecological risks. In 2007, sulfuryl fluoride was the top pesticide used in California, with more than 2.1 million pounds applied for structural pest control and about 42,000 pounds sprayed on almonds, broccoli, dried fruits, prunes, rice and other agricultural commodities.

Dow Agrochemical has applied to EPA for permission to apply 35,000 pounds of sulfuryl fluoride gas on 65 acres of test plots. Pesticide Action Network (PAN) warns that, if only 10% of this gas escapes into the air, it would have the global warming impact of driving a car 23 million miles or 930 times around the world. Commercial use of Vikane could easily result in the annual release of hundreds of times more climate-changing emissions. According to PAN, the "EPA's best course — and the one the law demands — is to deny the experimental use permit, as the climate impacts of sulfuryl fluoride make its use unjustifiable."

REMEDIES

There are non- and least-toxic alternatives for structural pest management that do not put public health and the environment at risk. In the field, there are many agricultural pest control options ranging from Ecological Pest Management to the use of mustard plants, which provide an effective (and biodegradable) alternative to chemical fumigants.

www.panna.org/fumigants/alternatives

CAMPAIGN

Alaska Community Action on Toxics, the Center for Biological Diversity, the Center for Environmental Health, Defenders of Wildlife, Pesticide Action Network, and the Sierra Club have issued a joint-appeal to the EPA to deny an experimental permit for the use of Vikane. <http://panna.org/fumigant>

MONSANTO

The False Promise of “Climate-Ready” GMOs

Monsanto is an agricultural company. We apply innovation and technology to help farmers around the world produce more while conserving more. We help farmers grow yield sustainably so they can be successful, produce healthier foods, better animal feeds and more fiber, while also reducing agriculture’s impact on our environment.

— Monsanto

The Monsanto Company is a US-based multinational agricultural biotechnology corporation. It is the world’s leading producer of the herbicide glyphosate (aka “Roundup”). Monsanto is the world’s largest supplier of conventional seed and the leading producer of genetically engineered (GE) seed, selling 90% of the world’s GE seeds. Founded in 1901, the Missouri-based company employs 21,700 workers and netted \$2.1 billion in profits on earnings of \$11.7 billion in 2009. Monsanto’s development and marketing of GE seed and bovine growth hormone, as well as its aggressive litigation and political lobbying, have made the company a major target of environmentalists and anti-globalization activists around the world.

BACKGROUND

As a result of decades of bad farm policy, market consolidation and corporate influence, our modern food system is dominated by a small number of powerful agribusiness giants. Many activists consider Monsanto “the worst of the worst” — a corporation that intimidates farmers and extorts consumers. At the December 2009 Climate Summit in Copenhagen, environmental activists from around the world presented Monsanto with the Angry Mermaid Award, for being “the worst corporate climate lobbyist on the planet.” After years of federal inattention, the Obama Administration has signaled an interest in addressing the impacts of the monopolization of the nation’s food system. In March, the Department of Justice began a series of nationwide hearings into Monsanto’s anti-trust violations and monopolistic practices.

Monsanto is both a major chemical pesticide manufacturer and a major source of genetically engineered seeds. In 2008, 85% of corn and 92% of soy acreage was planted with GE seeds designed for use with chemical weed-killers — a strategy that increases the sales of both seeds and herbicides. The most successful seed-chemical match-up has been Monsanto’s Roundup-Ready seeds, engineered to survive repeated spraying of Monsanto’s Roundup



GE seeds threaten organic farms.

herbicide. Today, nearly 40% of commercial seeds have been engineered to contain insecticidal genes. Some seeds are now “double-” or “triple-stacked” to contain multiple genes for both pest- and herbicide-resistance. Over the past decade, the cost of Monsanto’s GE seeds has nearly doubled, outpacing crop yields by 2 to 4% a year.

Monsanto has found a way to profit from the fear of climate change by promoting the idea that biotechnology offers a “techno-fix” to unpredictable weather extremes. As of 2008, Monsanto and other biotech giants had filed more than 500 patents for “climate-related genes,” touting the imminent arrival of a new generation of seeds engineered to withstand heat and drought. This attempt to control the global market by patenting genes for proprietary seeds will further restrict the age-old farming practice of saving seeds with desirable traits (a practice that may prove even more important as the climate changes). Despite this latest gene-grab, none of these products has come close to fulfilling the manufacturers’ promise to end world hunger by creating drought-, heat- and salt-tolerant seeds and crops.

Genetically engineered crops that can resist climate change do not exist. Despite more than a decade of research and millions of research dollars, the bio-tech industry has failed to produce a single GE crop that can resist climate stress or vanquish hunger. Genetically uniform, single-template solutions cannot adapt to meet the unpredictable shifts of climate change — swings in temperature, rainfall, pest and disease, increasing frequency and severity of drought, storms and other weather extremes. In addition, the imposition of corporate patents serves to concentrate control over the seed sector, limiting seed diversity and binding growers to industry’s products. Industrial agriculture’s approach of linking GMOs and chemicals can actually boost GHG emissions while disrupting the soil’s ability to store carbon, cycle nutrients and retain water.

The costs of investing scarce research dollars in high-input technologies with a high failure rate are enormous — especially when this steers resources from chronically underfunded research in ecological and organic agriculture. Case in point: the last federal farm bill channeled “agrofuel” subsidies to Monsanto to produce a new line of genetically engineered Roundup-Ready sugar beets.

Herbicides in the Amazon

Like a planet-sized air-conditioner, the Amazon pumps seven trillion tons of water into the atmosphere every year, helping to regulate the climate and cool the planet. But, today, the Amazon is slowly drying out. Thanks to agricultural deforestation, the Amazon’s AC system is failing. Brazil now emits more greenhouse gases than Germany or the United Kingdom — and 59% of these GHGs arise from the sprawling soy plantations that are displacing the Amazon’s threatened forests. These unnatural monocultures demand massive infusions of chemical fertilizers and pesticides that Monsanto is only too happy to provide. Monsanto recently announced plans to introduce GE sugarcane to serve Brazil’s ethanol market.

Brazil has become one of the world’s largest users of pesticides. With 15 million people working on 3 million farms, pesticides can sicken as many as 200,000 and kill thousands in a single year. A quarter of the pesticides are used on Brazil’s soy crops. Monsanto’s glyphosate-based herbicide, Roundup, is widely used in the Amazon — even more so now that Monsanto has begun selling genetically engineered Roundup-Ready soy. As local vegetation evolves resistance to Roundup, the typical response of growers is to apply more Roundup. While Brazilian law bans planting of GE seeds in protected areas, buffer zones and Indigenous lands, Brazil’s government has signed an agreement with Monsanto to create new GE soy varieties custom-tailored to the Amazon’s soil and climate.

The Amazon suffers from the most massive deforestation on Earth, having lost twice as much forest acreage as Indonesia. (Indonesia’s *rate* of deforestation, however, is nearly triple that of Brazil’s). If deforestation continues at present rates, 40% of the Amazon could be gone in 40 years. The impact on our climate would be cataclysmic.

The Failure of GE Crops

Evidence continues to mount that GE seeds and GE-friendly chemicals are failing to sustain increased yields — but they have contributed to a soaring increase in the application of pesticides. An Organic Center study found that, between 1996-2008, US farmers who relied on GE seeds applied 318 million additional pounds of pesticides to 941 million acres — about an extra quarter pound for every acre of GE crop. In 2008, GE crops (soybeans account for two-thirds of the total) required 26% more pounds-of-pesticides-per-acre than conventional crops.

The amount of extra herbicides being poured on America’s GE acreage is increasing with each passing year. Between 2007 and 2008, herbicide use soared a whopping 31.4%. But now, with herbicide and pesticide sales falling (owing to the rise of “superweeds” that have developed resistance to its chemicals), Monsanto may be preparing to abandon pesticides for the seed business. “The value in the agriculture industry has shifted dramatically away from chemicals and into seeds,” says CEO Hugh Grant.

The Threat of GE Alfalfa

In 2006, the Center for Food Safety (CFS) successfully sued USDA on behalf of interested advocacy groups and a coalition of farmers who wanted to continue growing conventional alfalfa and feared crop contamination from Monsanto’s GE alfalfa seeds. Because alfalfa is a major source of forage for dairy cattle, it is the fourth most widely grown crop in the US. The USDA approved planting and sales of “Roundup Ready” alfalfa — the first genetically engineered perennial — without conducting the required environmental impact study and despite knowledge that Monsanto’s open-pollinated crops already had contaminated conventional and organic fields. Having appealed (and lost) twice in the lower courts, Monsanto has appealed the case to the US Supreme Court. The case, Monsanto vs. Geertson Seed Farms, marks the first time the risks of bioengineered seeds will be considered by the members of the High Court.

REMEDIES

- Establish protected areas in the Amazon to prevent further loss of forest cover. (As of 2006, Brazilian President Lula da Silva had created nearly 14.5 million hectares of parks and communal reserves in the Amazon.)
- Prevent the illegal occupation and clearing of the Amazon by demarcating Indigenous lands.
- Halt construction of roads like Brazil’s BR 163 that disrupt the integrity of the Amazon’s ecology by encouraging the expansion of illegal farming and cattle ranching and exposing the forest to increased risk of catastrophic fires.
- Halt expansion of Brazil’s soy export market by restricting soy cropping to land outside the Amazon region.

CAMPAIGNS

Combat Monsanto is an international campaign aimed at “building a world free from Monsanto.” www.combat-monsanto.co.uk

Millions Against Monsanto is the **Organic Consumers Association’s** campaign to “mobilize 1,000,000 consumers to end Monsanto’s global corporate terrorism.” www.organicconsumers.org/monlink.cfm

Stop GE Alfalfa. Despite widespread concerns, the USDA is getting close to approving the use of Monsanto’s GE alfalfa. **Food and Water Watch, Organic Consumers Association, Pesticide Action Network** and **La Via Campesina** are asking consumers to tell the USDA to preserve organic and reject GE alfalfa. <http://ga3.org/campaign/alfalfaEIS/>

Campaigns Against GE Food. NGOS have launched campaigns to stop Monsanto and other multinationals from claiming patents on seeds. In the US, **The True Food Network** petitions food companies that use GE ingredients and the **Center for Food Safety** backs two House bills requiring safety testing and labeling of GE foods. http://ga3.org/campaign/Label_GE_Food

SOLUTIONS

Farming to Save the Earth

“The American lifestyle is non-negotiable.”
— President George H.W. Bush,
1992 Earth Summit in Rio de Janeiro

“We must accept the challenge of doing the impossible. The alternative is unthinkable.”
— Elizabeth May,
Green Party of Canada

Agribusiness promised to end world hunger with a Green Revolution powered by costly chemicals, persistent pesticides, manufactured seeds, fossil-fuel fertilizers, and oil-powered machinery. But the Revolution faltered as living soils became addicted to chemicals and demanded ever-increasing doses to maintain an artificial “high.” While companies like Monsanto and Dow AgroSciences prospered by pushing their synthetic “fixes,” falling yields and rising costs eventually triggered farmer bankruptcies and mass-suicides — most notably in India. Meanwhile, companies like ADM, Cargill, Dean Foods and Tyson, were expanding, thanks to a “global market approach” that replaced local-farming-for-local-consumption with consolidated plantation economies designed to produce commodity crops for export. Many of these crops did nothing to directly address human hunger. Instead, crops were turned into animal feed and agrofuel or used as secondary ingredients in highly processed foods. As a result, the legacy of “agribusiness as usual” has been increasing hunger, soaring rural poverty, rising unemployment and social unrest.

Corporations can manipulate chemicals and markets but they cannot control nature’s swings of temperature, sun and rain. Land-based farmers, on the other hand, must learn to survive by adapting to ever-changing conditions and by maintaining flexible, ecologically resilient farming systems. A global shift to organic cultivation can start to undo damage caused by chemical fertilizers that have already destroyed much of the productive and carbon-holding capacity of the Earth’s soil. Such a shift also would directly benefit the one billion hungry people living in the world’s poorest regions. The 1948 Universal Declaration of Human Rights enshrined humanity’s “right to food,” but the 2009 World Food Summit expanded the concept of “Food Sovereignty” to insist that people also have a right to determine what they eat, how it is grown and how resources and benefits are shared.

Regenerative organic farming could turn farmlands into way-stations for survival. There are around 3.5 billion acres of tillable land on Earth. Converted to organic growing, the soil on these farms could sequester nearly 40% of current CO₂ emissions. If all 434 million acres of US farmland were



Alessandra Benedetti / FAO

converted to organic farming, this could eliminate nearly 25% of total US GHG emissions.

Organic farming is better suited to help increase food security in developing countries because organic inputs are available locally and at less cost than expensive imported chemicals. This guarantees that organic farming directly benefits local economies. The International Trade Center reports that organic farming generally requires less fossil fuel per-hectare and kilogram-of-produce than crops dependent on chemical fertilizers. Well-managed organic soils are better able to handle unpredictable climate extremes because of their ability to capture and store carbon, nutrients and moisture.

The Assessment

The epic 2008 report of the UN International Assessment of Agricultural Knowledge, Science and Technology (IAASTD) concluded that the key to global food security is not the costly industrial model favored by powerful multinational corporations but a global matrix of small-scale farms applying simple, low-cost, agro-ecological practices. At a time of global financial uncertainty, investing taxpayer dollars in costly, unproven high-tech projects doesn’t offer the kind of payback available from relying on proven, long-established farming practices. Turning away from industrial agriculture would assure an immediate drop in the production of the three major greenhouse gases — carbon dioxide, nitrogen oxide and methane.

The landmark IAASTD report argues that small-scale, sustainable agriculture can easily be integrated into local and regional food systems. A rapid shift from industrial monocultures to agro-ecological farming will require both state-of-the-art science and local, Indigenous knowledge — the kind of experience that comes from biodiverse, ecological, place-based farming. The IAASTD concluded that investing in agro-ecological farming is one of the best ways to improve yields while protecting public health and building cropland that is resilient to climate change.

Agro-ecological farming includes political, cultural, social and economic dimensions. Agro-ecological innovations tend to be low-cost, readily adaptable by small- and medium-scale farmers and are likely to advance social equity while conserving natural resources. Crop rotation, habitat diversification, agroforestry, mixed livestock-crop-fish systems, contour planting and Ecological Pest Management work to assure highly productive fields and yields that often out-perform conventional farms. Agro-ecological farming can be particularly effective in developing countries — especially during episodes of droughts, floods, storms and extreme temperatures.

In Central America, small-scale farmers using agro-ecological methods found their crops were better able to withstand the devastating effects of Hurricane Mitch. These organic growers lost less soil and money than those farming conventionally. Increased biodiversity tends to support the conservation of pollinators and natural pest enemies, enabling least-toxic pest management. Crop diversity also supports economic stability, more diverse diets and improved health and nutrition.

The IAASTD’s findings have been confirmed by numerous scientific studies. An Essex University review of 286 projects in 57 countries found that agro-ecological farming achieved average production gains of 79% per hectare. All the projects reported increased water efficiency and 77% showed significant reductions in pesticide use. Similarly, a University of Michigan examination of nearly 300 studies worldwide found that organic agriculture out-performed conventional practices by 57%. In 2008, a UN Conference on Trade and Development and UN Environment Programme report judged organic farming more likely to meet Africa’s food security needs than conventional production systems.

Organic Farming

At the start of 2008, 32.2 million hectares of certified organic crops were under cultivation worldwide (with 37% of the total in Australia). In 2009, more than 1.2 million organic farmers in 141 countries produced \$50 billion worth of chemical-free food. For more than 30 years, the Rodale Institute has been comparing side-by-side fields of conventional and organic crops. The evidence is in: organic farms can produce greater yields without synthetic or petrochemical inputs. Where industrial agriculture releases greenhouse gasses into the air, organic soils and crops pull carbon back out of the sky and put it back in the ground to nourish the next harvest.

After 50 years of “modern” chemical farming, the carbon content of many Midwest farms has plunged from 20% to between 1-2%. In contrast, Rodale’s “regenerative organic farming,” which relies on cover crops and compost instead of chemical fertilizers, has produced a 30% increase in stored carbon over the past 28 years. (And this improvement in crop-nourishing in-soil carbon was achieved with a 33% decrease in fossil-fuel use.)

Rodale estimates that organic farming, if practiced on all the Earth’s 3.5 billion tillable acres, could sequester nearly 40% of current global CO₂ emissions. As the Rodale Institute explains, regenerative organic farming “can convert carbon from a greenhouse gas into a food-producing asset.”

While the importance of the world’s great forests for carbon sequestration is well understood, the role of soil is often overlooked. Earth’s soils store an estimated 1.74 trillion tons of carbon — three times as much as is stored in the atmosphere, five times as much as is stored in forests.

Conventional crops grown with chemical fertilizers lose about 300 pounds of carbon per-acre-per-year. Rodale’s extensive field-testing has demonstrated that using composted manure and crop-rotations can sequester up to 2,000 pounds of carbon per-acre-per-year. Each pound of carbon captured in the soil represents 3.5 pounds of CO₂ removed from the air. If all of America’s cropland was converted to organic farming, this would capture nearly 1.6 billion tons of CO₂ per year — almost one-fourth of total US fossil fuel emissions, the equivalent of retiring one gas-powered car for every two acres of organic crops.

Because organic farming relies on local and natural inputs, it represents the most effective, inexpensive and easily implemented approach to addressing climate change and local food security while offering the best path out of poverty for the world’s 1.5 billion poorest farmers. As the UN Conference on Trade and Development declared in 2008: “Organic agriculture can be more conducive to food security than most conventional systems and it is more likely to be sustainable in the long term.”

No-till Farming & Silvopastors

No-till practices are often promoted as one of the best means to secure carbon in the soil. However, no-till practices are frequently accomplished by applying high levels of herbicides — most commonly Monsanto’s Roundup® (glyphosate) and Syngenta’s atrazine. This chemical-intensive strategy produces GHGs through herbicide manufacture, transport and application. It also poisons surface water and destroys mycorrhizal fungi that are crucial to the maintenance of healthy soils with the capacity to cycle nutrients and sequester carbon. USDA research has demonstrate that a chemical-free, minimal tillage practice — involving organic soil management with occasional tillage to incorporate organic amendments — sequesters far more carbon and builds greater soil fertility.

Silvipastoral practices increase biodiversity and soil carbon storage by intermingling a mix of trees, shrubs and crops. Silviculture projects in Latin America cut methane emissions by 21 percent and nitrous oxide emissions by 36%. The World Bank reports that the adoption of silvipastoral practices in Costa Rica and Nicaragua boosted the income of the local farmers by 55.5% and 66.9%, respectively.



The Rodale Institute's "regenerative" farmlands.

REMEDIES

Land-based Solutions

- Manage cropland to avoid leaving land bare.
- Use "catch-and-cover" crops to prevent erosion that can strip carbon and nutrients from the soil.
- Apply only appropriate amounts of nitrogen fertilizer.
- Reduce reliance on chemical fertilizers by rotating crops with nitrogen-fixing legumes.
- Halt the field-burning of crop residues.
- Reduce tillage. Organic no-till agriculture leaves more carbon in the soil.
- Restore the organic content in degraded land to maximize stored carbon.
- Avoid draining wetlands and apply erosion control.
- Improve water and rice management.
- Set aside lands protected from conversion to cropland.
- Practice silvipastoring and agroforestry.
- Improve management of livestock wastes.
- Eliminate chemical fertilizer manufacturing to reduce GHGs.

Institutional Solutions

- Reduce consumer demand for unhealthy commodity crops and meat.
- Enforce antitrust laws in agricultural production.
- Stop subsidizing agribusiness and unhealthy commodity crops through federal laws like the US Farm Bill.
- Stop using World Bank, International Monetary Fund and foreign aid loans to support unsustainable farming practices.
- Replace current predatory economic models with Green Economies that, instead of exploiting the many to benefit the few, benefit the many by providing real, sustainable benefits at the community level.
- Demand significant and enforceable international agreements to drastically reduce GHGs.

Shareholder Resolutions

A record number of global warming shareholder resolutions will be considered during the 2010 proxy season as new Securities and Exchange Commission guidance on climate change disclosure serves as a wake-up call for companies.

For nearly 40 years, the **Interfaith Center on Corporate Responsibility** has been a leader of the corporate social responsibility movement with an association of 275 faith-based institutional investors. Each year, the ICCR's members sponsor more than 200 shareholder resolutions on major social and environmental issues. www.iccr.org

The 20-year-old **Ceres** organization directs the Investor Network on Climate Risk, an association of 80 institutional investors with \$8 trillion of collective assets focused on the business impacts of climate change. www.ceres.org

Stop Eating Meat

Livestock farming has been blamed for everything from polluting local streams to deforesting the Amazon. Ultimately, the recognition that we inhabit a finite planet leads to an inescapable conclusion: in order for the human community to survive, people in the world's industrialized nations will need to eat less meat.

Dr. Rajendra Pachauri, Chair of the United Nations Intergovernmental Panel on Climate Change, author Michael Pollan (*Omnivore's Dilemma*) and Sir Paul McCartney all believe that one of the best ways we can help the environment and our health is to stop eating meat — at least once a week. "Give up meat for one day, initially, and decrease it from there," Pachauri advises. Meatless Monday, in association with the Johns Hopkins Bloomberg School of Public Health recommends a 15% reduction in meat consumption. (An even better way to reduce the human community's carbon footprint, of course, would be for the world's over-consuming nations to sharply reduce or eliminate consumption of all meat products.)

Compassion in World Farming calculates that, if the average UK household halved meat consumption, that would cut GHG emissions more than reducing car use by half. The group has called for industrialized nations to reduce meat consumption 60 percent by 2020. Campaigners have also pointed out the health benefits of eating less meat. The average person in the US eats around 234 pounds of meat and poultry per year — more than three times the world average and 25-50 percent more than World Health Organization guidelines.

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Agribusiness Action Initiatives

www.agribusinessaction.org



John Kykinga / USDA

Agribusiness and Climate Change Resources

Agriculture and Public Health Gateway
Bon Appetit Management Company
Center for Food Safety
Center on Race, Poverty and the Environment
Civil Eats
Clean Air Task Force
Community Food Security Coalition
Cool Foods Campaign
Cornucopia Institute
Earth Island Institute
Eco Agriculture
Family Farm Defenders
Farm Sanctuary
Food Climate Research Network
Food and Water Watch
Food First
Friends of the Earth
GRAIN
Green America
Greenpeace
Humane Society of the United States
Institute for Agriculture and Trade Policy
Interfaith Center on Corporate Responsibility
Johns Hopkins Center for a Livable Future
La Via Campesina
La Vida Locavore
Meatless Monday

National Catholic Rural Life Conference
National Family Farm Coalition
National Sustainable Agriculture Coalition
Natural Resources Defense Council
Organic Farming Research Foundation
Oxfam America
Pesticide Action Network
Pew Charitable Trust Commission on
Industrial Farm Animal Production
Rainforest Action Network
Real Food Challenge
Rodale Institute
Rural Coalition
SawitWatch
Sierra Club
Slow Food USA
Small Planet Fund
Sustainable Table
The Cornucopia Institute
The Ethicurean
The Green Fork Blog
The Land Institute
The Oakland Institute
The Organic Center
Union of Concerned Scientists
Waterkeeper Alliance
Wetlands International