Crisis brings opportunity

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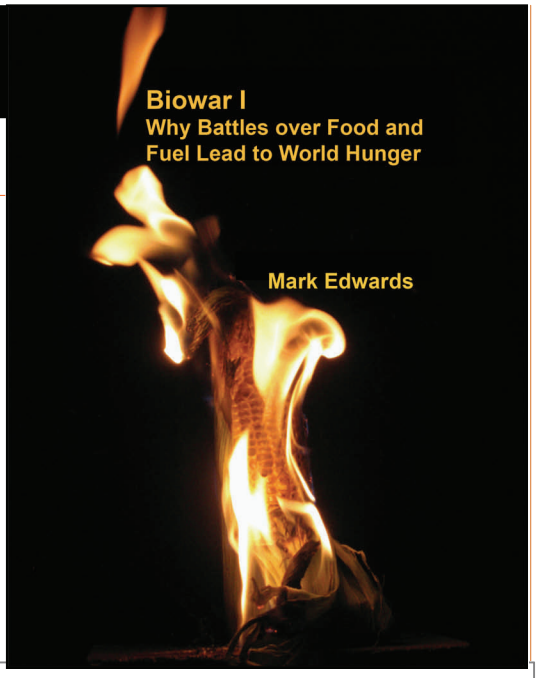
Biowar I: Solve World Hunger

Declare war to save food, water and peace.



Biowar I begins with these historical records for humans on Earth, the most:

- Food insecure global citizens, 3.7 B
- Hungry Americans
- Aquifer crashes
- Hot years & decades
- CO_2 levels in air
- GHG production
- Fierce hurricanes
- Springs, rivers and lakes go dry
- Cities facing water crisis
- Polluted rivers, lakes and well-water
- Dead zones
- Wild fires
- Acute human pesticide poisonings

Historical lowest:

- US grain stores
- Global grain stores
- Rainfall and reservoirs
- Aquifer levels
- Water tables
- Snow pack

It seems a poor time to self-inflict a costly, unilateral biowar.

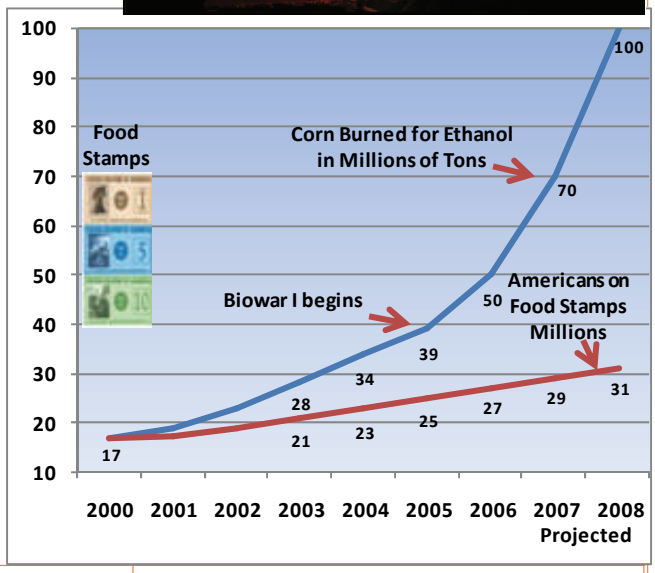
Burning 100 million tons of our primary food for fuel is **unsustainable** and wastes non-renewable resources, especially water. Growing massive amounts of corn represents ecological suicide as it drains trillions of gallons of non-replenishable groundwater, spikes food and fuel prices, decimates food exports and threatens millions with starvation from a food cascade.

Biowar I inflicts costs, casualties and catastrophe in a magnitude far greater than a conventional war. Taxpayers are forced to pay $43 B annually to subsidize erosion and pollution of our air and water for a tiny, 1.1%, replacement of foreign oil. America has insufficient disposable cropland, water or energy to waste on a policy that fails its objectives.

Compared with biofuel alternatives:

- Corn requires more water, land, fertilizer, herbicides + pesticides
- Severely pollutes air, soils, rivers, lakes and well-water
- Degrades and erodes soils
- Grows slowly and produces a low energy biomass yield, 3%

Corn ethanol is not sustainable. It consumes too much water, land, fertilizer and energy. The direct and indirect costs of the ethanol industry are neither sustainable nor sensible for farmers, consumers, taxpayers or food support recipients.



Biowar I Began

The 2005 Energy Policy Act ignited Biowar I with subsidies and mandates to increase food burned for fuel by 300% at a very inopportune time.

A 500 year drought endangers U.S. aquifers and survival for cities such as Atlanta and Aurora.

Over production of corn, due to subsidies, threatens to drain non-replaceable groundwater dry and pollute the remaining groundwater. U.S. energy policy wastes critical resources, decimate exports and threatens a food cascade that is likely to claim 30 million lives from starvation.

We must end Biowar I

Biowar I must end with a peace treaty promising to withdraw not soldiers but subsidies that are ecologically destructive such as water and ethanol.

America needs a sustainable foods and fuels policy.

A shift in subsidies to ecologically smart actions will enable a strong American economy that uses sustainable technologies to produce both food and fuel.

Fidel Castro's letter to President Bush and warned that his enthusiasm for his "sinister idea of converting food into fuel that jeopardizes the lives of 3 B people."

Mark Edwards speaks internationally on sustainable food and fuels, consults on marketing, leadership and strategy and serves on boards for food, energy and technology firms.

Mark can be reached at **drmetrics@cox.net**

Food

Sierra Edwards holds 3.6 lbs of corn, enough to fuel the Hummer for 1 mile. A Hummer consumes 33 tons of corn a year running on ethanol, enough **food to feed 777 children**.

This year while the Hummer gobbled corn, 11 M children died of starvation; 30,000 child deaths each day.

The World's Apple — shrinks by 40%

1. Over 150 countries must import food
2. Countries depend on supply and a stable price
3. The US supplies 50% of world grains
4. Only four other countries export much grain
5. Drought and heat toasted 15% of the other countries exports in 2006
6. The US will burn 50% of our half of world grain exports in 2008
7. Assuming a good US and world crop, the word's apple shrinks by 40% in 2008
8. Food prices spike, meat growers are forced to slaughter their animals and US exports tank

It's hard to imagine self-inflicting this damage.

Water

Aquifer – underground water storage; rock, sand, gravel.
Water table – top level of underground water.

Topsoil

Extraction

Alluvial – some recharge, 10% / yr.
- Extraction causes storage loss
- Depends on rivers flooding

Shale / bedrock

Fossil – no recharge
- Blocked by bedrock

Water table

- Can extract but not recharge
- Water entered a millennia ago

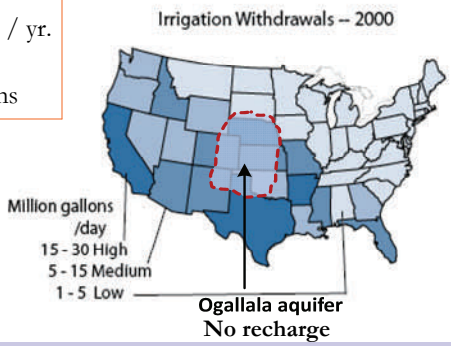
High Plains and West extract from fossil aquifers.
As water table lowers, spring, lakes and rivers go dry.

Aquifer water loss:

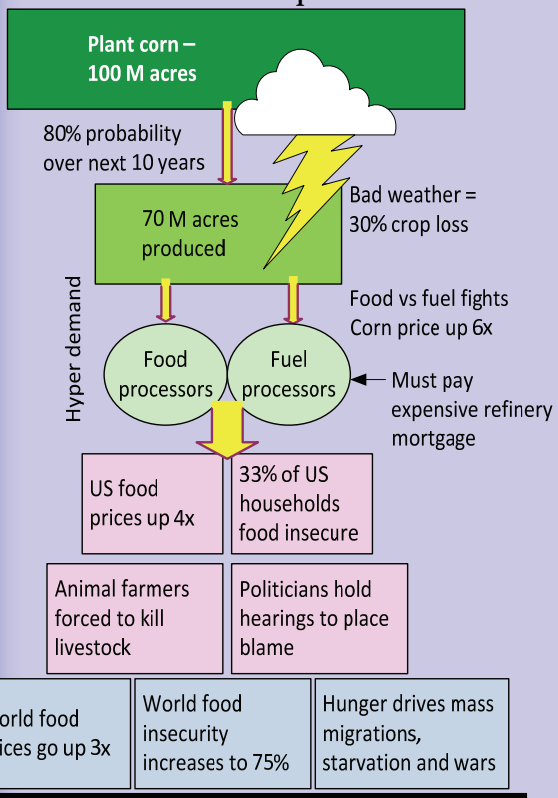
- > 5 Trillion gal pumped / yr.
- Parts already crashed
- Tragedy of the Commons

Subsidies for:

- Water and power
- Storage + delivery
- Growing corn
- Ethanol refining



Food Cascade — catastrophe



30 million people die of starvation due to food instability.

A **Food Cascade** operates like a bank run. It starts with a modest crop loss and then access swing begins as refineries search for corn. Then:

1. Food fights — foodies lose
2. Price spikes + spikes + ...
3. Exports crash
4. Meat producers slaughter their animals
5. People hoard food
6. Mass hunger and global food destabilization

What might create a 30% crop loss?

Bank runs are awful but less fierce than a food cascade because people are only fighting over money.

The costs and casualties from a food cascade are catastrophic.

- We must end Biowar I
- We can save 30 M lives.
- **End subsidies now!**

Our path forward; we need your help:

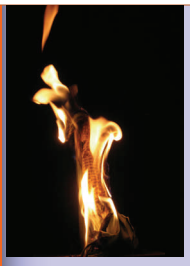
1. Write congress to end water and ethanol subsidies and waste
2. Extend Biowar I content — post
3. Send Biowar I to a friend
4. Update or correct sources
5. Enhance our network of people and sustainable food and fuel knowledge
6. Use Biowar I content for local presentations (Yes, you may.)
7. Contribute to surveys on sustainable foods and fuels policies
8. Add your quote to the world's voice!

Algae Case Study

Algae offers a renewable biofuel source that compared with corn is:

- 30 times more energy productive
- Takes 0.001 as much water
- Requires no cropland
- Gives a positive ecological footprint

www.biowar1.com



Action Plan —Save:

- Groundwater for our next generation
- Our soils from degradation and erosion
- Wetlands, birds, amphibians, fish and wild critters
- Groundwater from pollution
- 80 M Americans from food insecurity

- 30 M global citizens from starvation from a food cascade

www.biowar1.com

Our strategy to end Biowar I engages the combined efforts of many people. The web site provides opportunity to contribute your insights. Users may:

- Critique concepts, post new ideas or extend Biowar I content and models
- Identify sources for fuels and foods
- Present alternatives
- Update sources
- Use Biowar I content for local presentations
- Share your ideas for an effective path forward

Add your voice with a quote to support the world's voice.

Biowar I — Arguments against Corn Ethanol
Burning 100 M tons of Food

Science, economics and experience provide strong arguments against corn ethanol as a fuel source.

1. **World food** – Removing 50% of U.S. corn from world markets creates world food insecurity, a food cascade, riots, wars, population migration and **mass starvation**.

2. **Abuse of power** – Growing food gives the U.S. power and responsibility. We abdicate our responsibility to our fellow world citizens when we burn the food for our convenience that would stabilize world food markets and keep others from starvation.

3. **Fossil water** – Non-replaceable fossil water supports cities as well as irrigation. Irrigated corn requires **12 tons of fossil or surface water** for each gallon of ethanol.. The water exchange rate is far too high.

4. When aquifers crash, farmers will go bankrupt while they watch their fields revert to tumble weeds. Cities will have to relocate unless pipelines can replace aquifer water.

5. **Trade balance** – Ethanol was supposed to improve the trade balance by replacing foreign oil imports but fails that objective as the U.S. must import more natural gas. Ethanol threatens to decimate not just grain exports but meat and diary by reducing animal feed supplies and increasing prices.

6. **Eflation** — ethanol production drives up the cost of all corn inputs, foods made with corn and dairy and meats that depend on corn like cheese and beef.

7. **Land** – Production of over 120 M corn acres requires too much precious cropland – and with rotation, it requires over 240 M acres. America does not have disposable cropland.

8. **Water cost** – The U.S. has insufficient water in the right places to sustain the industry. The subsidized cost of irrigation makes irrigation water too expensive for ethanol.

9. **Environment degradation** – Massive corn production destroys the ecosystem, pollutes well water, rivers and lakes and devastates a large section of the Gulf of Mexico.

10. **Low productivity** – Ethanol production takes five acres of dedicated corn cropland, a full city block, to support just one car each year. A Hummer operating on E-100 consumes over 33 tons of corn a year.

11. **Cost** – Ethanol costs too much to make and requires unsupportable subsidies. Those subsidies could achieve U.S. energy objectives if used elsewhere.

12. **GHG** – The ethanol industry pollutes the air with inputs for growing corn, energy used in processing and transportation and burning ethanol in cars.

13. **Failed objectives** – Ethanol fails every objective promised by the Bush administration and his appointees at EPA, DOE and USDA.

14. **Energy** – Ethanol takes as much or more energy to produce as it delivers. Ethanol represents a zero-sum game.

15. **Green** – Ethanol production requires fossil fuels that are not renewable.

16. **Wipes out wildlife** – Massive corn production kills animals, birds and fish through habitat

destruction and pollution.

17. **Focus on ethanol** – Ethanol subsidies preclude sufficient R&D for renewable fuels with higher potential.

18. **Biomass waste** – Over 97% of the corn plant is waste, not energy. One corn plant yields only 1.5 ounces of gasoline equivalent energy.

19. **Not practical** – Massive use of resources makes ethanol unfeasible.

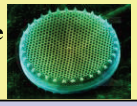
20. **Unsustainable** — resource constrains such as water, weather, land. Pollution and costs make the ethanol industry unsustainable.

Biofuels from Algae in *Biowar I: Foods and Fuels*

Algae Photosynthesis

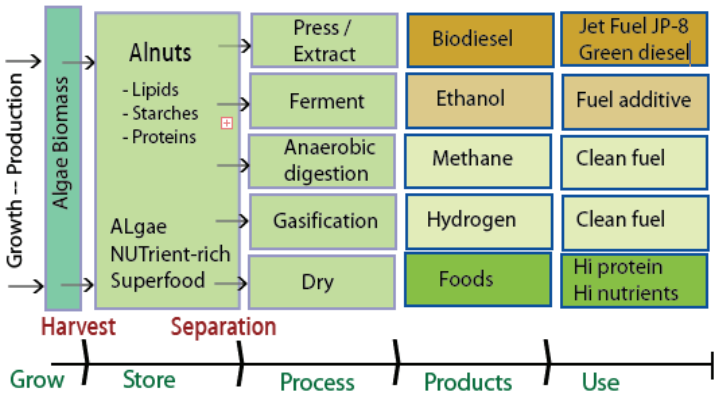
$6H_2O + 6CO_2$ ⇄ (Photosynthesis / Respiration) ⇄ $C_6H_{12}O_6 + 6O_2$

Water + carbon dioxide — glucose + oxygen (organic matter)

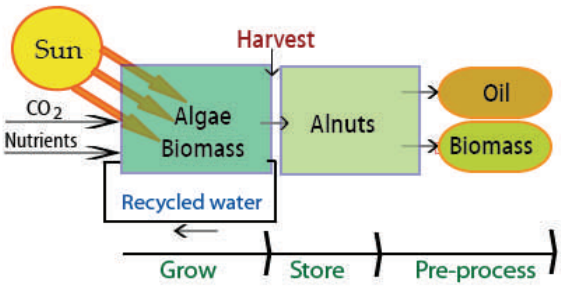


Cost of Production per Barrel

Algae / Alnuts Production and Uses



Cultivated Algae Production System, CAPS



Algae strategic issues:

1. **Light** — sunlight and /or artificial
2. **Mixing** — enable all cells to receive light
3. **Water** — variations in saline, waste and impurities
4. **Nutrients** — same as land plants, recoverable

Algae strategic issues, continued:

5. **CO_2** — food, delivery and management
   - Waste CO_2 utilization and conversion
   - Waste heat capture and use
6. **pH** — key to stability and species invasion
7. **Stability** — sustain optimal growing conditions

Mark Edwards champions solutions for sustainable food and fuels. Biowar I takes action to **save 30 M people from a food cascade and starvation** from the US energy policy that burns our food.

Biowar I offers strategic solutions:

1. End ethanol and water subsidies — subsidies promote overconsumption and waste
2. Preserve US groundwater — or ethanol will drain the US dry
3. Stop growing massive amounts of corn — it's ecological suicide
4. Stop burning food and avoid mass starvation from a food crisis
5. Engineer **sustainable foods and fuels** with water-plants or other organisms that do not compete with food for water or cropland.

Mark graduated from the U.S. Naval Academy in mechanical engineering, oceanography and meteorology where Jacques Cousteau motivated and mentored his interest in the oceans and global stewardship. He holds an MBA and PhD in marketing and consumer behavior and has taught food marketing, leadership, world future and entrepreneurship for over 30 years at Arizona State University. He serves on several boards, including the Arizona Science Center.

Mark served as CEO of TEAMS Intl., the software and consulting firm he founded based on his research on advanced assessment technologies. He served as lead assessment and leadership development consultant for over 400 firms globally such as Disney, J&J, GE, Intel, HP, AON, Monsanto, Motorola, General Mills, Coca Cola and food and energy companies. He has been retained by many U.S. departments and the military, including DOE, DOD and each of the National Laboratories. His technology firm, TEAMS Intl., won the prestigious Inc. 500 award and sold to an international consultancy. Since then, Mark focuses his energy on world hunger solutions and sustainable foods and fuels.

Engaging take-aways:

- Define the crisis for food, water, fuel and sustainability
- Understand ethanol, corn, ecology and sustainability
- Answer your questions about advances in foods and fuels
- Decipher government and industry disinformation
- See clear science, e.g., 1 gal of ethanol consumes 3,000 gal of water, 12 tons
- Learn a sensible path forward

Create an action plan to save:

- Groundwater for our next generation
- Our air and soils from, GHG, degradation and erosion
- Wetlands, birds, fish, amphibians and wild critters
- 80 M Americans from food insecurity
- 30 M people from starvation

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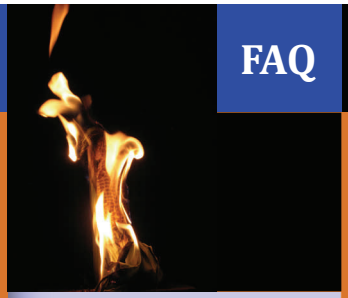


FAQ

Biowar I: Food versus Fuel — Key Metrics

Stop burning food. End ecologically damaging subsidies.

What is a biowar? **Biowar** – Food or poisonous agents act as destructive weapons. Biowar I burns our #1 food source, corn, to produce a weak energy product and inflicts:

Costs – Billions in subsidies + higher food and gas costs

Casualties – 60 M Americans are hungry and on food support

- Extracts our non-renewable fossil water, especially in the High Plains and West
- Poisons our rivers, lakes and well water from fertilizer and pesticides
- Kills or maims fish, aquatic life, amphibians and birds

Catastrophe – high probability of causing mass starvation for **30 M world citizens**

Biowar I causes pain, loss and destruction in a magnitude far greater than a conventional war because it operates **systemically.**

What are the key metrics? Corn's weak productivity:

- Burning 50 M tons of corn replaced only 1.1% of imported fuel in 2006
- A 10', 4 lb mature corn plant yields only 1.2 oz gas equivalent energy
- 97% of the corn biomass is waste, not energy
- 1 Hummer consumes 33.5 tons of corn, enough to feed 400 children for a year
- 35 B gal of ethanol, the DOE target, would consume about half of U.S. cropland

Corn's thirst: 1:3,000

- 1 gallon ethanol from irrigated corn consumes 3,000 gallons of water
- 300 foot drop in the non-renewable water table in parts of the High Plains and West

Corn's pollution:

- 6 tons of soil per acre of corn are lost to erosion each year
- 10:5:5 M tons of nitrogen, potash and potassium applied annually; corn's fertilizer
- Creates dead zones in water bodies such as one the size of New Jersey in the Gulf
- Corn needs more fertilizers, herbicides and pesticides than other crops
- Led to 4 M acute poisonings in 2004 and 30% of water bodies unfit for people

Corn ethanol's cost:

- 43 B in direct and indirect subsidies
- Pushes up prices of natural gas, land, equipment and all agricultural inputs
- Burning 100 M tons of corn drives food prices beyond the means of many

World food:

- Taking 100 M tons of corn off world markets will at least double food prices
- Ethanol consumption of corn will crash U.S. food exports
- A modest production loss will lead to a food cascade and mass starvation

What new content does Biowar I offer?

Biowar I offers new content showing the unintended consequences from ethanol:

1. Three fatal design flaws in the ethanol business model
2. The high probability for U.S. and world food destabilization
3. The incredible land and fossil water for minimal replacement of fossil energy
4. A clear report card on energy policy objectives
5. A renewable fuel source many times more energy productive than corn
6. A compilation of experts and world leaders who say "stop burning food"

Biowar I provides a practical path forward to end the biowar and create a sustainable food and fuels future for the U.S. and the world by developing an algae industry.

What can you do?

We need your help on our path forward.

1. Write Congress to end ecologically damaging subsidies such as water and ethanol
2. Extend Biowar I content — post on www.Biowar1.com
3. Talk to your friends about Biowar I
4. Create a new metric
5. Update sources and enhance sources
6. Challenge these or new arguments — pro or con
7. Enhance our network of people interested in sustainable food and fuel
8. Add useful links to content and people
9. Use Biowar I content for local presentations (Yes, you may.)
10. Contribute to surveys on sustainable foods and fuels policies
11. Add yours to the world's voice with a

Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has.

—Margaret Mead

Biowar I. *America becomes the first society in human history to intentionally burn their food.*

End subsidies now!

Biowar I:

1. **Stop burning food**
2. **End ecologically damaging subsidies**
3. **Avert a world food catastrophe**

The Biowar I initiative does what?

Biowar I initiates a social revolution that engages stakeholders to address the collateral damage of our ethanol policy that burns our food and threatens millions with starvation. Taxpayers must pay $43 B annually to subsidize the pollution of our air, soils and water. We have insufficient disposable cropland, water and energy to waste on a policy that achieves none of its objectives. The goal of Biowar I is to withdraw ecologically damaging subsidies such as water, corn and ethanol.

What is meant by burning food?

Farmers grow corn as the feedstock to produce ethanol. Corn may be sold to food processors for food or animal feed or may be sold to ethanol refineries. Ethanol refineries crush and heat the corn in fermentation ovens in order to make ethanol — 200 proof corn whisky.

Is there an alternative to ethanol?

Biowar I offers an alternative renewable fuel; alnuts made from algae. This solution, along with other renewable energy options such as wind, solar and others, provide renewable fuels that do not compete with food. Biowar I must end with a peace treaty that promises to withdraw not soldiers but subsidies that encourages consumption that causes global warming and ecological destruction. America can build an economy that uses truly sustainable technologies for food and fuel.

Why does ethanol push up food prices?

When refineries burn 100 M tons of corn in 2008 to produce ethanol, the supply of corn in the U.S. and on world markets go down. As supplies fall, food prices go up because about 25% of the foods in a supermarket have corn or corn sugar as an ingredient.

Why do meat and dairy prices increase?

Farmers feed corn to their animals. When the price of corn doubles, farmers' input costs go up, which pushes up the cost of meats, diary, poultry and oils. If the inputs exceed market price, farmers lose money and all their hard work goes for naught.

What is eflation?

The price increase in food due to food supply reduction from ethanol is called eflation. An average family paid about $263 extra in 2007 due to price increases due to the ethanol industry.

Do consumers have a choice in using ethanol?

No, the government has mandated ethanol blends. Several states such as California have sued EPA and DOE with proof that ethanol creates smog and a 26% loss in grapes and citrus crops. Unsurprisingly, the government ruled in it's own favor — to impose ethanol.

Why did government miss the water requirement?

No one did the math.

The industry began with the EPA and then, because the clean air claim was false, moved to DOE. None of the origination documents on which the industry is based addressed either water consumption or water pollution.

The USGS claims only 10% of corn acreage receives irrigation while the USDA says 16%. A look at the placement of ethanol refineries shows over 30 depend on irrigated corn.

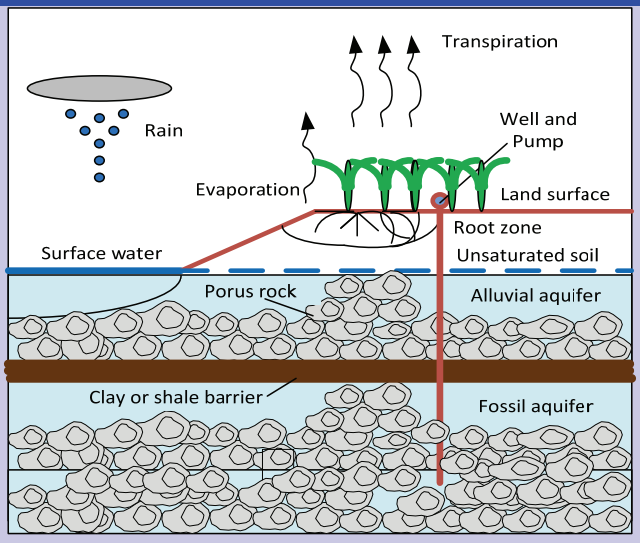
The Water Use Report shows the high plains getting 2.5 acre feet while some states in the West get 5 acre feet of water. Farmers and water utilities in the West have confirmed corn's need for 3 acre feet. In order to apply 3 acre feet, considerably more water must be delivered due to evaporation and seepage during water distribution.

Isn't irrigation water renewable or replaceable?

Mostly no. Water used for growing crops is called consumptive because much of the water evaporates from the soil or transpires from the leaves and is lost for local use. This water vapor may float hundreds of miles before it falls again in the mountains or on the seas. For farmers, families and industry, consumptive water is consumed and not replaceable. Rainfall may recharge surface water but only a modestly. Only 10 to30% of rainfall recharges alluvial aquifers.

Irrigation on the High Plains and parts of the West comes from the non-rechargeable fossil aquifers where the waters are as old as fossil fuels. Fossil water is not replaceable because a barrier of shale or clay stops seepage. Even if technology could solve the barrier problem, water contracts for cities and farmers have surface water locked up so it is not available for recharge.

Alluvial and Fossil Water Aquifers



What happens if the ethanol subsidies continue?

America loses its Breadbasket as the High Plains reverts to dry prairie. Farmers first, then communities and finally cities will be forced to migrate to find clean groundwater.

Ethanol fails its strategic objectives.

Strategic Objective	Meaning	Grade and Outcome
Independence	Help make the U.S. energy independent – use less oil	**F** 1.1% substitute for imports
U.S. Energy	Sourced in the U.S. – home grown or extracted	**C** About 60% US sourced Shift to dirty coal
Green	Sustainable renewable energy resource	**F** Neither renewable nor sustainable
Global warming	Reduce greenhouse gases	**F** Adds serious greenhouse gases
Environmentally friendly	Ecologically positive – a friend of the earth and enhances the environment	**F** N, P and pesticide run-off destroy well and other water
Clean burning	Creates a clean burn for consumers	**F** Ethanol is clean but growing corn and processing makes it dirty
Ethanol economy	Integrate ethanol through the U.S. economy	**D** Done but consumers have no choice and must pay billions in false environmental taxes

Ethanol fails its objectives. Why pay Billions for failure?

Why haven't others stopped the ethanol industry?

Politics. Ethanol is embedded in politics. Many people make huge donations to politicians with the expectation of subsidy benefits. Both political parties enjoy the donations from the farm and agribusiness lobbies. Many people have railed against subsidies, including politicians. However, seldom are subsidies retired because they are too lucrative to politicians.

Since the Presidency goes through the Iowa Caucuses, nearly every politician, except Senator John McCain, have not only blessed ethanol but called for increased incentives. Many Midwest Congressmen are locked in a cycle of political donations and promises to support ethanol subsidies.

Then how can we end subsidies?

Declare war — Biowar I. We can show the true cost of ecologically destructive subsidies such as water, power and ethanol. Only when the potential pain from agricultural suicide is readily apparent will politicians act.

Vision: Make the unintended costs and consequences of the ethanol industry crystal clear.

What are the main points of Biowar I?

U.S. Energy Policy that burns 100 M tons of food:

- Replaces only 2% of imported energy
- Makes no sense in a world where 4 B people are malnourished and 60 M Americans receive food support
- Subsidizes ecological destructive behavior – use of fossil fuels, fossil water and ethanol
- Fails its objectives – clean air, clean environment, renewability or displacing foreign oil
- Is impractical because it requires nearly half of US cropland to meet energy targets
- Uses 12 tons of water per gallon of ethanol
- Represents agricultural suicide due from massive monocropping of corn and resulting ecological damage
- Is unsustainable due to weather, water energy consumption and costs

Algae provides a far more productive biofuel alternative that consumes 0.001 as much water, no cropland and yields far more energy faster

A shift in subsidies to ecologically smart actions will enable America to build a strong economy that uses truly sustainable technologies for food and fuel

What surprised you in this research?

The non-sustainability of the ethanol industry:

- Subsidy costs exceeding $43 B a year
- Groundwater extraction for irrigated corn
- Low productivity of corn as a biofuel — < 3 % of the green biomass
- Fertilizer, herbicide and pesticide requirements
- Systemic pollution of air, soils and water from cornfields
- Increases in inputs, especially 500% for natural gas
- Surface and groundwater pollution resulting in poisoned water and dead zones
- The availability of strong alternatives such as algae, bacteria, puffs, slimes and yeasts
- The strong messages from world leaders to end the burning of foods, especially the U.N.

Way aren't people against ethanol?

Surprisingly, the large majority of people interviewed or contacted during this research acknowledged the industry is built on a foundation of sand. They just did not know how to end it.

Why is ending subsidies crucial?

If ethanol makes sense, the market will make adjustments and find the right price. Ethanol direct and indirect subsidies are so large they eclipse the opportunity to put strong R&D into alternative fuels that are truly renewable and that do not compete with food.

Is the ethanol industry sustainable?
No.

America has neither sufficient disposable water nor cropland to support the ethanol industry.

Production of 5 B gallons of ethanol in 2006 required 50 M tons of corn and reduced the US oil dependency 1.1% or about 15 days. When the ethanol refineries under construction come online in 2008, they will consume 100 M tons.

The industry is unsustainable due to:

Insufficient cropland. The president's goal of 35 B gallons of ethanol will require approximately one quarter of all available US cropland. In most areas, corn must be rotated annually with a nitrogen fixing crops such as alfalfa or soybeans which doubles the land requirement for corn. The US has insufficient quality cropland to produce enough ethanol.

Insufficient water. Irrigated corn consumes approximately 3 acre feet of water. This means every gallon of ethanol produced on irrigated land costs about 3000 gallons of water or 12 tons. Expanded corn production will use marginal land that requires more irrigation because most of the rain fed corn land is already under production. Most of the corn land west of the Mississippi requires 50 to 100% irrigation. Expanded corn production will dry up critical aquifers not only putting farmers out of business but putting cities in jeopardy such as Atlanta and San Diego.

Water pollution. Corn uses more nitrogen than other food crops but corn plants are inefficient in uptake and may only use half of the fertilizer applied to a field. Nitrogen dissolves easily in water and corn field run off enters wetlands, creeks and rivers, lakes, estuaries and groundwater. Nitrogen poisoning creates a host of serious health problems, especially for young and older people. Some communities in corn growing areas such as Iowa, Nebraska, Texas and California cannot use their groundwater due to nitrogen pollution. A recent EPA report indicated that over half of US estuaries are unfit for a primary use such as fishing or recreation.

Ecological degradation. Row crops like corn cause erosion of about 6 tons of topsoil per acre each year from wind and rain. Eroded topsoil pollutes waterways and groundwater and creates dead zones in lakes, rivers and estuaries. The dead zone at the mouth of the Mississippi is larger than the state of New Jersey. Pollution of wetlands poisons birds, fish, amphibians and other animals. Many rural families cannot use groundwater due to pollution from fertilizers, largely nitrogen.

Subsidies. The ethanol industry currently requires about $43 B annually in subsidies when all the water, power, corn, ethanol refining and other subsidies and incentives are summed. Subsidies for simply refining corn to ethanol at 51 cents a gallon will cost $5 B when 10 B gallons are produced in 2008.

Destroys U.S. exports. Corn ethanol will drive up the cost of U.S. foods, especially meats, dairy, poultry and oils and make them non-competitive in world markets. The U.S. will become a net food imported in 2008 making it quite illogical to burn 100 M tons of food for fuel.

Nitrogen. Corn fertilizer, especially nitrogen and potash, is not sustainable. The U.S. was the largest exporter of fertilizer for decades. Unfortunately, fertilizer production, like ethanol, requires lots of natural gas. The 500% increase in natural gas prices have extinguished fertilizer exports. In 2008, American farmers will buy a majority of imported fertilizers. An input that cost farmers 10% only a few year ago may cost 30% of more of their growing costs.

Ethanol 's fatal business model flaws.

What are the ethanol business model flaws?

Weather. The industry depends on good weather. One bad weather year for corn will crash the industry.

Governor. The industry designers forgot to put a limit on the amount of ethanol refined. Iowa, for example, will have 44 refineries and Iowa refineries will have to import corn feedstock from other states.

Cost ripple. Burning millions of tons of corn drives up the cost of foods, natural gas, land, equipment, fertilizers and all agricultural inputs. Food costs more because of ethanol.

How can we end Biowar I?

1. Withdraw ethanol subsidies	Let ethanol compete in the market with other bioenergy options.
2. Create a sustainable energy project	Focused on multiple renewable energy sources.
3. Withdraw subsidies that encourage pollution	Shift those subsidies, especially fossil fuels, to renewable energy.
4. Enable US departments to regulate	Allow departments to regulate in the public interest not the interests of Big Oil and political donors.
5. Begin environmental tax reform	Increase taxes on environmentally destructive activities.

A shift in subsidies to ecologically smart actions will enable America to build a strong economy that uses truly sustainable technologies for food and fuel.

Quotes

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The World's Voice — "Stop Burning Food."

United Nations: "Corn ethanol puts world food security at risk."

Many of the food, economics and environmental policy advocacy groups have repeated these arguments against the ethanol industry and shared their concerns about the impact on world food. For example:

James Hansen, Director, NASA Goddard Institute for Space Studies. "We are on the precipice of climate system tipping points beyond which there is no redemption."

Fidel Castro. In an April 2007 letter, he warned President Bush about his enthusiasm for his "sinister idea of converting food into fuel that jeopardizes the lives of 3 billion people."

Jacques Diouf, Director-General, United Nations FAO. "Crops that require high fossil energy inputs and valuable farmland, and that have relatively low energy yields, should be avoided."

Simon Upton, Director of the Global Subsidies Initiative. "All indications are that subsidies are being piled on top of one another without policy makers having a clear idea of their potential impact on the environment and the economy. Yet the potential for waste on a grand scale and some spectacularly perverse environmental outcomes is large. We suggest that the U.S. Congress declare a moratorium on programs that would increase or extend subsidies to liquid biofuels, with a view to developing a plan for phasing out subsidies to all transport fuels as quickly as possible."

Jeffery Sachs, Director of the Earth Institute at Columbia University. "Environmental pressures, namely loss of soil moisture, will compel hundreds of millions of people to relocate. This will deepen the food crisis for many of the world's poorest and most vulnerable people. Food and water insecurity creates wars, severe human suffering and starvation."

Jacques Diouf. "The most fundamental human right is the right to live, to exist, to biological integrity, which is not guaranteed to 854 million people who are hungry in the world."

Roger Samson, Canadian specialist in biofuels policy at REAP. "If this is a horse race, the U.S. government has bet on a donkey."

Steve Sanderson, president, Wildlife Conservation Society. "Intensive, subsidized sugar farming in Brazil displaced small farmers, many of whom have taken to cutting down and farming land in the Amazon rain forest."

Lester Brown, President, Earth Policy Institute. "The world population has the lowest grain reserves in 40 years, which means many people face starvation. Ethanol displaces too much food, is unsustainable, creates environmental destruction and will lead to dire consequences."

Robert Niven, Professor, University of New South Wales. "Ethanol increases the production of photochemical smog; offers little advantage in terms of greenhouse gas emissions, energy efficiency or environmental sustainability; and will significantly increase both the risk and severity of soil and groundwater contamination."

Ted Williams, Audubon Society. "Our addiction to corn-derived alcohol is not only costing us a lot of money but it's also wiping out fish and wildlife habitat, and polluting our air, soil, and water."

Tad Patzek, U.C. Berkeley. "The low energy conversion efficiency coupled with the energy intensive-process to produce corn ethanol, results in an overall process that yields no significant net energy benefit from corn-derived ethanol."

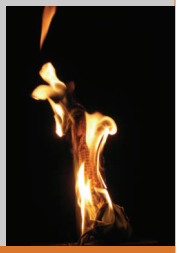
Josué de Castro, Brazil, *Geography of Hunger*. "Underdevelopment is not the lack of development; it is the result of an ill-guided kind of universal development.. Underdevelopment is a product of misuse of natural and human resources.. Underdevelopment and hunger can only be eliminated from the face of Earth through a global development strategy which will mobilize production means in the interest of the community."

Wall Street Journal. "Betting billions of tax dollars and millions of acres of farmland on ethanol (or even cellulosic ethanol) strikes us as bad policy."

Wall Street Journal. "Heavily subsidized and absurdly inefficient, corn-based ethanol has already driven up food prices. But the Senate's plan to increase production to 36 billion gallons by 2022, from less than seven billion today, will place even greater pressure on farm-belt aquifers."

Lao Tze. "The sage's transformation of the world arises from solving the problem of water."

Jonathan Swift, *Gulliver's Travels*. "Whoever could make two ears of corn to grow upon a spot of ground where only one grew before would deserve better of mankind than the whole race of politicians put together."



Michael Pollen, *The Carnivore's Dilemma*. "Corn is a greedy crop. Ask a farmer."

Chinese government. "We will halt ethanol plant construction for the threat it poses to food security.

End subsidies now!

What may cause a food cascade?

A small supply disruption will ignite market forces to create an economic firestorm that will kindle catastrophic damage as well as U.S. and world hunger.

The probability of each factor individually may be modest. However, taken together, especially including weather, the factors predict significant production interruptions. Then the only question under debate will be: "How could the experts have failed to anticipate either the events or the consequences?"

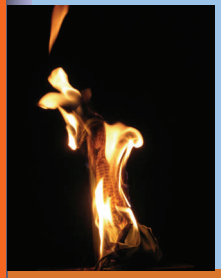
A variety of other factors could create a modest 30% production loss that leads to a food cascade; a chain of consequences that creates a psychology of scarcity and spikes food prices. Consider the events or factors that may create a 30% corn crop loss.

Environmental source

Drought – cities demand water as drought intensifies.
Big fall storm – twists stalks so harvesters fail to work.
Blight – mildew, rust or root knot nematodes destroy crops.
Rains – machinery cannot get into fields to plant, cultivate or harvest.
Resistance – pest develops insecticide resistance.
Global warming – unleashes a spectrum of fungal attacks on corn.
Volcano – in Pacific Rim blocks sun and creates 30 to 100% crop failure.
Aquifer depletion – a major aquifer goes dry from over-extraction.
Environmental crash – corn pollution causes an ecosystem to crash.
Hurricane – destroys oil rigs and infrastructure in the Gulf of Mexico.

Human source

EPA – begins enforcing fertilizer run-off pollution.
Cities sue – force farmers to stop well-water pollution.
Oil embargo – oil crisis makes ethanol inputs unavailable.
Potash mines – phosphate or potash mines run out of product.
DNA threat. GMO recall takes 50% of corn seeds off the market.
Fishermen sue – force industry to pay for Gulf of Mexico or Chesapeake Bay dead zone.
Seed supply – production mistake fails to produce enough corn seed.



China – experiences crop failures and buys entire U.S. corn production.
FTC – enforces "truth in advertising" and shuts down ethanol ads.
U.S. food importer – the U.S. becomes a net food importer and needs food to feed Americans.

Alternatives to the ethanol industry

Current energy policy fails all its strategic objectives and r**eplaces only 1.1% of U.S. energy imports** while wasting billions of dollars on subsidies, millions of acres of prime cropland and precious aquifer water. Simple actions might have saved more imported oil and natural gas than the billions of gallons wasted on ethanol, such as the following.

Subsidy changes

- Transfer ethanol subsidies to five cities a year to build public transportation systems
- End rather than increase subsidies for Big Oil fossil fuels
- Shift the U.S. fleet from expensive and inefficient E-85 to efficient gas-electric hybrids
- Require auto makers to increase gas mileage efficiency in cars by 5% (or keep the same mpg standards but use E-85 for mpg tests)
- Redirect half of NASA's space budget to renewable fuels R&D and climate monitoring

Environmental tax

- Follow Ross Perot's recommendation to tax gasoline to break our addiction
- Put an ecosystem tax on bottled water to represent its true environmental cost of bottling, transportation, handling and waste disposal
- Put a luxury tax on the sale and annual license of SUVs and other gas-inefficient vehicles
- Create ecotaxes or tax breaks to encourage consumer purchases of sustainable products and packaging

Promote energy savings

- Promote ride-sharing, mass transit, bikes and other forms of energy-efficient urban transportation
- Engineer a national campaign for home and commercial building insulation
- Replace incandescent light bulbs with energy efficient compact fluorescent bulbs that use one fourth as much electricity
- Recycle and reuse energy-costly products such as printer cartridges

Consumer behavior change

- Encourage consumers buy reusable bags for groceries and put ecotaxes on plastic bags
- Put meters on home electrical boxes so consumer can see their costs and savings
- Create a national campaign to insure tires are inflated properly
- Mandate more efficient household appliances, especially air conditioners

The corn ethanol industry cannot sustain itself, even with huge federal subsidies.

A shift in subsidies to ecologically smart actions will enable America to build a strong economy that uses truly sustainable technologies for food and fuel.