

## Achieving Multiple Strategic Goals with Agricultural Policy

A Series of One Page Strategic Goal Summaries

January 21, 2009

*Agricultural and food policies can impact other major policy objectives in very non-obvious ways. Expanding goals include: food and economic justice for all (urban and rural), energy independence, reduction of health problems which lowers health care costs, reduction and adaptation to climate change, increase in national security, and protection of our natural resources*

### 1. Creating economic and food justice

- Food justice means not just sufficient calories but an abundance of healthy, delicious high-quality food. Malnourished people do not thrive, and are more susceptible to a multitude of barriers to success. Urban agriculture can not only improve school performance but also create urban green jobs and revitalize local economies.
- Rural family farms are declining rapidly. The strongest family farms are the ones moving to organic, to direct sales through farmers markets and CSA's, to diversification, etc.

### 2. Moving towards energy independence with low-petroleum food systems

- Petroleum-based agriculture is raising prices *at every stage* of our food system- chemical farm inputs, multiple and long trips during processing, heavy packaging, etc.
- Converting to natural farm inputs and growing foods in non-traditional areas near population bases, reducing distant processing and processing more locally, reducing and reusing packaging all help mitigate total dependence on dwindling supplies of fossil fuels.

### 3. Reducing costs of health care with ag/food policies

- Agriculture that depletes healthy soils depletes the health of those eating the food. Hormone disrupting and neurotoxic chemicals sprayed onto our foods, industrial foods shift to unhealthy oils and high sugar content, etc. are contributing to a multitude of chronic illnesses, creating huge economic expense in lost productivity and medical care costs.
- Prevention with high quality foods is far cheaper than medical treatments for chronic illnesses.

### 4. Reducing greenhouse gas (GHG's) emissions and adapting food to a changing climate

- Agriculture has major untapped potential to sequester carbon to help reduce CO<sub>2</sub> levels, with organic regenerative farming having significantly more potential than chemical no-till.
- Food systems both create huge GHG emissions *and* are seriously vulnerable to changing climates.
- Food systems emissions are not merely from the agriculture sector, but also significant portions of transportation, energy used in manufacturing and in buildings, deforestation, etc.
- Perhaps the biggest threat of climate change is what happens to our food. Quite simply, plants grow outside, and the outside is quickly changing faster than plants will adapt.
- Major shifts towards seed conservation and sovereignty, diversification and localization of food production and processing, and carbon sequestration using sustainable regenerative methods.

### 5. Increasing national security through strengthening food systems and farm-based renewables

- When carbon begins to get priced to slow GHG emissions, petroleum-based growing and food traveling for thousands of miles even within the U.S. will become prohibitively expensive. This creates a sense of urgency because low-carbon food systems will take years to develop.
- Foreign countries need support in agro-ecology for local independence and sustainability without inputs from thousands of miles away.
- Renewable energy sources on ag lands must be carefully evaluated. Bio-fuels must be limited to being farmed sustainably with a significant carbon ratio benefit and be low-risk.

### 6. Improving environmental stewardship and food security through revamping our food systems

- Farming does not have to pollute our waterways and air with nitrogen and toxins; biodiversity can thrive in farmlands; pests and diseases can be controlled through sustainable farming methods; and healthy soils can help alleviate multiple problems, including depleted aquifers and other water issues.
- Local foods can reduce trash considerably by reusing food wastes and minimizing packaging.

*A one page summary will be available for each of these topics.*

## Creating Economic and Food Justice through Agricultural Policy

*Agriculture policy relates deeply to economic justice. Well-nourished people are happier, learn better, behave better, and are more successful. Nutrients essential to healthy bodies and brains are missing in today's processed foods, leading to major economic and food justice issues. Jobs can also be created in urban areas that lead to a healthier community. A new vision is also needed for small sustainable farmers.*

### Improving school performance through better food and gardens:

- One in six children suffers from a disability that affects their behavior, memory, or ability to learn,<sup>1in6</sup> and obesity, diabetes, allergies, and other health problems are exploding.
- Neurotoxins that harm brains are found in children at unsafe levels, much from food.<sup>BD</sup>
- Behavior and academic performance are significantly affected by the foods we provide children during the school years.<sup>1in6</sup> A Wisconsin school for at-risk students found that eliminating junk food, adding fresh food, etc. improved rates of attendance, suspension and truancy, while teachers noted marked behavioral improvement.<sup>BSB</sup> In California, some schools are linking improved school food, including direct farm-to-cafeteria foods (even organic salad bars) with gardens in the schools.<sup>BSF</sup>
- Behavior and learning can be markedly improved by changing to healthy foods.<sup>LB</sup>

### Creating green jobs with urban agriculture:

- Urban youth and others are earning incomes and learning skills through urban agriculture.<sup>JOB</sup>
- Affordable, fresh, delicious, chemical-free produce, meat and fish can be grown in cities.<sup>UA</sup>
- Community-based urban agriculture is a solution to food insecurity.<sup>FS</sup> New models for access to healthy food in urban food deserts, such as Oakland's People's Grocery,<sup>PG</sup> must be supported.

### Reducing unprecedented prison population through nutrition and gardening

- For the first time, more than one in every 100 U.S. adults is now confined in a jail or prison.<sup>1in100</sup> Developing strategies to stop this huge injustice must include *optimal nutrition* to include essential oils, minerals, and vitamins, while reducing neurotoxins. Nutrition has been repeatedly implicated in aggression<sup>AO,WO</sup>, alcoholism<sup>NA</sup>, mental illness,<sup>MI</sup> and other causes of incarceration. Neurotoxins in pesticides also influence poor behavior.<sup>PBP</sup>
- Growing food can transform lives, empowering prisoners, former offenders and at-risk youth<sup>CP</sup> Crime rates can go down nearly half in areas with community gardens.<sup>GCR</sup>

### Supporting small sustainable farmers

- The decades of "get big or get out" policies have doomed most small producers, and the pro-corporate philosophy dominates our food/ag policies and practices in hundreds of ways. Issues like destructive monocultures, healthier food, food miles, and soil carbon will not truly be dealt with until we effectively repopulate our farmlands with alternative farmers who can survive, including sustainable, polyculture,<sup>MF</sup> CSA's, etc. The aging farmer/rancher population must be solved!

### Actions include:

- Shift all agricultural/food policies and subsidies towards healthier foods- whole, nutrient-dense, uncontaminated, well-balanced foods available to all citizens, not just the wealthier.
- Redo nutrition education and the Food Pyramid to eliminate empty calories and heavily processed foods, qualify the difference between fats that heal and fats that are harmful,<sup>FH</sup> and more prominence to fresh vegetables and fruits.
- Redesign school lunch, WIC, and other food programs to provide far more nutritious meals that come from farms with rich soils and no toxins, and have few food miles.
- Initiate a major program to use optimal nutrition and organic food-growing gardens to both prevent and treat anti-social or other negative behavior, in schools, at-risk programs, treatment centers, therapeutic program, prisons, institutions, etc.
- Restructure farm policies to actively support the small farmers and develop training programs for switching to organic methods that build soils effectively. Different models exist. Give strong support to farmers markets. End "food deserts" where only unhealthy food is available.<sup>PG</sup>
- Give far more support to young farmers. Fund training at numerous levels- high school, college. To meet modern needs, education needs to be for sustainable methods. Set up mentoring with experienced organic farmers, help them get land, etc.
- Protect conscientious farmers from contamination from GMO's and ag chemicals.

## Footnotes for Creating Economic and Food Justice through Agricultural Policy

1in6- Children with Disability- [http://www.ecoliteracy.org/publications/rsi/alan\\_greene.html](http://www.ecoliteracy.org/publications/rsi/alan_greene.html)

1in100- in jail now in U.S.-<http://www.pewcenteronthestates.org/uploadedFiles/One%20in%20100.pdf>

AO- Aggression and Oils- Hibbeln JR, Nieminen LR, Lands WE. Increasing homicide rates and linoleic acid consumption among five Western countries, 1961-2000. *Lipids*. 39(12):1207-1213 and Hibbeln JR, Bissette G, Umhau JC, Georgo DT. Omega-3 status and cerebrospinal fluid corticotrophin releasing hormone in perpetrators of domestic violence. *Biol Psychiatry*. 56(11):895-897

BD- Brain Damage- [http://www.panna.org/docsTrespass/ChemTresExSumEng\(screen\).pdf](http://www.panna.org/docsTrespass/ChemTresExSumEng(screen).pdf)

BSB- Better School Behavior- [http://www.michaelfieldsagainst.org/programs/food/case\\_study.pdf](http://www.michaelfieldsagainst.org/programs/food/case_study.pdf)

BSF- <http://www.edibleschoolyard.org/homepage.html> and <http://www.school lunchinitiative.org/about/fag.shtml>

CP- Crime Prevention-<http://www.gardenproject.org/thegardenproject.htm> and <http://www.yesmagazine.org/article.asp?ID=381>

FH- Fats that Heal- *Fats that Heal, Fats that Kill*, Udo Erasmus. <http://www.udoerasmus.com/fatsmain.htm>

FS- Food Security- <http://www.nytimes.com/2008/10/01/dining/01genius.html>

GCR- Gardens reduce Crime Rates- <http://www.urbanohio.com/forum2/index.php?topic=11907.0> Crime rates in communities with urban gardens are reduced by up to 48 percent, with 56 percent less violent crime

JOB- <http://bss.sfsu.edu/urbanaction/ua2006/pdf/ua2006-Haletky%20&%20Taylor.pdf>

LB- Learning Better- <http://www.aasd.k12.wi.us/ACA/phys%20health.htm>

MF- Model Farms- <http://www.polyfacefarms.com/> Joel Salatin wrote an interesting book *Everything I Want to Do Is Illegal: War Stories from the Local Food Front* Comment: This farmer is quite popular. Many other valuable models exist, however.

MI- Mental Illness- numerous books show hope for mental illness by supplementation of nutrients and detoxing- *The Mood Cure* by Julia Ross, *Optimum Nutrition for the Mind*, Patrick Holford, *Nutrition and Mental Illness* by Carl Pfeiffer, and *Brain Allergies* by William Philpott

NA- Nutrients for Alcoholism- [http://www.healthrecovery.net/Seven\\_Weeks\\_To\\_Sobriety.html](http://www.healthrecovery.net/Seven_Weeks_To_Sobriety.html) and <http://www.niaaa.nih.gov/ResearchInformation/IntramuralResearch/AboutDICBR/LMBB/NN/>

PBP- Pesticide Behavior Problems- <http://www.organicconsumers.org/organic/wic-faq.pdf> Organophosphate pesticides (OP) are now found in the blood of 95% of Americans tested. OP levels are twice as high in blood samples taken from children than in adults and linked to hyperactivity, behavior disorders, learning disabilities, and more.

PG- People's Grocery- <http://www.peoplesgrocery.org/> Comment: This is a fine model to get healthy food into a city's "food desert" that needs to be replicated all over.

UA- Urban Agriculture- [http://www.macfound.org/site/c.lkLXJ8MQKrH/b.4537249/k.29CA/Will\\_Allen.htm](http://www.macfound.org/site/c.lkLXJ8MQKrH/b.4537249/k.29CA/Will_Allen.htm) Comment: Will Allen of Growing Power in Milwaukee, is the model for the future. He won the "Genius Award" and very rightly so. Watch the videos <http://www.growingpower.org/tours.htm>

WO- Wrong Oils- . [http://neurologicalillness.suite101.com/article.cfm/mental\\_illness\\_and\\_violence](http://neurologicalillness.suite101.com/article.cfm/mental_illness_and_violence) **It is extraordinarily difficult for a person in poverty to eat a healthy, natural diet. The poor tend to drink soda and eat junk food. Their diet is loaded in the unhealthy fats, sugars and salt--and poor in the healthy fats. They tend to live in cities where access to fresh vegetables and fruits is difficult. Some fats, known as essential fatty acids (EFA), are "essential" for a healthy brain. Without the EFAs the brain has a reduced ability to manage stress and tends toward primitive behaviors which are violent and addictive.** Research by Dr. Hibbeln at the National Institutes of Health has shown that **people with violent behavior tend to have low levels of essential fatty acids in their bodies.** (Note: When calculating costs of transitioning to healthier foods, variables such as crime rate, prison costs, costs of drug and alcohol rehab programs, costs of pharmaceutical drugs, costs of adverse drug reactions that are on the rise, and other variables must be put into the balance sheet. The potential upsides are tremendous. Dr. Hibblein's work should be an integral part of any planning process. )

Also some additives are an issue. Aspartame needs reevaluation-<http://www.amazon.com/Sweet-Deception-Splenda-NutraSweet-Hazardous/dp/0785221794> (Dr. Mercola)

## Moving towards Energy Independence with Low-Petroleum Food Systems

*Our current food systems have grown so exorbitantly dependent on fossil fuels that it often takes more calories to generate the food than the food itself contains. Reversing this trend will help our nation move towards energy independence while also protecting our food systems from growing global competition over dwindling oil supplies.*

### Reducing need for petroleum fertilizers, herbicides, and pesticides on farms

- World fertilizer prices surged 200% in 2007<sup>PF</sup>, fueled by new demand for biofuel grains, higher energy/freight prices, emerging foreign markets demand for grain-fed meat, and increased use of natural gas. As the cost of inputs increases, so does the price of food.
- The genetically-modified RoundupReady (RR) crops drove a more than 15-fold increase in the use of the herbicide glyphosate on major field crops from 1994 to 2005.<sup>HI</sup>
- Conventional economic analyses of pesticides often ignore critical elements that need to be included.<sup>EA</sup> Non-toxic, organic agriculture has multiple under-evaluated techniques and advantages.<sup>OW</sup>

### Supporting food not requiring energy-intensive manufacturing

- Manufacturing requires heavy energy usage, and food manufacturing accounted for 13 percent of the value from all U.S. manufacturing plants.<sup>SEF</sup> Automation decreases the number of jobs.<sup>AFJ</sup>
- Foods prepared with multiple ingredients, some foreign, are based on low-cost fuels for shipping
- Food manufacturing energy ranks third among input costs, behind raw materials and labor,<sup>EM</sup> and the amount of energy is expected to rise.<sup>ER</sup> Clearly less processed foods typically use less energy.

### Documenting accurate GHG emissions and oil dependency from food

- The range of GHG estimates from food systems varies greatly, yet it is clear that when the entire food system is included, along with all GHGs, the percentage is very high, *even up to a third of all emissions*.<sup>HGG</sup> Food systems must be an integral part of all climate change mitigation plans, as well as energy independence plans.

### Lowering food miles

- Food miles have increased markedly over the last decade because of the consolidation of multiple stages of processing. For example, a hamburger from a U.S. steer that never left the U.S. can require over 3,000 miles from birth to grocery store (not including back-hauling which adds many more miles)<sup>FMB</sup>, while U.S. wheat put into some packaged products like cookies can travel over 5,000 miles.<sup>FMW</sup>
- *Food manufacturing has the largest transportation demand of the major manufacturing sectors*, comprising more than 20 percent of manufacturing's shipping.<sup>EM</sup>
- Food miles have also increased because our imported foods from foreign countries now approximately equal our food exports. Adding food miles on labels has begun in other countries. The most secure food is grown close to where eaters live.<sup>LF</sup>

### Reducing amounts of packaging

- Vast amounts of food packaging have huge embodied energy including from mining/clear-cutting, manufacturing, long miles traveled, energy to process as waste, and landfill greenhouse gases.<sup>FP</sup>

#### Actions include:

- Begin major reductions in petroleum chemicals by altering farm subsidies, supporting conversion to organic, regenerative soil-building farming. Fund training and research for organic and soil building farming, sustainable urban agriculture, bio-char, local food systems, etc.
- Develop comprehensive local food systems, including urban agriculture, with ambitious goals. Define rules for nutrition assistance to support local, healthy, sustainable foods.
- Reduce energy usage by supporting healthy whole foods rather than making commodities so cheap that they are manufactured into endless unhealthy processed foods surrounded by layers of packaging.
- Evaluate food systems by climate change impacts and dependency on fossil fuels. Conduct accurate tracking from farm or ranch of all the ingredients for complete food miles, embodied energy, and GHG emissions. Use data to determine strategies to reduce direct and indirect energy usage/ emissions.
- Create packaging regulations that include reuse and recycling requirements to eliminate one-use packaging. Support the potential of local foods to reduce excessive packaging needs and allow for easy reuse of containers, plus use huge safe composting potential to grow more food.

## Footnotes for *Moving towards Energy Independence with Low Petroleum Food Systems*

AFJ- Automation Fewer Jobs- [http://www.trade.gov/td/ocg/report08\\_processedfoods.pdf](http://www.trade.gov/td/ocg/report08_processedfoods.pdf)

EA- Economic Analysis- <http://www.pan-uk.org/pestnews/issue/pn61/pn61p3.htm> Two important consequences of pesticide use which do not feature in conventional economic analysis of pesticides: the disruption or elimination of natural pest control by killing beneficial insects and birds, and the development of resistance among target pests.

EM- Energy for Manufacturing- <http://www.epa.gov/sectors/energy/index.html> page 3-31 "The (food) sector also has the largest transportation demand of the (manufacturing) sectors considered in this analysis, comprising more than 20 percent of the manufactured commodity shipping ton-miles recorded by DOT in 2002." And "Energy ranks third among input costs, behind raw materials and labor."

ER- Energy Requirements- <http://www.epa.gov/sectors/energy/index.html>

FMB- Food Miles Beef- [http://www.organicconsumers.org/fair\\_trade/beef.htm](http://www.organicconsumers.org/fair_trade/beef.htm) Beef can travel for 8 different steps in 8 different states. There are actually more than 3,000 miles because trucks carrying certain loads go back empty- called "backhauling." In this particular case, it is estimated that the miles are closer to 5,000 when the backhauling is added. Hauling live cattle is messy, plus refrigerated trucks hauling carcasses are not flexible for carrying a different type of load on the return trip.

FMW- Food Miles of Wheat- [http://www.organicconsumers.org/articles/article\\_711.cfm](http://www.organicconsumers.org/articles/article_711.cfm) The 5,000 miles is only for the one ingredient- wheat. When the other ingredients such as possibly sugar from Brazil are added, and then all the miles embodied in the product packaging, as well as the shipping packaging such as pallets. The miles for the total would be far greater. We need accurate analyzes to truly understand and quantify this important issue. Thousands of examples of the long distances among the various stages in modern food production exist.

FP- Food Packaging- Comment: We need "cradle to cradle" analysis. Evaluating food packaging impacts is very difficult because the waste systems separate categories by material- ie glass versus paper, not by function- food packaging. This is the same kind of mistake made when evaluating greenhouse gas emissions- it was not the function- total food systems- but ag, transportation, manufacturing, rather than all the sectors as part of food systems. When we work with totals for functions, then we can easily see how to reduce impacts across sectors. Farmer's markets can, for example, reduce waste to almost nothing by minimizing packaging, reusing packaging like egg cartons, and composting food wastes.

HGG- High Greenhouse Gases- <http://www.greenpeace.org/raw/content/international/press/reports/cool-farming-full-report.pdf> The total global contribution of agriculture, considering all direct and indirect emissions is between **17 and 32%** of all global human-induced GHG emissions, including land use changes p. 5. Comment: This is only for agriculture and does not include manufacturing, food miles, packaging, etc.

HI- Herbicide Increase- <http://organicconsumers.org/forum/index.php?s=c464dd737bdf8b2125caf96de44b8ff7&showtopic=1063&pid=8188&st=0&#entry8188>

LF- Local Food- Comment: With such volatility in petroleum prices, reducing travel of food increases food security and ensures greater stability of price when food miles are short. Also, with ocean piracy of oil tankers now, another risk is added. During World War II, England had to endure severe food rationing because ships carrying imported food were being sunk. We can do without new TV's from China, but we must always produce sufficient healthy food for our entire population.

OW- Organic Works- [http://attra.ncat.org/new\\_pubs/attra-pub/weed.html?id=lowa#weefree](http://attra.ncat.org/new_pubs/attra-pub/weed.html?id=lowa#weefree) A popular belief is that it is not possible to grow organically, yet it is being done successfully for all crops now. Each location and each crop needs to be analyzed to select the best methods for getting farmers to transition. One method that has worked is for the farmers more experienced in chemical-free farming to conduct open houses and to participate in mentoring farmers wanting to transition. This peer coaching is working well in numerous areas, but needs financial assistance as is being given in California. Comment: Chemical fertilizers can be replaced by sustainable non-chemical methods to increase soil fertility, including the use of green manures (growing crops to fertilize the soil), compost, crop rotations, polyculture with animals, companion planting, etc. Pesticides and herbicides can be replaced by multiple techniques, including improvements in soil (healthy soil creates healthy plants), inter-cropping, hedge rows, crop diversity, timing, rotations, beneficial insects, etc.

PF- Price Fertilizer- <http://news.mongabay.com/2008/0220-fertilizers.html>

PO- Peak Oil- a useful website: <http://www.energybulletin.net/>

SEF- Significant Energy for Food manufacturing- <http://www.ers.usda.gov/Briefing/FoodMarketingSystem/processing.htm>

## Reducing Health Care Costs with Ag/Food Policies

*Rising obesity, chronic illnesses, behavioral problems, and many more health issues have come about with the deterioration of our nation's farm soils, the increase of toxic chemicals, and the consumption of heavily processed foods. Prevention is far cheaper than years of treatment. Health care will never be affordable until we make major food and agricultural policy shifts.*

### Decreasing key nutrients in our foods depletes human health

- Chemically treated soils grow less nutritious food. Our agriculture practices are seriously depleting essential nutrients in today's foods, compared with food 50 years ago which impact health significantly. <sup>DN, FB</sup>
- Organically produced foods contain more health-promoting nutrients than conventional foods. <sup>ON</sup>
- Even mental illness, including violence, can be caused by depleted nutrients and toxic heavy metals. <sup>MI</sup>

### Rising rates of obesity and chronic diseases create enormous medical care costs

- 45% of the population has at least one chronic disease, and 2/3 of the increase in health care spending is from increased prevalence of chronic disease. <sup>CD</sup>
- Doubling of obesity from 1987 to today accounts for nearly 30% of the rise in health care spending, and the CDC estimates that 80% heart disease, type 2 diabetes, and 40 per cent of cancer could be prevented if Americans would eat better food, stop smoking, and exercise more. <sup>CD</sup>

### Rising percentages of processed (junk) foods

- The real cost of essential fresh fruits and vegetables ("specialty crops") rose nearly 40 percent in the past 20 years. Our ag policies have made the real costs of soda pop, sweets, and fats and oils, on the other hand, decline. Food manufacturers have created high fructose corn syrup and hydrogenated vegetable oils (products that did not even exist before) because the basic ingredients are artificially cheap from subsidies to a few commodity crops. <sup>OFP</sup> Processed, "junk" foods have the wrong oils that deteriorate health, <sup>WO</sup> very high sugar content, refined nutrient-depleted grains, and numerous unhealthy additives.
- A ban on fast food TV ads during children's programming would reduce the number of overweight children and adolescents by 14 to 18 percent. <sup>TV</sup>

### Rising health impacts from pesticides that are neurotoxic and hormone disrupting

- Increasing numbers of scientists are concluding that people need to avoid ALL pesticides because they are definitively linked to serious illness such as: reproductive problems, fetal defects, neurological damage and the most deadly cancers. <sup>AP</sup> Even Type 2 diabetes is found to be related to pesticide exposure. <sup>DP</sup>
- Pesticides found in 95% of Americans are linked to hyperactivity, behavior disorders, learning disabilities, and more. Pesticide levels are twice as high in blood samples taken from children than in adults. <sup>PBP</sup>
- Children eating conventional foods have six times higher levels of pesticides compared with children eating organic food. <sup>CC</sup> Chemicals are up to ten times more toxic to children than adults. <sup>CV</sup>
- Sewer sludge ("biosolids") dumped on non-organic farmlands contain dangerous brain-damaging heavy metals, pharmaceuticals, endocrine-disruptors, etc. - all threats to health. <sup>SS</sup>

### Rising GMO's in our foods likely creating health problems

- The health impacts from eating genetically-modified foods (GMOs) can be numerous. Allergies, mutations, and disturbances of the gut include only some of the health concerns. <sup>UG</sup> A recent Austrian study documented a decrease in fertility. <sup>UG</sup> Cancer was suspected with rGBH. <sup>RGB</sup>

### Increasing toxic plastics in our food packaging causing hormone and other disruption

- Certain plastics used in food and beverage packaging have been found to contribute to breast and testicular cancer, diabetes, hyperactivity, obesity, and reproductive problems. <sup>TP</sup>

### Actions include:

- Shift all agricultural/food policies and subsidies towards healthier foods- whole, nutrient-dense, uncontaminated, well-balanced foods available to all citizens, not just the wealthier.
- Stop supports for GMO's- give no subsidies, require labeling and compensation for contamination, and conduct industry-independent research.
- Fund support for farmers transitioning away from chemicals and towards organic methods.
- Realign educational objectives of land grant institutions and the extension service.
- Reduce exposure to endocrine-disruptors, including banning their use in food/drink containers.

## Footnotes for Reducing Costs of Health Care through Prevention

AP- Avoid Pesticides- <http://www.ahrp.org/infomail/04/05/08.php> Ontario College of Family Physicians found "The body of evidence is consistent and overwhelming, leading the authors to conclude that common pesticides are definitively linked to serious illness such as: reproductive problems, fetal defects, neurological damage and the most deadly cancers. The study also shows that children are particularly vulnerable to pesticides. The evidence led the authors to advise the public to avoid ALL pesticides."

CC- Conventional Contaminated- <http://www.ehponline.org/docs/2003/5754/abstract.html> In blood samples of children aged 2 to 4, concentrations of pesticide residues are six times higher in children eating conventionally farmed fruits and vegetables compared with those eating organic food. Consumption of organic produce appears to provide a relatively simple way for parents to reduce their children's exposure to OP pesticides.

CD- Chronic Disease- <http://fightchronicdisease.org/issues/documents/UnhealthyTruths.ppt#1397>

CV- Children Vulnerable- <http://www.nap.edu/openbook.php?isbn=0309048753> In blood samples of children aged 2 to 4, concentrations of pesticide residues are six times higher in children eating conventionally farmed fruits and vegetables compared with those eating organic food.<sup>9</sup> Chemicals are up to ten times more toxic to children than adults.

DN- Depleted Nutrients- <http://www.jacn.org/cgi/content/full/23/6/669> The levels of six of the 13 nutrients show statistically significant declines: protein, calcium, phosphorous, iron, riboflavin, and ascorbic acid. The average levels of decline across the 43 foods fell within the range of a 6% decline in protein to a 38% drop in riboflavin.

DP- Diabetes and Pesticides <http://aje.oxfordjournals.org/cgi/content/full/167/10/1235?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=diabetes+pesticide&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT>

HB- Healthier Before <http://www.emeraldinsight.com/Insight/viewContentItem.do;jsessionid=C1652CF40CD1375CF2EDA7C965D.A0B98?contentType=Article&contentId=870383> There are statistically significant reductions in the mineral levels of Ca, Mg, Cu and Na in vegetables and Mg, Fe, Cu and K in fruit "Historical Changes in the Mineral Content of Fruits and Vegetables." Anne-Marie Mayer. British Food Journal, Volume 99, Number 6, 1997.

MI- Mental Illness- numerous books show hope for mental illness by supplementation of nutrients and detoxing- *The Mood Cure* by Julia Ross, *Optimum Nutrition for the Mind*, Patrick Holford, *Nutrition and Mental Illness* by Carl Pfeiffer, and *Brain Allergies* by William Philpott

OPF- Obesity & Farm Policy- <http://www.iatp.org/iatp/factsheets.cfm?accountID=258&refID=89968> *Food without Thought- How U.S. Farm Policy Contributes to Obesity*

ON- organic nutritious- <http://www.ift.org/cms/?pid=1001060> and <http://rs6.net/tn.jsp?t=msjio9aab.0.ibtqo9aab.obx6zyn6.570&p=http%3A%2F%2Fwww.soilassociation.org%2Fweb%2Fsa%2Fsaweb.nsf%2F848d689047cb466780256a6b00298980%2Fb1ab478889d5122180256f7d0041ec34%21OpenDocument> Found organic tomatoes had higher levels of secondary plant metabolites and higher levels of vitamin C, organic broccoli has significantly higher levels of the beneficial flavonoids. Organic milk has higher levels of Vitamin E, antioxidants and Omega 3 essential fatty acids.

PBP- Pesticide Behavior Problems- <http://www.organicconsumers.org/organic/wic-faq.pdf> Organophosphate pesticides (OP) are now found in the blood of 95% of Americans tested. OP levels are twice as high in blood samples taken from children than in adults and linked to hyperactivity, behavior disorders, learning disabilities, and more.

RGB- [http://www.preventcancer.com/press/conference/jan23\\_96.htm](http://www.preventcancer.com/press/conference/jan23_96.htm) The Cancer Prevention Coalition and Food & Water, released a new study today which concludes that milk from cows injected with recombinant Bovine Growth Hormone (rBGH) increases risks of breast and colon cancers in humans. and [http://foodconsumer.org/7777/8888/T\\_echnologies\\_40/111407472008\\_Study\\_Genetically\\_Modified\\_GM\\_Crops\\_Threaten\\_Human\\_Fertility\\_and\\_Health\\_Safety.shtml](http://foodconsumer.org/7777/8888/T_echnologies_40/111407472008_Study_Genetically_Modified_GM_Crops_Threaten_Human_Fertility_and_Health_Safety.shtml)

SS- sewer sludge- <http://sludgenews.org/resources/> Many studies show dangerous pharmaceuticals, brain-damaging heavy metals, endocrine-disruptors and other health threats are in the sewer sludge (biosolids) legally put on farm lands.

TP- Toxic Plastics- <http://www.endocrinedisruption.com/> <http://articles.mercola.com/sites/articles/archive/2008/11/22/fda-slammed-for-calling-bpa-safe.aspx> <http://www.physorg.com/news127749044.html>

TV- TV Ads- <http://www.marketwatch.com/news/story/Researchers-Ban-Fast-Food-TV/story.aspx?guid=%7BE828ED82-0770-46FB-A4B2-CC38067CC172%7D> The authors found that a ban on fast food television advertisements during children's programming would reduce the number of overweight children ages 3-11 by 18 percent, (adolescents 14%) Sweden, Norway and Finland have banned commercial sponsorship of children's programs. The study also found that the elimination of tax deductibility tied to advertising would similarly produce declines.

UG- Unhealthy GMOs- . <http://www.geneticroulette.com/> Sixty-five health risks of the foods that Americans eat every day are presented in easy-to-read two-page spreads. An internationally acclaimed text on GMO's. A must-read. And [http://foodconsumer.org/7777/8888/T\\_echnologies\\_40/111407472008\\_Study\\_Genetically\\_Modified\\_GM\\_Crops\\_Threaten\\_Human\\_Fertility\\_and\\_Health\\_Safety.shtml](http://foodconsumer.org/7777/8888/T_echnologies_40/111407472008_Study_Genetically_Modified_GM_Crops_Threaten_Human_Fertility_and_Health_Safety.shtml)

WO- Wrong Oils- . [http://neurologicalillness.suite101.com/article.cfm/mental\\_illness\\_and\\_violence](http://neurologicalillness.suite101.com/article.cfm/mental_illness_and_violence) **It is extraordinarily difficult for a person in poverty to eat a healthy, natural diet. The poor tend to drink soda and eat junk food. Their diet is loaded in the unhealthy fats, sugars and salt--and poor in the healthy fats. They tend to live in cities where access to fresh vegetables and fruits is difficult. Some fats, known as essential fatty acids (EFA), are "essential" for a healthy brain. Without the EFAs the brain has a reduced ability to manage stress and tends toward primitive behaviors which are violent and addictive.** Research by Dr. Hibbeln at the National Institutes of Health has shown that **people with violent behavior tend to have low levels of essential fatty acids in their bodies.** (Note: When calculating costs of transitioning to healthier foods, variables such as crime rate, prison costs, costs of drug and alcohol rehab programs, costs of pharmaceutical drugs, costs of adverse drug reactions that are on the rise, and other variables must be put into the balance sheet. The potential upsides are tremendous. Dr. Hibbeln's work should be an integral part of any planning process. )

And additives- aspartame needs reevaluation-<http://www.amazon.com/Sweet-Deception-Splenda-NutraSweet-Hazardous/dp/0785221794> (Dr. Mercola)

Read: **Fatal Harvest: The Tragedy of Industrial Agriculture**, Andrew Kimbell, ed., Island Press, 2002.

**Fats that Heal, Fats that Kill**, Udo Erasmus. <http://www.udoerasmus.com/fatsmain.htm>

## Reducing Greenhouse Gas Emissions and Adapting Food to a Changing Climate

*The most unrecognized and untapped solutions to climate change lie within our agricultural and food policies. In addition to potential significant GHG emissions reductions, nearly 1.6 billion tons of CO<sub>2</sub> could be sequestered in our agriculture soils per year, mitigating close to one quarter of U.S. total fossil fuel emissions.*<sup>OF</sup>

### Utilizing agriculture to sequester atmospheric carbon into soils

- Renowned NASA scientist James Hansen's latest research reveals we need to have a *maximum of 350 ppm CO<sub>2</sub>* in the atmosphere.<sup>350</sup> We are *already at 382 ppm CO<sub>2</sub>* which means *we will have to remove carbon from the atmosphere by sequestration. The most responsible way to sequester carbon is to get it back into our soils!*
- Conventional no-till farming is petroleum-dependent and toxic. Now new research shows that *carbon is sequestered 2 to 4 times more in organic and organic no-till.*<sup>NT</sup>
- *Up to 2,000 lbs/ acre of carbon can be sequestered with organic farming, the equivalent of taking 1 car off the road for every 2 acres under organic regenerative management.*<sup>OF</sup>
- An ancient method called *bio-char has huge potential to reduce GHG emissions, increase the sequestration of greenhouse gases, improve soil fertility and increase crop production.*<sup>BC</sup>

### Reducing Greenhouse Gases (GHG) from farming

- Nitrous oxide has 310 times more GHG potential than CO<sub>2</sub>.<sup>NO</sup> Adding nitrogen fertilizer releases significant nitrous oxide- *67% of all human related sources.*<sup>NO</sup> Also the nitrogen fertilizer industry is an energy-intensive industry.<sup>NF</sup>
- Nitrogen fertilizers moreover make GHG worse because they release soil carbon into the atmosphere.<sup>ND</sup> *Nitrogen fertilizer is a major GHG problem.*
- Irrigation systems typically use extensive amounts of power to pump water.<sup>H<sub>2</sub>O</sup> Organic soils hold water better and produce higher yields during droughts.
- Using cover crops/compost versus chemical fertilizer can *reduce fossil fuel use by 33% or more.*<sup>OF</sup>

### Reducing greenhouse gases from our entire food systems

- Food systems emissions are not merely from the agriculture sector, but also include significant portions of transportation, energy used in food processing and in buildings, deforestation, packaging, waste disposal, etc. Estimates vary, but they are very significant, even one third of all emissions.<sup>HGG</sup>
- *Processed U.S. foods can travel over 5,000 miles.*<sup>FM</sup> *Food miles must be greatly reduced.*

### Accelerating solutions because of the seriousness and urgency of climate change

- Climate change is happening faster than predicted in 2007<sup>SF</sup> and can happen quickly.<sup>ACC</sup>
- Researchers around the world are predicting significant decreases in food production from climate change, threatening hundreds of millions of people.<sup>TF</sup>
- Atmospheric carbon dioxide is making oceans so acidic, pushing to the verge of threatening life in the sea, with serious global food implications.<sup>AO</sup>

### Protecting critical genetic resources essential for climate change adaptation

- Changing climate will necessitate shifting varieties and species to adapt to multiple changes.
- Genetic erosion, large-scale monocultures, and genetic contamination pose serious threats to our food supply.<sup>GT</sup>
- Heritage breeds and seeds are the only real offer of genetic security and must be preserved and uncontaminated.

### Actions include:

- Create the paradigm shift to recognize the huge advantages of both mitigation and adaptation to climate change through agricultural/food systems. Convert to organic, regenerative soil-building farming. Fund training and research for organic and soil building farming, sustainable urban ag, bio-char, local food systems, etc.
- Develop comprehensive local food systems, including urban agriculture, with ambitious goals. Define nutrition assistance to support local, healthy, sustainable foods.
- Move urgently to resilient agriculture and food systems that are both sustainable and adaptive to the changing conditions of climate change and Peak Oil.
- Protect biodiversity, including seed banks and heritage breeds. Stop contamination by GMO's.

## Footnotes for Reducing Greenhouse Gas Emissions

350- 350 parts per million CO<sub>2</sub>- <http://dotearth.blogs.nytimes.com/2008/03/19/back-to-1988-on-co2-says-nasas-hansen/?hp>  
 AO- Acid oceans- [http://www.oceana.org/fileadmin/oceana/uploads/Climate\\_Change/Acid\\_Test\\_Report/Acidification\\_Report.pdf](http://www.oceana.org/fileadmin/oceana/uploads/Climate_Change/Acid_Test_Report/Acidification_Report.pdf) and Marine biologist Nancy Knowlton said, "This is typical of so many climate studies—almost without exception things are turning out to be worse than we originally thought AND The increase in acidity we saw during our study was about the same magnitude as we expect over the course of the next century <http://blogs.discovermagazine.com/80beats/2008/11/25/ocean-acidification-worse-than-the-big-problem-we-thought-it-was/>

ACC- Abrupt Climate Change- Abrupt Climate Change: Inevitable Surprises, National Research Council (U.S.). Committee on Abrupt Climate Change, National Academies Press, 2002 Conclusion: **Major and widespread climate change has occurred with startling speed- sometimes within 10 years.** [http://books.google.com/books?id=JR\\_nvkhOJnYC&pg=PA1&ie=ISO-8859-1&output=html&source=qbs\\_toc\\_r&cad=0\\_0](http://books.google.com/books?id=JR_nvkhOJnYC&pg=PA1&ie=ISO-8859-1&output=html&source=qbs_toc_r&cad=0_0)

BC- Bio-Char- Sequestration in Terrestrial Ecosystems- a Review "Apart from positive effects in both reducing emissions and increasing the sequestration of greenhouse gases, the production of bio-char and its application to soil will deliver immediate benefits through improved soil fertility and increased crop production." <http://www.css.cornell.edu/faculty/lehmann/publ/MitAdaptStratGlobChange%2011,%20403-427,%20Lehmann,%202006.pdf>

FM- Food Miles- One example shows over 5,000 miles within the U.S. borders- [http://www.organicconsumers.org/2006/article\\_711.cfm](http://www.organicconsumers.org/2006/article_711.cfm)

GL-Genetic Loss- Farm animal biodiversity "Of the more than 7,600 breeds in FAO's Global Databank for Farm Animal Genetic Resources, 190 have become extinct in the past 15 years and a further 1,500 are considered "at risk" of extinction. Dryland breeds are under threat." <http://www.fao.org/Aq/magazine/0609sp1.htm>

GT- Genetic Threats- *The Last Harvest: The Genetic Gamble That Threatens to Destroy American Agriculture* Paul Raeburn U of Nebraska Press, 1996 **A very important book to read!**

H2O- Water and energy use- In California, the **State Water Project is the largest consumer of electrical energy** in the state. I-14 <http://www.itrc.org/reports/energyreq/energyreq.pdf>

HGG- High Greenhouse Gases- <http://www.greenpeace.org/raw/content/international/press/reports/cool-farming-full-report.pdf> The total global contribution of agriculture, considering all direct and indirect emissions is between **17 and 32%** of all global human-induced GHG emissions, including land use changes p. 5. Comment: This is only for agriculture, not food systems, and does not include manufacturing, food miles, packaging, etc.

ND- Nitrogen Depletion- **Study Reveals that Nitrogen Fertilizers Deplete Soil Organic Carbon we found consistent evidence of an organic carbon decline for fertilized soils throughout the world and including much of the Corn Belt besides Illinois.** <http://www.aces.uiuc.edu/news/internal/preview.cfm?NID=4185&CFID=1627523&CFTOKEN=53360267> and <http://jeq.scijournal.org/cgi/content/abstract/36/6/1821>

NF- Nitrogen Fertilizer - <http://www.fertilizer.org/ifa/layout/set/print/Home-Page/SUSTAINABILITY/Climate-change/Greenhouse-gas-emissions-and-fertilizer-production.html>

NO- Nitrous Oxide- <http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissionsUSEmissionsInventory2005.html>

NT- No-till- can be organic <http://newfarm.rodaleinstitute.org/depts/notill/index.shtml> AND <http://www.beyondpesticides.org/infoservices/pesticidesandyou/Spring%202007/hepperly.pdf>

OF- Organic Farming- [http://www.rodaleinstitute.org/files/Rodale\\_Research\\_Paper-07\\_30\\_08.pdf](http://www.rodaleinstitute.org/files/Rodale_Research_Paper-07_30_08.pdf) **A must-read paper!**

SF- Sooner, Faster- <http://int3rnalbeta.cnn.com/2008/TECH/science/10/20/wwf.climate.report/index.html> AND Arctic Climate Impact Science — an update since ACIA <http://www.worldwildlife.org/climate/WWFBinaryitem8706.pdf>

TF- Threat to Food- [http://www.sciencemag.org/cgi/search?fulltext=Battisti&issue=5911&journal\\_search\\_keyword\\_go.x=16&journal\\_search\\_keyword\\_go.y=7](http://www.sciencemag.org/cgi/search?fulltext=Battisti&issue=5911&journal_search_keyword_go.x=16&journal_search_keyword_go.y=7)



### CONTACTS:

**Paul Hepperly** (610) 683-8548 [paul.hepperly@rodaleinst.org](mailto:paul.hepperly@rodaleinst.org) for critical organic research on carbon sequestration and drought tolerance, etc.  
 For preservation of important hot weather foods- <http://www.nativeseeds.org/>

For updates on climate change- sign up for newsletter-

[www.ClimateToday.org](http://www.ClimateToday.org)

For GMO information- [www.geneticroulette.com](http://www.geneticroulette.com)

The visual to the left is just one example of how many miles U.S. processed foods can travel.

## Increasing National Security through Strengthening Food Systems and Renewable Energy

*Pending international carbon taxes or trading will raise the price of petroleum-dependent food systems, while our nation's millions of acres of farm and rangeland offer untapped opportunities in renewable energy and carbon sequestration. The biggest longer-range issue, however, is the dire prediction of climate change's impacts on global food supplies. With the possibility of hundreds of millions of environmental refugees, to ensure our national security, it is time to build resiliency and sustainability in food systems around the world.*

### Reducing the impact of carbon taxes/carbon trading on our food systems

- Our new President will be entering international agreements on climate change that include either carbon trading or carbon taxes. When our food systems squander energy so extensively, there are great opportunities to make major contributions to GHG reduction while buffering our food costs from this new commitment. Goal 2 defines issues and actions which can apply internationally, as well.

### Using responsible guidelines for the development of biofuels

- Opinions, methods, and statistics on biofuels vary considerably,<sup>OB</sup> with many proposals threatening unacceptable risks. International controversy has occurred over the role of biofuels on rising food costs.<sup>FP</sup> Corn was a false start because insufficient analyzes were done. The next move must more thoroughly investigate effectiveness and risks such as ecological hazards and wasted resources. Five stringent biofuel *guidelines are needed* – 1. Set realistic expectations- use biofuels only as a backup to major reductions of liquid fuels uses (reduce miles, electric cars, etc); 2. Do real (not hyped) assessments of net energy;<sup>CF</sup> 3. Use no materials needed for the transition to organic and carbon-building for soils such as crop residues; 4. Avoid the risks of GMO's;<sup>RGM</sup> and 5. Do effective evaluations of impacts- on food supply, toxicity, and other environmental and health risks.

### Combining renewable energy with food production

- With over 800 million acres of U.S. farm and ranch lands,<sup>AFR</sup> the potential is great for adding renewable energy. Ranchers and farmers are benefiting from wind turbines on their lands.<sup>WF</sup> Rural areas can also benefit from contributing to solar energy development while not replacing food production.

### Developing resilience in global food systems to prevent future military conflicts

- *The* most difficult issue is the world's food supply, which even now is being threatened. Many studies from all over the globe have corroborated predictions of declines in food production from varied impacts of changing climate. The latest in Science was quite dire, even though it only considered one impact- rising temperatures.<sup>TA</sup> There are far more threats, including desertification<sup>DW</sup>, drying aquifers, loss of summer snow melt, extreme weather, rising seas, etc. Pentagon advisors have predicted wars and "large population movements" (refugees) over food.<sup>PR</sup> Others also predict hundreds of millions of environmental refugees from climate change, often from loss of food.<sup>CCR</sup> Even if our food production were secure, major declines in other nations is a serious national security issue.
- Current efforts to address increasing production in hungry countries must avoid the fatal flaws of unsustainable methods that depend on chemicals and GMO's, which are not resilient, a fundamental requirement under changing conditions.<sup>PA</sup> Alternatives exist! Urgency exists to begin now.

### Actions include:

- Create a new team<sup>TM</sup> of external and internal experts to develop an international sustainable agricultural plan to produce more resilient and diversified food production, including agroecology,<sup>AE</sup> biointensive<sup>BI</sup>, permaculture, and urban agriculture. Base the goals on inputs being local and sustainable, not from distant corporations<sup>BI</sup>; soils being resilient, including drought resistant<sup>DR</sup>; methods being safe such as life-giving natural fungi<sup>FG</sup> and adding biochar to soils to deal with desertification and carbon sequestration.<sup>BC</sup> Include irreplaceable seed stocks protection including not being contaminated.<sup>SSS</sup>
- Renegotiate NAFTA to provide "an alternative trade model that puts people and the environment first over the profits of global corporations."<sup>NAF</sup>
- Follow the 5 guidelines for biofuels evaluation.
- Work cooperatively to develop programs for greatly increasing renewable energy, including solar and wind.
- Support work to reduce petroleum dependency and GHG emissions in all agricultural and food policies.
- Make carbon sequestration through safe farming methods an international as well as national goal.

## Footnotes for *Increasing National Security through Strengthening Food Systems Combined with Renewables*

AFR- Acres Farm and Ranch Land- <http://www.ers.usda.gov/StateFacts/US.htm>

AE- Agroecology- <http://www.agroeco.org/> Comment: The international work of Miguel A. Altieri is vitally important.

BC- Bio-char- [http://www.unccd.int/publicinfo/poznanclimatetalks/docs/Submission\\_by\\_UNCCD\\_to\\_AWG-LCA\\_on\\_Biochar.pdf](http://www.unccd.int/publicinfo/poznanclimatetalks/docs/Submission_by_UNCCD_to_AWG-LCA_on_Biochar.pdf) and <http://www.sciencealert.com.au/features/20091901-18690.html>

BI- Biointensive farming- [http://www.organicconsumers.org/articles/article\\_3659.cfm](http://www.organicconsumers.org/articles/article_3659.cfm) and <http://www.growbiointensive.org/> Biointensive mini-farming techniques make it possible to grow food using 99 percent less energy in all forms - human and mechanical, 66 percent to 88 percent less water, and 50 percent to 100 percent less fertilizer, compared to commercial agriculture. They also produce two to six times more food and build the soil. Comments: John Jeavons has done great work worldwide.

CCR- Climate Change Refugees- [http://www.oxfordresearchgroup.org.uk/publications/briefing\\_papers/uncertainfuture.php](http://www.oxfordresearchgroup.org.uk/publications/briefing_papers/uncertainfuture.php) An Uncertain Future: Law Enforcement, National Security and Climate Change.

CES- Comparing Energy Solutions- [http://www.rsc.org/delivery/ArticleLinking/DisplayHTMLArticleforfree.cfm?JournalCode=EE&Year=2009&ManuscriptID=b809990c&Iss=Advance\\_Article](http://www.rsc.org/delivery/ArticleLinking/DisplayHTMLArticleforfree.cfm?JournalCode=EE&Year=2009&ManuscriptID=b809990c&Iss=Advance_Article)

CF- Comparing Energy sources- [http://www.rsc.org/delivery/ArticleLinking/DisplayHTMLArticleforfree.cfm?JournalCode=EE&Year=2009&ManuscriptID=b809990c&Iss=Advance\\_Article](http://www.rsc.org/delivery/ArticleLinking/DisplayHTMLArticleforfree.cfm?JournalCode=EE&Year=2009&ManuscriptID=b809990c&Iss=Advance_Article) Wind farms would occupy about 0.5 percent of all U.S. land, but this amount is more than **30 times less** than that required for growing corn or grasses for ethanol. The biofuel options provide no certain benefit and the greatest negative impacts.

DR- Drought Resistance - [http://www.newfarm.org/depts/NFfield\\_trials/1103/droughtresearch.shtml](http://www.newfarm.org/depts/NFfield_trials/1103/droughtresearch.shtml)

DW- Desertification Worsening- <http://www.unccd.int/meetings/global/hlpd/docs/HLPD-Report-2008.pdf> Drylands ... are home to more than 2 billion people. Today, over 250 million people are already directly affected by land degradation. Africa is particularly threatened because land degradation processes have spread to about 46 % of the continental area. Asia, on the other hand, is the worst hit in terms of the number of people afflicted by desertification and drought. The world's drylands not only make up 34 % of the global population, their soils contain over a quarter of all of the organic carbon stores in the world as well as nearly all the inorganic carbon. p.9.

FP- <http://www.guardian.co.uk/environment/2008/jul/03/biofuels.renewableenergy> Biofuels have forced global food prices up by 75% - far more than previously estimated - according to a confidential World Bank report.

FG- Fungi- <http://www.fungi.com/books/stamets.html> Read *Mycelium Running: How Mushrooms Can Help Save The World* by Paul Stamets. Comment: this work with fungi is extremely important for multiple reasons.

OB- Overestimating Biofuels- [http://www.iop.org/EJ/article/1748-9326/4/1/014004/erl9\\_1\\_014004.pdf?request-id=67b29836-1d01-4028-810b-f64f98493ef6](http://www.iop.org/EJ/article/1748-9326/4/1/014004/erl9_1_014004.pdf?request-id=67b29836-1d01-4028-810b-f64f98493ef6) "Global results show overestimates of biofuel yields by 100% or more for many crops."

NAF- NAFTA- <http://www.tradeobservatory.org/headlines.cfm?refid=104909>

PA- Problems of Agriculture- [http://www.cnr.berkeley.edu/~agroeco3/modern\\_agriculture.html](http://www.cnr.berkeley.edu/~agroeco3/modern_agriculture.html)

PR- Pentagon Report- <http://www.gbn.com/GBNDocumentDisplayServlet.srv?aid=26231&url=/UploadDocumentDisplayServlet.srv?id=28566> *An Abrupt Climate Change Scenario and Its Implications for United States National Security*, 2003. The report explores how such an abrupt climate change scenario could potentially de-stabilize the geo-political environment, leading to skirmishes, battles, and even war due to resource constraints such as: Food shortages due to decreases in net global agricultural production. p. 2.

RGM- Risks of Genetic Modification- Comment: The risks of GMO foods are very real, and if you talk with organic farming experts, we do not need GMO's for production. Here are a few references- The Future of Food <http://www.amazon.com/Future-Food-John-Chater/dp/B000V5IOWK> or <http://www.thefutureoffood.com/>; Genetic Roulette <http://www.geneticroulette.com/> or [http://www.chelseagreen.com/bookstore/item/genetic\\_roulette/](http://www.chelseagreen.com/bookstore/item/genetic_roulette/); for a talk available online- <http://video.google.com/videoplay?docid=210802296580005689>; Seeds of Deception- <http://www.amazon.com/Seeds-Deception-Government-Genetically-Engineered/dp/0972966587>; for one of the many farmers that are victims of GMO's- <http://www.percyschmeiser.com/>. The risks are potentially more dangerous with an organism so prevalent and so fundamental as algae. Some scientists feel it's not worth the risks, noting that even a non-GMO could become invasive because the quantities will be so great if this concept moves forward- <http://www.sciam.com/article.cfm?id=blue-green-acres>.

SSS- Save Seeds for Survival- <http://www.croptrust.org/main/> and for the Svalbard Seed vault- <http://www.croptrust.org/main/arctic.php?itemid=211> Comment: Organizations that are carefully preserving seeds that are tolerant of heat and drought need support- <http://www.nativeseeds.org/>.

TA- Threat to Agriculture- [http://seattletimes.nwsourc.com/html/localnews/2008606940\\_warming09m.html](http://seattletimes.nwsourc.com/html/localnews/2008606940_warming09m.html) and <http://www.sciencemag.org/cgi/content/full/sci:323/5911/183d?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=Battisti&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT> and [http://seattletimes.nwsourc.com/html/localnews/2008606940\\_warming09m.html](http://seattletimes.nwsourc.com/html/localnews/2008606940_warming09m.html) *Global warming will be a killer for agriculture*

TM- Team of Experts- Important people to include are- Miguel Altieri<sup>AE</sup>, Paul Stamets<sup>FG</sup>, John Jeavons<sup>BI</sup>, Paul Hepperly (of Rodale), Will Allen of Growing Power in Milwaukee. Also include several who understand climate change creating need to adapt.

WF- Wind Farms- <http://www.grist.org/comments/soapbox/2000/08/21/brown-something/>